केन्द्रीय विद्यालय संगठन

Kendriya Vidyalaya Sangathan

भूगोल

GEOGRAPHY

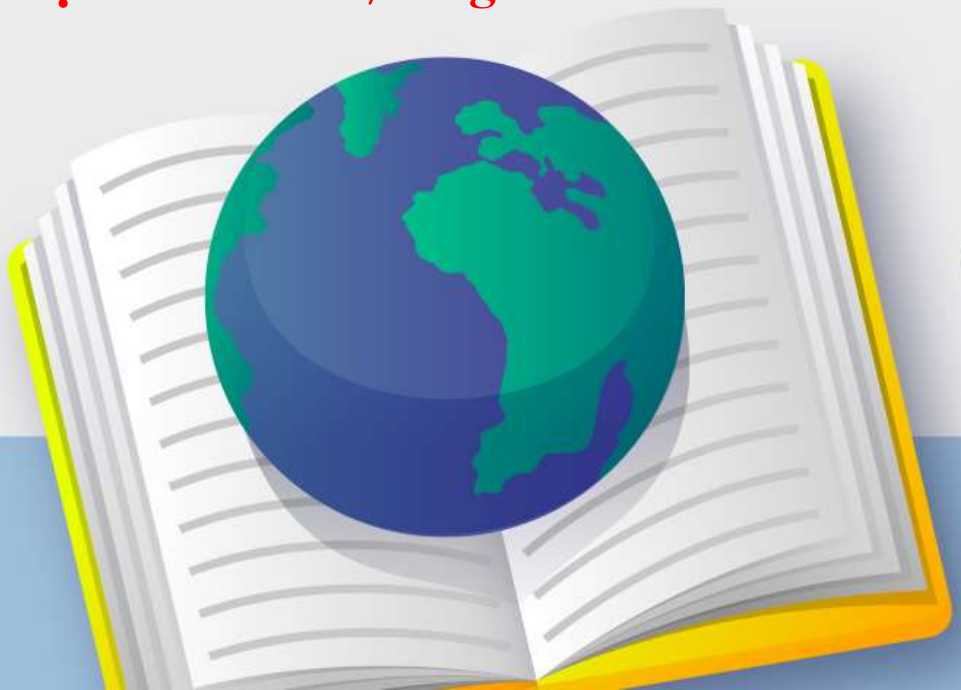
कक्षा/Class: XI

2024-25

विद्यार्थी सहायक सामग्री

Student Support Material

अंग्रेजी माध्यम /English Medium



संदेश

विद्यालयी शिक्षा में शैक्षिक उत्कृष्टता प्राप्त करना केन्द्रीय विद्यालय संगठन की सर्वोच्च वरीयता है। हमारे विद्यार्थी, शिक्षक एवं शैक्षिक नेतृत्व कर्ता निरंतर उन्नति हेतु प्रयासरत रहते हैं। राष्ट्रीय शिक्षा नीति 2020 के संदर्भ में योग्यता आधारित अधिगम एवं मूल्यांकन संबन्धित उद्देश्यों को प्राप्त करना तथा सीबीएसई के दिशा निर्देशों का पालन, वर्तमान में इस प्रयास को और भी चुनौतीपूर्ण बनाता है।

केन्द्रीय विद्यालय संगठन के पांचों **आंचलिक शिक्षा एवं प्रशिक्षण संस्थान** द्वारा संकलित यह 'विद्यार्थी सहायक सामग्री' इसी दिशा में एक आवश्यक कदम है । यह सहायक सामग्री कक्षा 9 से 12 के विद्यार्थियों के लिए सभी महत्वपूर्ण विषयों पर तैयार की गयी है । केन्द्रीय विद्यालय संगठन की 'विद्यार्थी सहायक सामग्री' अपनी गुणवत्ता एवं परीक्षा संबंधी सामग्री-संकलन की विशेषज्ञता के लिए जानी जाती है और अन्य शिक्षण संस्थान भी इसका उपयोग परीक्षा संबंधी पठन सामग्री की तरह करते रहे हैं । शुभ-आशा एवं विश्वास है कि यह सहायक सामग्री विद्यार्थियों की सहयोगी बनकर सतत मार्गदर्शन करते हुए उन्हें सफलता के लक्ष्य तक पहुंचाएगी ।

शुभाकांक्षा सहित ।

निधि पांडे
आयुक्त, केन्द्रीय विद्यालय संगठन

SUBJECT CONVENER

SH. AKHILESH KUMAR CHOUDHARY
ASSOCIATE COURSE DIRECTOR
VICE PRINCIPAL, K.V NO. 4 GWALIOR

SH. SUBHASH PANCHONIA
RESOURCE PERSON
PGT(GEO)
KV MHOW,
BHOPAL

SH. SATISH KUMAR SINGH
RESOURCE PERSON
PGT(GEO)
K V RAEBARELI **SHIFT – 2,**
LUCKNOW

EDITORIAL COMMITTEE
CO-ORDINATOR

SH. JOSEPH K.A., T.A./PGT (ECONOMICS), ZIET, GWALIOR

CLASS XII CONVENER

SR. NO.	NAME	DESIG.	KV	REGION
1	**MUKESH KUMAR**	PGT(Geo)	BHAKLI	GURUGRAM
2	**CHARAN SINGH**	PGT(Geo)	NO 4 JALANDHAR CANTT	CHANDIGARH
3	**SUBHASH CHANDRA SAMOTA**	PGT(Geo)	NO. 5 JAIPUR SHIFT -II	JAIPUR

CLASS XI CONVENER

SR. NO.	NAME	DESIG.	K.V	REGION
1	**MUKTESHWAR SINGH**	PGT(Geo)	AFS TUGHLAKABAD SHIFT-1	DELHI
2	**ANWAR HUSSAIN**	PGT(Geo)	SHAHDARA	DELHI
3	**SUNIL KUMAR**	PGT(Geo)	14 GTC SUBATHU	GURUGRAM

MAP PREPERATION
XI & XII CONVENER

SR. NO.	NAME	DESIG.	K.V	REGION
1	**HIMANI MEHTA**	PGT(Geo)	KV NO.2 KHARAGPUR	KOLKATA
2	**HARISH KUMAR**	PGT(Geo)	PITAMPURA SHIFT-2, NEW DELHI	DELHI

COURSE CONTENT COMPILED BY:

SR. NO.	NAME	DEISIG.	K.V	REGION
1	**PRATAP SINGH SHEKHAWAT**	PGT(Geo)	NO.1 AFS BHUJ	AHMEDABAD
2	**MANOJ KUMAR ASERI**	PGT(Geo)	EME BARODA	AHMEDABAD
3	**KUMAR SHYAM SHAISHAV**	PGT(Geo)	BHU VARANASI FS	VARANASI
4	**RAMANUJ CHATURVEDI**	PGT(Geo)	CHITRAKOOT	VARANASI
5	**RAJA RAM**	PGT(Geo)	IIMC, JOKA,KOLKATA	KOLKATA
6	**RAJESH SINGH**	PGT(Geo)	KV BEG & CENTRE PUNE	Mumbai
7	**N P SINGH**	PGT(Geo)	ADRA	KOLKATA
8	**HEMLATA BHARTI**	PGT(Geo)	BLW VARANASI	VARANASI
9	**RAJ KUMAR**	PGT(Geo)	KV NO.2 OF, DEHU ROAD PUNE	Mumbai
10	**AJAY SHANKER UPADHYAY**	PGT(Geo)	KATIHAR	PATNA
11	**PREM CHAND KUMAR GUPTA**	PGT(Geo)	BARRACKPORE AFS KOLKATA	KOLKATA
12	**AVNI BHUSHAN**	PGT(Geo)	KV SAINIK VIHAR	DELHI
13	**BIPIN CHANDRA KANDWAL**	PGT(Geo)	AGCR COLONY DELHI	Delhi
14	**RAMPRAVESH YADAV**	PGT(Geo)	KESHAVPURAM SHIFT-2	Delhi

REVIEW TEAM

Conveners

S.No.	Name	Designation	K. V.	Region
1	Mr. RAJESHWAR SINGH	Principal	KV Sawai Madhopur	Jaipur
2	Mr. VIJAYENDRA NAGDA	Principal	KV Deogarh	Jaipur

Team Members

S.No.	Name	Designation	K. V.	Region
1	Mr. RAMANUJ CHATURVEDI	PGT(Geo)	KV Chitrakoot	Varanasi
2	Mr. RANJEET KUMAR RAI	PGT(Geo)	KV No.1, Chakeri, Kanpur	Lucknow
3	Mr.RAJESH PATHAK	PGT(Geo)	KV 1STC, Jabalpur(Shift 1)	Jabalpur
4	Mr.ANIL KUMAR MISHRA	PGT(Geo)	KV No.1 AFS Agra	Agra

Technical Expert

S.No.	Name	Designation	K. V.	Region
1	Mr. ALOK GUPTA	PGT(CS)	KV Etawah	Agra

INDEX

CBSE GEOGRAPHY SYLLABUS 2024-25

(Code No. 029) CLASS- XI

Table of Contents

BACKGROUND/ RATIONALE

Geography is introduced as an elective subject at the senior secondary stage. After ten years of general education, students branch out at the beginning of this stage and are exposed to the rigors of the discipline for the first time. Being an entry point for the higher education, students choose Geography for pursuing their academic interest and, therefore, need a broader and deeper understanding of the subject. For others, geographical knowledge is useful in daily lives because it is a valuable medium for the education of young people. Its contribution lies in the content, cognitive processes, skills and values that Geography promotes and thus helps the students explore, understand and evaluate the environmental and social dimensions of the world in a better manner.

Since Geography explores the relationship between people and their environment, it includes studies of physical and human environments and their interactions at different scales-local, state/region, nation and the world. The fundamental principles responsible for the varieties in the distributional pattern of physical and human features and phenomena over the earth's surface need to be understood properly. Application of these principles would be taken up through selected case studies from the world and India. Thus, the physical and human environment of India and study of some issues from a geographical point of view will be covered in greater detail. Students will be exposed to different methods used in geographical investigations.

LEARNING OBJECTIVES

The course in Geography will help learners to:

- Familiarize with key concepts, terminology and core principles of Geography.
- Describe locations and correlate with Geographical Perspectives.
- List/describe what students might see, hear, and smell at a place.
- List/describe ways a place is linked with other places.
- Compare conditions and connections in one place to another.
- Analyse/ describe how conditions in one place can affect nearby places.
- Identify regions as places that are similar or connected.
- Describe and interpret the spatial pattern features on a thematic map.
- Search for, recognize and understand the processes and patterns of the spatial arrangement of the natural features as well as human aspects and phenomena on the earth's surface.
- Understand and analyse the inter-relationship between physical and human environments and utilize such knowledge in reflecting on issues related to community.
- Apply geographical knowledge and methods of inquiry to emerging situations or problems at different levels-local, regional, national and global.
- Develop geographical skills, relating to collection, processing and analysis of spatial data/ information and preparation of report including maps and graphs and use of computers where ever possible; and to be sensitive to issues.
- The child will develop the competency to analyse, evaluate, interpret and apply the acquired knowledge to determine the environmental issues effectively.

Class XI

Prescribed Books:

1. Fundamentals of Physical Geography, Class XI, Published by NCERT
2. India, Physical Environment, Class XI, Published by NCERT
3. Practical Work in Geography Part I, Class XI, Published by NCERT

Links for Rationalised 2024-25 NCERT Social Science textbooks:

1. https://ncert.nic.in/textbook.php?kegy2=0-14
2. https://ncert.nic.in/textbook.php?kegy1=0-6
3. https://ncert.nic.in/textbook.php?kegy3=0-6

Note:

1. The above textbooks are also available in Hindi medium.

Kindly refer to the latest editions of all NCERT Textbooks

CLASS XI COURSE STRUCTURE

Book- Fundamentals of Physical Geography

Chapter No.	Chapter name	Periods	Weightage
Unit- I Geography as a Discipline			
1	Geography As a Discipline	5	3
Unit II The Earth			
2	The Origin and Evolution of the Earth	6	9
3	Interior of the Earth	6	
4	Distribution of oceans and continents	5	
Unit- III Landforms			

5	Geomorphic Processes	9	6
6	Landform and their Evolution	9	
Unit-IV Climate			
7	Composition and Structure of Atmosphere	3	8
8	Solar Radiation, Heat balance and Temperature	7	
9	Atmospheric Circulations and Weather Systems	7	
10	Water in the Atmosphere	4	
11	World Climate and Climate Change (To be tested through internal assessments in the form of project and presentation)	5	
Unit-V Water (Oceans)			
12	Water (Oceans)	6	4
13	Movements of Ocean Water	8	
Unit VI Life on the Earth			
14	Biodiversity and Conservation (To be tested through internal assessments in the form of project and presentation)	4	–
	Map Work	5	5
Total		**89**	**35**

Book – India- Physical Environment

Chapter No.	Chapter Name	Periods	Weightage
Unit-I Introduction			
1	India- Location	5	5
Unit II Physiography			
2	Structure and Physiography	18	13
3	Drainage System	14	

Unit III Climate Vegetation and Soil			
4	Climate	16	12
5	Natural Vegetation	14	
Unit-IV Natural Hazards and Disasters: Causes Consequences and Management			
6	Natural Hazards and Disasters (To be tested through internal assessment in the form of Projects and presentation)	6	–
	Map	5	5
Total		**78**	**35**

Geography Practical Part I

Chapter No.	Chapter Name	Periods	Weightage
1	Introduction to Maps	6	3
2	Map Scale	6	4
3	Latitude Longitude and Time	8	4
4	Map Projections	10	4
5	Topographical Maps	10	4
6	Introduction to Remote Sensing	10	6
Practical file and Viva			5
Total		**50**	**30**

CLASS XI COURSE CONTENT

Fundamentals of Physical Geography

Chapter No. and Name	Specific Learning Objectives	Suggested Teaching Learning Process	Learning Outcomes

1 **Geography as a Discipline**	• To define and understand the scope and nature of Geography as a discipline.	Observe your surroundings and note down the variation in natural as well as cultural phenomena. Discuss with your partner: Geography is the study of "areal differentiation." **Project Work** **Topic: - Forest - as a natural resource.** • Prepare a map of India showing the distribution of different types of forests. • Write about the economic importance of forests for the country. • Prepare a historical account of conservation of forests in India with focus on Chipko movements in Rajasthan and Uttaranchal.	**At the completion of this unit students will be able to:** • Explain the meaning of geographyas an integrating discipline. • State the fields of geography and its relationship with other disciplines. • Explain the approaches to study geography.
2 **The Origin and Evolution of the Earth**	• To acquire knowledge about earth's origin through various theories. • To under stand variou	• Watch videos of theories (Big Bang etc.) in the classroom through projector. • Presentation and interaction about the origin of the earth by students.	**At the completion of this unit students will be able to:** • Describe the Big Bang, Planetesimal theory, Nebular Hypothesis related to the origin of the universe.

	s stages in theev olutio n of the earth.	• Students to explore more information related to the topic.	
3 **Interior of the Earth**	• To understand that the configuration of the surface of the earth is largely a product of the exogenic and endogenic processes operating in the interior of the earth	**Activity: Draw a well labelled diagram to show the interior of the earth.** • Draw a diagram of a volcano and mark the following parts: **a.** Magma Chamber **b.** Vent **c.** Central Pipe **d.** Lava flow • Draw a diagram to show the intrusive volcanic forms. • Case study of earthquakes that occurred in India and Turkey in recent times.	**At the completion of this unit students will be able to**: • Describe direct and indirect sources of information about the interior of the earth. • Discuss Earthquakes—its causes and effects, define: Epicentre, Hypocentre, Earthquake waves and its propagation, Shadow zones, Measuring the intensity of Earthquakes. • Explain the interior structure of the earth. • Explain Volcanoes, its types and volcanic landforms.

4 **Distribution of seas and oceans**	• To describe the theory of continental drift proposed by Alfred Wegner. • To understand the present configuration of continents and oceans through plate tectonics theory.	• On the outline world map mark and label the following: a. Major plate boundaries b. Ring of fire c. Hot spot Volcanoes • Draw diagrams to show different types of plate boundaries. • Case Study: https://www.downtoearth.org.in/news/natural-disasters/out-of-the-abyss-56977	**At the completion of this unit students will be able to:** • Provide evidence in support of continental drift and force for drifting. • Explain Post drift studies, Convectional current theory, Mapping of the ocean floor, Ocean floor configuration, Concept of sea floor spreading, • Describe theory of plate tectonics and different types of plate boundaries. • Trace the movements of Indian Plate.
5 **Geomorphic Processes**	• To understand various exogenic and endogenic processes responsible to bring changes in the configuration of the surface of the earth.	• Prepare a concept map to show different Exogenic and Endogenic Processes. • Students will prepare concept map on denudational processes. • Study types of weathering: Physical, Chemical, Biological and their importance for	**At the completion of this unit students will be able to:** • Differentiate between geomorphic processes and geomorphic agents. • Describe factors that affect soil formation. • Define the following terms: Exfoliation, Denudation, Weathering etc.

		human being. • Study types of mass movements and prepare a mind map.	
6 **Landforms and their Evolution**	• To understand the nature of different erosional and depositional agents and landforms made by them.	• Visit nearby landforms and draw sketches. • Draw neat and well labelled diagrams of landforms created by running water, wind, waves etc. • Watch videos of different landforms created by running water, underground water, glacier, wind, sea waves etc. • Find out the advantages and disadvantages of different landforms from the internet. • Prepare charts to show different landforms.	**At the completion of this unit students will be able to:** • Describe and draw various erosional and depositional landforms created by different agents. • Students will be able to compare and analyse various landforms. • Locate different landforms (mountains, plateaus, plains) on the outline map of the world.

7 **Composition and Structure of Atmosphere**	• To understand the composition and structure atmosphere.	• Watch a video on the importance of different layers of the atmosphere. • Write songs based on different seasons. • Draw a neat and well labelled diagram to show different layers of the atmosphere and write the importance of each layer.	**At the completion of this unit students will be able to:** • Describe the composition and characteristics of different layers of atmosphere. • Correlate climate change with Sustainable Development Goals13: Climate Action.
8 **Solar Radiation, Heat Balance and Temperature**	• To understand the heating and cooling of the atmosphere and the resultant temperature distribution over the surface of the earth.	• Students to learn about the three different modes of heat transfer—convection, conduction, radiation— with the help of an activity and how they are related to the Sun and life on our planet. • Draw a diagram to show the passage of solar radiation through the atmosphere.	**At the completion of this unit students will be able to:** • Differentiate between solar radiation and terrestrial radiation. • Give reasons for variability of insolation at the surface of the earth. • Explain the heat budget of the planet earth. • Describe factors controlling temperature distribution. • Explain inversion of temperature.

		• Study figure 9.4 and 9.5 and write the distribution of surface temperature in the month of January and July.	
9 **Atmospheric Circulation and Weather Systems**	• To understand the general atmospheric circulation and the forces that control the circulation. • To understand the meaning of various terms related to the topic. • To know the causes and consequences of air circulation.	• Students may read various theories and articles related to atmospheric circulation and weather system. • Students are advised to watch videos on movements of winds: • The students can be encouraged to prepare presentation on different topics in the chapter. • Examine the weather conditions necessary for the formation of cyclones, tornadoes, hurricanes etc.	**At the completion of this unit students will be able to:** • Describe the permanent pressure belts and the prevailing winds. • Explain different types of winds. • Differentiate between tropical and extra tropical cyclones. • Realize how global warming is result of atmospheric pollution and how it can be minimised if not prevented.
10 **Water in the Atmosphere**	• To understand continuous exchange of water between the atmosphere, the oceans and the continents through the processes of evaporation,	• Make a list of different forms of condensation and precipitation and define them. • Draw diagrams of different types of	**At the completion of this unit students will be able to:** • Explain the process of precipitation and its different forms.

	transpiration, condensation and precipitation.	rainfall. • On a world map mark and label areas of heavy, moderate, low and inadequate rainfall.	• Analyse the variation in the distribution of rainfall in the world.
11 **World Climate and Climate Change** **(To be tested through internal assessments in the form of project and presentation)**	• To define three broad approaches that have been adopted for classifying climate – Empirical Classification, Genetic Classification, and Applied Classification. • To Describe various types of climates and their groups/ subtypes. • To analyse Koeppen's Scheme of Classification of Climate • To explain climate change and related concepts. • To evaluate the climate changes in	• Classify climate based on various schemes by Koeppen with the help of a mind map. • Describes the causes and effects of global warming. • Evaluate the climate changes in the recent past.	**At the completion of this unit students will be able to:** • The topic can be presented in class through PPT or Project Work after conducting extensive and guided research by students.

	the recent past.		
12 **Water (Oceans)**	• To explain water cycle and summarize how an increase in demand for water leads to a water crisis. • To Illustrate major and minor ocean floor features. (mid- oceanic ridges, seamounts, submarine canyons, guyots, and atolls) • To describe horizontal and vertical distribution of oceanic temperature . • To evaluate the factors affecting the salinity of ocean waters.	• Draw a diagram to show major and minor features of ocean floor. • Study figure 13.5 and analyse the horizontal distribution of salinity in different oceans. • Locate and label the major seas on a political map of the world (As given in map list).	**At the completion of this unit students will be able to:** • Describe the basic processes involved in hydrological cycle with the help of a well labelled diagram. • Describe the relief features of the ocean floor. • Explain the process of heating and cooling of oceanic water and factors that affect temperature distribution in the ocean. • Describe the salinity of ocean waters.

13 **Movements of Ocean Water**	• To define and differentiate between tides and currents. • To describe the formation of sea waves. • To analyse the importance of tides. • To classify and describe major ocean currents and its effects.	• Mark and label the major warm and cold currents on an outline world map. (As per the given map list) • Draw a diagram of spring and neap tides.	**At the completion of this unit students will be able to:** • Explain tides, currents and waves. • Analyse the economic significance of tides. • Describe ocean currents and the forces that influence them. • Distinguish between cold and warm ocean currents.
14 **Biodiversity and Conservation**	• To explain the three major realms of the environment. • To explain the concept of ecology. • To analyse the features and types of aquatic ecosystems and biomes, with examples.	• Make a list of flora and fauna found in your surroundings and make a scrap book containing information and pictures of at least ten species.	**At the completion of this unit students will be able to:** • Describe the characteristic features of the biosphere. • Define ecology and related terms and explain the need for ecological balance. • Recognize the abiotic and biotic factors of the ecosystem. • Compare and contrast the features of five major biomes of the world – forest, grassland, desert, aquatic, and altitudinal.

India Physical Environment

Chapter No. and Name	Specific Learning Objectives	Suggested Teaching Learning Process	Learning Outcomes
1 **India- Location**	• **To understand the geographical location of India and its significance.**	• **On an outline map of India mark all the neighbouring countries and compare the size of India with its neighbours.** • **Make a list of all the states that share common boundary with our neighbouring countries.** • **Mark and label the land boundary and coastline on an outline map of India.** • **On a political map of India mark and label the states and UTs.**	**At the completion of this unit students will be able to:** • **Describe the location of India mentioning the surrounding water bodies.** • **Analyse the implications of living in a country with vast longitudinal and latitudinal extent and its impact on the standard time of India.** • **Explain the vastness of India and the diversity that comes along with it.**
2 **Structure and Physiography**	• **To understand the evolution of different geological structures in India.** • **To acquire**	• **Identify the physiographic and geological region you live in. Discuss the impact of**	**At the completion of this unit students will be able to:** • **Explain the evolution of various geological structures in different parts of the country.**

	knowledge about physiographic divisions and their subdivisions.	**physiography on the development of your region.** • **On an outline map of India mark and label the physiographic divisions of India.**	• **Describe major physiographic divisions and the processes of their formation.** • Locate the major physical features on the map of India
3 **Drainage System**	• To understand the drainage system and drainage patterns of Indian rivers. • To understand the extent of use ability of river water and the problems associated with it.	• Have a group discussion in your class about floods-their positive and negative impact. • Make a list of east flowing and west flowing rivers of Peninsular region.	**At the completion of this unit students will be able to:** • Understand the major drainage systems of India. • Analyse the causes of river water pollution. • Differentiate between Himalayan and Peninsular rivers.
4 **Climate**	• To understand Indian monsoon: and its mechanism. • To list the weather conditions that prevail during different seasons. • To analyse the variation in distribution of rainfall in India.	• Students to mark and label the hottest, coldest, driest and wettest places in India. (on a political map) • Students should be made to understand Air Quality Index. • (The Air Quality Index is a way for the government to alert people to the quality of the air and	**At the completion of this unit students will be able to:** • Discuss the factors affecting climate of the country and its effect on country's economic life. • Understand the annual cycle of four main seasons in India. • Able to realise the causes and problems of climate changes. • Able to understand the concept of Global Warming.

		how bad the air pollution is in an area or city. • Colours are used to indicate the air quality. • Green - the air is good. • Yellow - the air is moderate • Orange - the air is unhealthy for sensitive people like the elderly, children, and those with lung diseases. • Red – Unhealthy • Purple - Very unhealthy • Maroon – Hazardous)	
5 **Natural Vegetation**	• To understand the relationship between vegetation belts and the climate.	• Students would be able to enhance their communication skills by debating on positive and negative impact of human activities on forest cover and wildlife. • To mark all major types of forests on a map of India. • Class can be divided into groups to collect information about people's participation in the conservation of forests and	**At the completion of this topic the students will be able to:** • The students will be able to recognise the importance of forest cover in the country and its spatial distribution. • They will learn about number of species of plants and animals in India. • They will appreciate the efforts in conservation of forests and wildlife.

		wildlife.	
6 **Natural Hazards and Disasters** (To be tested through internal assessment in the form of Projects and presentation)	• To make students aware about natural hazards and disasters happening in various parts of the country, their impact and ways to mitigate the damage caused by them.	• Divide your class into groups and allocate one disaster to each group. • Every group should think of themselves as living in a disaster prone area of their allocated topic. • All groups would give a presentation on causes, impact and risk reduction of that disaster.	• Describe causes, effects and mitigation policy for various natural disasters. • Identify and locate regions prone to different disasters on the map. • • Understand the concept of disaster management.

Map Items for locating and labelling on outline political World Map Fundamentals of Physical Geography

Chapter No. and Name	Map Work
4 **Distribution of oceans and continents**	• Political Map of all Continents of the world. • Major Oceans of the world: Indian Ocean, Pacific Ocean, Atlantic Ocean, Arctic Ocean, Southern Ocean • Major lithospheric plates and Minor lithospheric plates, Ring of fire (Pacific Ocean), Mid-Atlantic Ridge.
9 **Atmospheric Circulations and Weather Systems**	**Major Hot Deserts of the world:** • Mojave Desert- Nevada, US • Patagonian Desert- Argentina • Sahara- Africa • Gobi Desert- Mongolia, Asia • Thar desert- India • Great Victoria desert- Australia
12 **Water(Oceans)**	• Major Seas • Black sea • Baltic sea • Caspian Sea • Mediterranean Sea • North Sea • Red sea • Bay of Fundy (Canada)-Famous for the highest tides in the world
13 **Movements of Ocean Water**	**OCEAN CURRENTS-Cold currents** • Humboldt c. • California c. • Falkland c. • Canaries c. • West Australian c. • Oyashio c. • Labrador c. **Warm currents** • Alaska c. • Brazilian c. • Aughlas c. • Kuroshio c. • Gulf stream c.

14 **Biodiversity and Conservation**	**Ecological hotspots** • Eastern Himalaya, India • Western ghats, India • Indonesia, Asia • Eastern Madagascar, Africa • Upper Guinean forests, Africa • Atlantic forest, Brazil • Tropical Andes

Map Items for locating and labelling on outline political map of India India Physical Environment

Chapter No and Name	Map Work
1 **India- Location**	• Latitudinal extent of India • Longitudinal extent of India • Standard Meridian of India • Important latitude passing through India (Tropic of Cancer) • Southern Most Point of mainland of India (Kanya Kumari)
2 **Structure and Physiography**	• **Mountains:** Karakoram Range, Garo- Khasi- Jaintia hills, Aravalli Range, Vindhyan Range, Satpura Range, Western ghats & Eastern ghats • **Peaks**: K2, Kanchenjunga, Nandadevi, Nanga Parvat, Namcha Barwa and Anaimudi • **Passes:** Shipkila, Nathula, Palghat, Bhor ghat and Thal ghat • **Plateaus**: Malwa, Chhotnagpur, Meghalaya and Deccan Plateau. • **Coastal Plains**: Saurashtra, Konkan, North and South Kanara, Malabar, Coromandel and Northern Circars • **Islands**: Andaman & Nicobar Islands and Lakshadweep Islands
3 **Drainage System**	• **Rivers**: Brahmaputra, Indus, Satluj, Ganga, Yamuna, Chambal, Damodar, Mahanadi, Krishna, Kaveri,Godavari, Narmada, Tapti and Luni • **Lakes:** (Identification)Wular, Sambhar, Chilika, Kolleru, Pulicat & Vembanad • **Straits, Bays , Gulfs**: Palk Strait, Rann of Kachch, Gulf of Kachch, Gulf of Mannar & Gulf of Khambat
4 **Climate**	• Area with highest temperature in India • Area with lowest temperature in India • Area with highest rainfall in India • Area with lowest rainfall in India

5 **Natural Vegetation**	(Identification on an outline map of India) Tropical evergreen, Tropical deciduous, Tropical thorn, Montane and Littoral/ Swamp forests. Wildlife reserves: (locating and labeling) • **National Parks**: Corbett, Kaziranga, Ranthambore. Shivpuri, Simlipal • **Bird Sanctuaries:** Keoladev Ghana and Ranganathitto • **Wild life Sanctuaries**: Periyar, Rajaji, Mudumalai, Dachigam,

Guidelines for Internal Assessment/ Geography Practical

1. A practical file must be prepared by students covering all the topics prescribed in the practical syllabus.
2. The file should be completely handwritten with a cover page, index page and acknowledgment.
3. All practical works should be drawn neatly with appropriate headings, scale, index etc. Data can be taken from the NCERT textbook.
4. The practical file will be assessed at the time of term end practical examinations.
5. A written exam of 25 marks will be conducted based on prescribed practical syllabus.
6. Viva will be conducted based on practical syllabus only.
7. Written Exam -25 Marks
8. Practical file- 03 Marks
9. Viva- 02 Marks

CBSE/ACADEMIC/JS(SG)/2024/ **3rd April, 2024**
Circular No. Acad-30/2024

All the Heads of Schools affiliated to CBSE

Subject: Assessment and Evaluation Practices of the Board for the Session 2024-25.

The Board in accordance with National Education Policy, 2020 has taken multiple steps towards implementation of Competency Based Education in schools, ranging from aligning assessment to competencies, development of exemplar resources for teachers and students as well as continuous capacity building of the teachers etc. The main emphasis of the Board was to create an educational ecosystem that would move away from rote memorization and towards learning that is focused on developing the creative, critical and systems thinking capacities of students to meet the challenges of the 21st century.

The Board has released guidelines vide Circular No. Acad- 05/2019 dated 18.01.2019; Circular No. Acad-11/2019 dated 06.03.2019; Circular No. Acad-18/2020 dated 16.03.2020; and Circular No. Acad-57/2022 dated 20.05.2022 to progressively align assessment to the vision of the NEP by including more *competency-based questions* in the Classes X and XII Board examinations.

Appropriately, the Board is continuing with aligning of the assessments and evaluation practices with NEP- 2020 for the academic session 2024-2025. Consequently, in the forthcoming session, the percentage of Competency Based Questions that assess application of concepts in real-life situations included in the question papers of the Board is given as under:

The changes for classes IX-XII year-end Board Examinations (2024-25)

(Classes IX-X)		
Particulars	**Academic Session 2023-24**	**Academic Session 2024-25** **(No change from previous academic session)**
Composition of question paper for year-end examination/ Board Examination (Theory)	• Competency Focused Questions in the form of MCQs/ Case Based Questions, Source-based Integrated Questions or any other type = 50% • Select response type questions (MCQ) = 20% • Constructed response questions (Short Answer/Long Answer Type Questions, as per existing pattern) = 30%	• Competency Focused Questions in the form of MCQs/Case Based Questions, Source-based Integrated Questions or any other type = 50% • Select response type questions (MCQ) = 20% • Constructed response questions (Short Answer/Long Answer Type Questions, as per existing pattern) = 30%
(Classes XI-XII)		
Particulars	**Academic Session 2023-24**	**Academic Session 2024-25**
Composition of question paper for year-end examination/ Board Examination (Theory)	• Competency Focused Questions in the form of MCQs/ Case Based Questions, Source-based Integrated Questions or any other type = 40% • Select response type questions (MCQ) = 20% • Constructed response questions (Short Answer Questions/Long Answer type Questions, as per existing pattern) = 40%	• Competency Focused Questions in the form of MCQs/ Case Based Questions, Source-based Integrated Questions or any other type = 50% • Select response type questions (MCQ) = 20% • Constructed response questions (Short Answer Questions/Long Answer type Questions, as per existing pattern) = 30%

Curriculum document released by the Board for the Academic Session 2024-25 and the Sample Question Papers may also be referred to for details of the QP design of individual subjects. Learning frameworks for various subjects for classes IX-XII are available at the linkhttps://cbseacademic.nic.in for reference.

(Dr. Joseph Emmanuel)

Director (Academics)

Copy to the respective Heads of Directorates, Organizations and Institutions as indicated below with a request to disseminate the information to all the schools under their jurisdiction:

1. The Commissioner, Kendriya Vidyalaya Sangathan, 18 Institutional Area, Shaheed JeetSingh Marg,New Delhi-16
2. The Commissioner, Navodaya Vidyalaya Samiti, B-15, Sector-62, Institutional Area,Noida-201309
3. The Secretary, Eklavya Model Residential Schools (EMRS), Ministry of Tribal Affairs,Government of India.
4. The Secretary, Sainik Schools Society, Room No. 101, D-1 Wing, Sena Bhawan, NewDelhi-110001.
5. The Chairman, Odisha Adarsha Vidyalaya Sangathan, N-1/9, Near Doordarshan Kendra, PO Sainik School Nayapalli, Bhubaneswar, Odhisha-751005.
6. The Director of Education, Directorate of Education, Govt. of NCT of Delhi, OldSecretariat, Delhi-110 054
7. The Director of Public Instructions (Schools), Union Territory Secretariat, Sector 9,Chandigarh-160017
8. The Director of Education, Govt. of Sikkim, Gangtok, Sikkim –737101
9. The Director of School Education, Govt. of Arunachal Pradesh, Itanagar –791 111
10. The Director of Education, Govt. of A&N Islands, Port Blair – 744101
11. The Director of Education, S.I.E., CBSE Cell, VIP Road, Junglee Ghat, P.O. 744103,A&N Island
12. The Director, Central Tibetan School Administration, ESSESS Plaza, CommunityCentre, Sector -3,Rohini, Delhi
13. The Additional Director General of Army Education, A –Wing, Sena Bhawan, DHQ, PO,New Delhi- 110001
14. The Secretary AWES, Integrated Headquarters of MoD (Army), FDRC Building No. 202,Shankar Vihar(Near APS), Delhi Cantt-110010
15. DS to Chairperson, CBSE
16. All Regional Directors/Regional Officers of CBSE with the request to send this circularto all the Heads of the affiliated schools of the Board in their respective regions
17. Secretary/Controller of Examinations/All Directors, CBSE
18. All Joint Secretary/ Deputy Secretary/ Assistant Secretary/PPS / Analyst, CBSE
19. All Head(s)/ In-Charge(s), Centre of Excellence, CBSE
20. In charge IT Unit with the request to put this Circular on the CBSE Academic Website
21. In-Charge, Library
22. The Head (Media & Public Relations), CBSE
23. Record File

Director (Academics)

KENDRIYA VIDYALAYA SANGATHAN,

CLASS XI GEOGRAPHY

BLUE PRINT– SESSION ENDING EXAM 2024

Part A (Book I): Fundamentals of Physical Geography							
Form of Questions		MCQ + Case based MCQ	Source based Question	S.A.	L.A.	Map Based / Map Que.	
	Name of Chapters	No. of questions Unit-wise					
	MARKS	1	3	3	5	5	Total Marks
1	Geography as a Discipline	-	-	3(1)	-	-	3 (1)
2	The Origin and Evolution of the Earth	1	-	-	-	-	1 (1)
3	Interior of the earth	3 (SBQ)	-	-	-	-	3(3)
4	Distribution of Oceans and Continents	-	-	--	1	-	5(1)
5	Geomorphic processes	1	-	-	-	-	1(1)
6	Land forms and their evolution	-	-	-	1	-	5(1)
7	Composition and Structure of Atmosphere	-	(SBQ) 3(1)	-	-	-	3(1)
8	Solar Radiation, Heat balance and Temperature	-	-	3(1)	-	-	3(1)

9	Atmospheric Circulation and Weather Systems	1	-	-	-	-	1(1)
10	Water in the Atmosphere	1	-	-	-	-	1(1)
11	Water (Oceans)	1	-	-	-	-	1(1)
12	Movement of Ocean Water	-	-	3(1)	-	-	3(1)
	Map Work					1	5 (1)
(A)	Sub- total	8(8)	3(1)	9(3)	10(2)	5(1)	35 (15)
	Part B (Book II): India: Physical Environment						
1	India-Location	2	-	3(1)	-	-	5 (3)
2	Structure and Physiography	1	-	-	1	-	6 (2)
3	Drainage System	2	-	-	1	-	7(3)
4	Climate	3	-	-	1	-	8(4)
5	Natural Vegetation	1	(SBQ) 3(1)	-	-	-	4(2)
	Map work	--	--	-	-	1	5 (1)
(B)	Sub - Total	9(9)	3(1)	3(1)	15(3)	5(1)	35 (15)
	TOTAL of (A) & (B)	17 (17)	6(2)	12 (4)	25 (5)	10 (2)	70 (30)

Easy = 20 % Average = 60 % Difficult = 20 %

FUNDAMENTALS OF PHYSICAL GEOGRAPHY

CHAPTER 1

GEOGRAPHY AS A DISCIPLINE

GIST OF THE LESSON:-

1. In very simple words, it can be said that Geography is the description of the earth.

2. The term geography was first coined by Eratosthenes, a Greek scholar (276-194 BC.).

3. Geography as a discipline is concerned with three sets of questions: WHAT, WHERE and

WHY?

4. Geography attempts SPATIAL synthesis and history attempts TEMPORAL synthesis.

5. The major approaches to study geography have been (i) Systematic and (ii) Regional.

6. The Systematic geography approach is the same as that of general geography. This approach was introduced by Alexander Von Humboldt, a German geographer (1769-1859).

7. In systematic approach, to study geography a phenomenon is studied world over as a whole, and then the identification of typologies or spatial patterns is done.

8. The Regional approach to study geography was developed by another German geographer, Karl Ritter (1779-1859).

9. In the regional approach, the world is divided into regions at different hierarchical levels and then all the geographical phenomena in a particular region are studied.

10. The word ‘dualism’ simply means the state of being divided (i.e. same subject exist in two different forms).

11. Dualism finally leads to ‘dichotomy’ which means the bifurcation of any subject into branches of knowledge.

12. Branches of Geography (based on Systematic approach)

A**. Physical Geography.**

a) Geomorphology

b) Climatology

c) Hydrology

d) Soil Geography

B. **Human Geography**

a) Social/Cultural Geography b) Population and settlement Geography

c) Economic Geography

d) Historical Geography

e) Political Geography

C. **Biogeography**

a) Plant Geography

b) Zoo Geography

c) Ecology/Ecosystem

d) Environmental Geography

13. Branches of Geography (based on Regional approach)

A. Regional Studies B. Regional Planning

C. Regional Development D. Regional Analysis

14. Pedogenesis: the process by which soil is formed

15. Definition by Richard Hartshorne: Geography is concerned with the description andexplanation of the areal differentiation of the earth's surface.

16. Definition by Hettner: Geography studies the differences of phenomena usually related with different parts of the earth's surface.

MULTILE TYPE QUESTIONS

Q.1 Which of the following geographer introduced systematic approach to study Geography: -

(A) Karl Ritter (B) Vidal-de-la-Blache,

(C) Friedrich Ratzel (D) Alexander Von Humboldt

Ans. (D) Alexander von Humboldt

Q.2 GIS stands for

(A) Geography Integrated System

(B) Geography Included Study

(C) Geographic Information System

(D) Geographic Inclusive Study

Ans: (C) Geographic Information System

Q.3 Which of the following is not correctly matched?

(A) Geomorphology - Study of landforms

(B) Cartography - Science of map making

(C) Economic Geography- Studies spatial dynamics

(D) Demography- Study of population

Ans. (C) Economic Geography- Studies Spatial dynamics.

Q.4 Assertion (A): Climate does not influence life of human beings.

Reason (R): Temperature and precipitation affects density of forests and quality of grassland.

(A) A and R are true and R is the correct explanation of A.

(B) A and R true but R is not the correct explanation of A.

(C) A is false but R is true.

(D) A is true but R is false.

Ans: (C) A is false but R is true.

Q.5 If a student is studying population distribution at the world level then he/she is following which approach to study geography?

(A) Systematic Approach (B) Regional Approach

(C) Quantitative Approach (D) Positive Approach

Ans. (A) Systematic approach.

Q.6. Which of the following statement is not true with respect to Regional Geography?

(A) This approach was given by Karl Ritter.

(B) In this approach the world is divided into regions at different hierarchical levels.

(C) This approach is the same as that of general geography.

(D) In this approach a region is studied in a holistic manner.

Ans: (C) This approach is the same as that of general geography.

Q.7 Geography studies the differences of phenomena usually related with different parts of the earth's surface. According to whom geography studies areal differentiation of the earth's surface?

(A) Vidal-de-la-Blache (B) Hettner

(C) Isaiah Bowman (D) Haggett

Ans: (D) Hettner.

SHORT ANSWER QUESTIONS

Q.1 Geography is an integrated discipline. Justify.

Ans. Geography, is a discipline of synthesis. It attempts spatial synthesis. That means that geography "as a subject studies all natural and human phenomena with reference to space.

(a) Geography recognizes that the world is a system of interdependencies.

(b) Geography as an integrating discipline has interface with numerous natural and social sciences.

(c) Geography attempts to comprehend the associations of phenomena as related in sections of reality in a holistic way.

Q.2 Highlight the importance of Physical Geography.

Ans. Physical Geography includes study of Lithosphere, Atmosphere, Hydrosphere and Biosphere. Each element is very important for human beings.

(a) The study of physical geography is emerging as a discipline of evaluating and managing natural resources. In order to achieve this objective, it is essential to understand the intricate relationship between physical environment and human beings.

(b) Physical environment provides resources, and human beings utilize these resources and ensure their economic and cultural development. For example, land provide base for agriculture, industries and settlements.

(c) Accelerated pace of resource utilization with the help of modern technology has created ecological imbalance in the world. Therefore, a better understanding of physical environment is essential in study of Geography.

Q.3With the help of technology relationship between physical environment and man has evolved through time. Explain

Ans. The geographical phenomena, both the physical and human, are not static but highly dynamic. They change over times as a result of the interactive processes between ever changing earth and untiring and ever-active human beings.

(a) Primitive human societies were directly dependent on their immediate environment. Human beings have come to terms with nature through adaptation and modification.

(b) Present societies have modified their natural environment by inventing and using technology and thus, have expanded the horizon of their operation by appropriate utilization of the resources provided by the nature.

(c) With the gradual development of technology, human beings were able to loosen the shackles of their physical environment. Technology helped in reducing the harshness of labour, increased, labour efficiency and provided leisure to human beings to attend to the higher needs of life.

Q.4 Differentiate between Systematic approach and Regional approach of study of geography.

Ans. Main differences between systematic and regional approach are summarized below:

Systematic Approach	Regional Approach

introduced by Alexander Von Humboldt, a German geographer.	Regional geography approach was developed by another German geographer and a contemporary of Humboldt, Karl Ritter
In the systematic approach, the world is divided phenomenon is studied world over as a whole, and then the identification of typologies or spatial patterns are done	In the regional approach, the world is divided into regions at different hierarchical level. All the geographical phenomena in a particular region are studied.
Systematic approach follows the theme.	Regional approach follows the area as a unit.

Q.5 How geography is concerned with other social sciences?

Explain with suitable examples.

Ans. One of the branches of Geography, Human Geography is closely linked with all the Social Science. History, Economics, Political Science, Sociology, Demography etc. in following way:

(1) History is linked with Geography as the subject areas of both the subjects are connected with space and time.

(2) The core concern of Political Science is territory, people and sovereignty while Political Geography is also interested in the study of the state as a spatial unit.

(3) Economics deals with basic attributes of economy which has spatial aspects and hence connected with economic geography.

With above examples it can be clearly established that geography has strong interface with natural and social sciences.

LONG ANSWER QUESTION

Q.1 "Physical Geography is closer to natural sciences." Comment.

Ans: Yes, this is true that physical geography is closer to natural sciences as it shares its content with Physics, Biology, Chemistry, Botany, Mathematics etc. For example:

(a) Geographers use knowledge of Mathematics for various calculations and data interpretation in practical geography like mean, median, mode etc.

(b) The cartography and quantitative techniques require proficiency in Mathematics for accurate calculations and results.

(c) To understand basic physical laws of climate knowledge of Physics is needed. The study of solar system and formation of universe is also included in Geography.

(d) Geomorphology derives its base from Geology.

(e) Bio Geography as much in common with Botany, Zoology etc.

Q.2 Discuss the scope of geography in detail.

Ans. Geography is regarded as mother of all sciences.

(a) Humans in their early stages of civilized life had to interact with an omnipotent and omnipresent nature.

(b) Humans suffered from serious limitations imposed by nature because nature was overpowering

(c) Humans used technological means to control nature.

(d) The need for a discipline, which looked at the causes and consequences of the arrangement of various natural and cultural features of earth surface existed before as it exists even today.

(e) Geography is, therefore, a truly holistic and interdisciplinary field of study.

CHAPTER 2

THE ORIGIN AND EVOLUTION OF THE EARTH

GIST IF THE LESSON

*Theories of the Origin of the Earth:

*Nebular Hypothesis (Kant and Laplace): Suggests the solar system developed from a large rotating cloud of gas and dust called a nebula.

*Big Bang Theory: Proposes that the universe began as a singularity that exploded about 13.8 billion years ago, leading to the formation of the universe.

*Modern Theory (Solar Nebula Disk Model) States that the solar system formed from a disk- shaped nebular cloud of gas and dust, which condensed and collapsed under gravity to form the sun and planets.

.Nebular Hypothesis

- Proposed by Immanuel Kant and later modified by Pierre-Simon Laplace.

- Suggests that the Solar System formed from a large cloud of gas and dust, known as a nebula.

- Gravity caused the nebula to collapse and spin, forming the Sun at the center, with planets forming from the surrounding material.

*Formation of Planets:

*Accretion- Process where particles in the nebula collided and stuck together to form planetesimals, which further coalesced into planets.

*Differentiation- Heavy elements sank to the center, and lighter ones floated to the surface, leading to the formation of core, mantle, and crust.

- Heavier elements (iron, nickel) sank to form the core, while lighter elements (silicon, oxygen) rose to form the mantle and crust.

*Formation of the Atmosphere and Oceans

- Volcanic outgassing released water vapor, carbon dioxide, and other gases to form the early atmosphere.

- As the Earth cooled, water vapor condensed to form oceans.

*Development of the Lithosphere

- The outer shell of the Earth cooled to form a solid crust known as the lithosphere.

- The lithosphere is divided into tectonic plates that move due to mantle convection.

Plate Tectonics

- The theory that explains the movement of Earth's tectonic plates.

- Responsible for the formation of mountains, earthquakes, and volcanic activity.

- Continents have drifted over geological time, leading to the current configuration.

*Early Earth:

- Initially, Earth was in a molten state due to intense heat from gravitational compression, radioactive decay, and frequent collisions.

- As it cooled, the outer layer solidified to form a crust.

*Atmosphere and Hydrosphere:

*Primitive Atmosphere: Composed of hydrogen and helium, which were lost due to solar winds.

*Secondary Atmosphere: Formed from volcanic outgassing, consisting of water vapor, carbon dioxide, nitrogen, and other gases.

*Hydrosphere Formation: Water vapor condensed to form liquid water, leading to the creation of oceans.

*Life on Earth:

*Chemical Evolution: Simple organic molecules formed in the primordial soup, eventually leading to complex molecules.

*Biological Evolution: First simple life forms (prokaryotes) appeared around 3.8 billion years ago.

Oxygen production began with the advent of photosynthetic organisms, leading to the development of the ozone layer.

MULTIPLE QUESTIONS

1. Which of the following is not related to the formation or modification of the present atmosphere?

(A) Solar winds (B) Differentiation

(C) Degassing (D) Photosynthesis

Ans (B) Differentiation

2. The inner planets mean

(A) Planets between the sun and the earth.

(B) Planets between the sun and the belt of asteroids.

(C) Planets in gaseous state.

(D) Planets without satellite(s).

Ans (B) Planets between the sun and the belt of asteroids.

3. Which one of the following experts gave the Collision Hypothesis?

(A) Immanuel Kant (B) Laplace

(C) Chamberlain (D) Sir James and Harold Jeffrey

Ans- (D) Sir James and Harold Jeffery

4. Which of the following gases were composed of the Primordial atmosphere?

(A) Nitrogen and oxygen, (B) Hydrogen and helium

(C) Carbon dioxide and oxygen (D) Neon and Argon

Ans. (B) Hydrogen and helium

5. Make correct pairs from the following two columns and mask the correct ones.

1. The small rocky particles A. A very large cloud of hydrogen gas found between the orbits of Mars and Jupiter

2. Nebula B. Gas Giant Plant

3. Mercury C. Asteroids

4. Saturn D. Inner Planets

(A) 1-B, 2-C, 3-A, 4-D (B) 1-A, 2-D, 3-B, 4-C

(C) 1-D, 2-B, 3-C, 4-A (D) 1-C, 2-A, 3-D, 4-B

Ans. (D 1-C, 2-A, 3-D, 4-B.

6. What does the Expansion of the universe stand for?

(A) Increase in the number of stars.

(B) Increase in space between the galaxies.

(C) Discovery of new celestial bodies.

(D) Increase in the speed of rotation of planets

Ans. b) Increase in space between the galaxies.

7. Which of the following concerning the big bang theory is not true?

(A) There was a tiny ball which has infinite temperature and density.

(B) Explosion led to huge expansion which continues even to the present day.

(C) This expansion continues till the present day, and at a very rapid speed.

(D) Within a few minutes of the explosion first atom was formed.

Ans. C).This expansion continues till the present day, and at a very rapid speed.

3 MARKS QUESTIONS

1. Read the passage given below and answer the following questions:

A large number of hypotheses were put forth by different philosophers and scientists regarding the origin of the earth. One of the earlier and popular arguments was by German philosopher Immanuel Kant. Mathematician Laplace revised it in 1796. It is known as the Nebular Hypothesis. The hypothesis considered that the planets were formed out of a cloud of material associated with a youthful sun, which was slowly rotating.

1.1. Which philosopher first put forth the Nebular Hypothesis regarding the origin of the Earth?

(A) Sir James Jeans (B) Immanuel Kant (C) Pierre-Simon Laplace (D) Harold Jeffrey

Ans (B) Immanuel Kant

1.2 When was nebular hypothesis proposed?

(A) 1796 (B) 1786

(C) 1780 (D) 1790

Ans A. 1796

1.3 What was stated in the nebular hypothesis?

Ans. The nebular hypothesis considered that the planets were formed out of a cloud of material associated with a youthful sun, which was slowly rotating.

2. Read the passage given below and answer the following questions:

The last phase in the evolution of the earth relates to the origin and evolution of life. It is undoubtedly clear that initially the earth or even the atmosphere of the earth was not conducive for the development of life. Modern scientists refer to the origin of life as a kind of chemical reaction, which first generated complex organic molecules and assembled them.

This assemblage was such that they could duplicate themselves converting inanimate matter into living substance. The record of life that existed on this planet in different periods is found in rocks in the form of fossils. The microscopic structures closely related to the present form of blue algae have been found in geological formations much older than some 3,000 million years. It can be assumed that life began to evolve sometime 3,800 million years ago.

2.1. What do modern scientists refer to the origin of life as?

(A) A mystical event (B) A divine intervention

(C) A kind of chemical reaction (D) A physical transformation

Ans(C) A kind of chemical reaction

2.2: Where is the record of life that existed on Earth in different periods found?

(A) In the atmosphere (B) In rocks in the form of fossils

(C) In ocean water (D) In ancient manuscripts

Ans (B) In rocks in the form of fossils.

2.3 Microscopic structures closely related to the present form of blue algae have been found in geological formations much older than how many million years?

(A) 1,000 million years (B) 2,000 million years

(C) 3,000 million years (D) 4,000 million years

Ans(C) 3,000 million years

3. What is meant by the process of differentiation?

Ans- The process of development of the layered structure of earth comprising crust, mantle and core is termed as differentiation.

Q.4. What was the nature of the earth surface initially?

Ans: The nature of the earth's surface initially was a barren, rocky and hot having a thin atmosphere of hydrogen and helium. This is far from the present day picture of the earth.

Q.5 What were the gases that initially formed the earth's atmosphere?

Ans- Hydrogen' and helium were the gases that initially formed the earth's surface. The early atmosphere with hydrogen and helium is supposed to have been stripped off as a result of intense solar wind. This happened not only in the case of earth but also in all the terrestrial planets which were supposed to have lost their primordial atmosphere through the impact of solar winds. During the cooling of the earth, gases and water vapor were released from the interior solid earth. Continuous volcanic eruptions contribute to water vapour and gases in the atmosphere. It was the first stage of atmosphere development.

LONG ANSWER QUESTIONS 5 MARKS EACH

Q.1 Write an explanatory note on the 'Big Bang Theory'.

Ans. In 1920, the Big Bang Theory or Expanding Universe hypothesis tried to justify how the universe is expanding. With the expanding universe, the distance between galaxies is expanding. This theory can be explained through the following developmental stages:

Stages of Big Bang theory:

(a) In the beginning, all matter was in the form of tiny balls (singular atoms).

(b) About 13.7 billion years ago the tiny ball exploded violently. The expansion continues even today.

(c) As a result, some energy was converted into matter.

(d) Within a fraction of a second there was rapid expansion.

(e) The expansion went slow down, but within the first three minutes of the Big Bang event, the first atom began to form.

(f) After 300000 years the temperature dropped down to 4,500 K and gave rise to atomic matter.

(g) The universe became transparent.

Q 2. List the stages in the evolution of the earth and explain each stage in brief.

Ans. Our planet Earth was formed some 4.6 billion years ago. Like all other planets, earth's formation took place as a result of a slow process mentioned below in three stages:

There are three different stages in the evolution of the Earth:

Stage I: When planetesimals accretion happened, the earth originated. Earth was a hot sphere, rocky, barren, and thin atmosphere of hydrogen and helium.

Stage II: Development of Lithosphere: The heavier materials like iron and nickel moved towards the center and the lighter ones moved towards the surface. Over a while, it cooled solidified, and condensed, later leading to the formation of the core, mental, and crust.

Stage III: Evolution of Atmosphere: During the cooling process of the earth, the gases were outpoured from the interior the process is called degassing. This started the evolution of the early atmosphere which contained nitrogen, carbon dioxide, water vapors methane, and little oxygen. Finally, the composition of the atmosphere was modified by the process of photosynthesis.

CHAPTER 3

INTERIOR OF THE EARTH

1. There are two sources of information about interior of the earth –

1.1. Direct Sources:

a. Mining b. Drilling c. Volcanic Eruption

1.2. Indirect Sources:

a. Seismic waves

b. Gravitational field

c. Magnetic field

d. .Meteors

3. EARTHQUAKE:-It is the shaking of the earth. It is a natural event. It is caused due to release of energy which generates waves that travel to all directions.

3.1. Focus: It is a point inside the earth surface from where an earthquake starts.

3.2. Epicenter: It is a point on the earth surface which records the seismic waves for the first time.

3.3. Seismograph:-An instrument which record the earthquake waves.

3.4. Measurement of earthquake a. Richter Scale b. Mercalli Scale

4. Earthquake Waves: Body waves and surface waves.

4.1. P and S waves are called as 'Body Waves' as they move inside the body of the earth. P waves are the fastest wave that move parallel to the direction of waves. These waves can move in solid, liquid and gaseous material.

4.2. S waves are slower than P waves. It moves perpendicular to the direction of the waves. These waves move only in solid and disappear in liquid.

4.3. Surface waves are the slowest waves. It moves on the earth surface. It causes maximum destruction on the earth surface.

5. Causes of earthquake: a) movement of plates, b) rising of magma, c) folding and faulting, d) violent volcanic eruption.

6. Structure of the earth:-

a. Crust:-It is the outermost solid part of the earth.

b. Mantle: - The portion of the interior beyond the crust is called the mantle.

c. Core: - It is the innermost layer of the earth.

7. VOLCANO:-Volcano means the vent through which magma and other substances erupt to the surface.

8. TYPES OF VOLCANOES: Classification of volcanoes based on nature of eruption and land forms developed on the surface.

8.1. SHIELD VOLCANO- Largest of volcanoes, Hawaiian Islands are best examples, Basalt lava flow, Lava is very fluid, they are not steep.

8.2. COMPOSITE VOLCANOES- Cool and more viscous lava, Explosive eruptions, they erupt pyroclastic and ashes along with lava, layers are formed.

8.3. CALDERA- A most explosive type of volcanoes. These volcanoes collapse onto themselves, collapsed depressions are called caldera, the magma chamber is huge and close to surface.

8.4. FLOOD BASALT PROVINCES- Consists of highly fluid lava, Some parts of the world are covered by thousands of sq.km of basalt, There can be the series of flows, Average thickness is more than 50 meter, Individual flow is 100 of sq.k.m, Ex. Deccan plateau

8.5 MID OCEANIC RIDGE VOLCANOES- Found in oceanic surfaces, More than 70,000 km length, Frequent volcanic eruptions, Ex. Mid Atlantic ridge

9. INTRUSIVE VOLCANIC LANDFORMS:-When lava comes out forms volcanic rocks, some part cools down in the lower portion forms plutonic rocks.

a. BATHOLITH: A large part of the magma material that cools in the deeper depth of the crust. They are dome shaped, cover large areas. They come out when erosion takes place. They are granite bodies.

b. LACOLITHS: Large dome shaped intrusive bodies. Consists of level bodies connected through pipe like conduit from below.

c. LAPOLITHS: concave shaped lava formation

d. PHACOLITH: wave typed lava formation

e. SILL: horizontal deposit of lava

f. DYKES: vertical lava formation

MULTIPLE CHOICE QUESTIONS

1. The earth's radius is about?

(A) 5370 km (B) 6370 km (C) 8000 km (D) 9000 km

Ans. (B) 6370 km

2. The _____ is the point within the earth where an earthquake rupture starts.

(A) hypocenter (B) epicenter (C) fault (D) fold

Ans. (A) hypocentre

3. _____ instrument is used to record the earthquake waves.

(A) Anemometer (B) Rain Gauge (C) Seismograph (D) Barometer

Ans. (C) Seismograph

4. Identify the incorrect statement.

(A) Velocity of earthquake waves changes as they travel through materials with different densities.

(B) The denser the material, the lower is the velocity.

(C) Their direction also changes as they reflect or refract when coming across materials with different densities.

(D) None of the above

Ans. (B) The denser the material, the lower is the velocity.

5. The upper portion of mantle is called:

(A) Lithosphere (B) Thermosphere (C) Mesosphere (D) Asthenosphere

Ans. (D) Asthenosphere

6. Deccan traps in India are an example of:

(A) Shield Volcanoes (B) Composite Volcanoes

(C) Flood basalt provinces (D) Caldera

Ans. (C) Flood basalt provinces

7. A saucer shaped, concave to the sky, volcanic landform is?

(A) Batholith (B) Lacoliths (C) Lapolith (D) Phacolith

Ans. (C) Lapolith

8. Read the assertion and reason and select the correct option.

Assertion: Shield volcanoes are very steep.

Reason: In shield volcanoes magma made up of basalt is very fluid.

(A) A and R are true and R is the correct explanation of A.

(B) A and R true but R is not the correct explanation of A.

(C) A is false but R is true.

(D) A is true but R is false.

Ans. (C) A is false but R is true

9. The crust and mantle are separated by which of the following discontinuities?

(A) Gutenberg discontinuity (B) Moho discontinuity

(C) Conrad discontinuity (D) Lehman discontinuity

Ans. (B) Moho discontinuity

10. Which of the following scales is used to measure magnitude of an earthquake?

(A) Richter Scale (B) Mercalli Scale

(C) Beaufort Scale (D) Kelvin Scale

Ans. (A) Richter Scale

11.Most explosive volcanoes are called:

(A) Shield Volcanoes (B) Composite Volcanoes

(C) Flood basalt province (D) Caldera

Ans. (D) Caldera

3 MARKS QUESTIONS

Q.1 Discuss the direct sources of information about the interior of the earth.

Ans. (a) Mining: The most easily available solid earth material is surface rock or the rocks we get from mining areas.
(b) Deep Ocean Drilling Projects: Many deep drilling projects have provided large volume of information through the analysis of materials collected at different depths.
(C) Volcanic eruptions: During volcanic eruption lava becomes available for laboratory analysis.

Q.2 What is gravity anomaly?

Ans. The reading of the gravity at different places is influenced by many factors. These readings differ from the expected values. Such a difference is called gravity anomaly. Gravity anomalies give us information about the distribution of mass of the material in the crust of the earth.

Q.3 What do you mean by shadow zone in reference of earthquake?

Ans. Earthquake waves get recorded in seismograph located at far off locations. However, there exist some specific areas where the waves are not reported. Such a zone is called the ‘shadow zone’.
Shadow zone of P waves: 105° to 145° from focus.
Shadow zone of S waves: 105 ° to 105° from focus.

Q.4 Explain any three types of earthquakes.

Ans. (a) *Tectonic* earthquakes:- The most common ones are the *tectonic* earthquakes. These are generated due to sliding of rocks along a fault plane.
(b) *Volcanic* earthquake:- A special class of tectonic earthquake is sometimes recognised as *volcanic* earthquake. However, these are confined to areas of active volcanoes.
(c) *Collapse* earthquakes:- In the areas of intense mining activity, sometimes the roofs of underground mines collapse causing minor tremors. These are called *collapse* earthquakes.

Q.5 Differentiate between Primary waves and Secondary waves.

Ans.

P-waves	S-Waves
1. These are called primary waves.	1. These are called secondary waves.
2. These seismic waves move faster and are the first to arrive at the surface.	2. These arrive at surface with sometime lag.
3. The shadow zone of P-waves is much smaller than that of the S-waves.	3. The shadow zone of S waves is much larger than that of the P-waves.
4. They travel through gaseous, liquid and solid materials.	4. S-waves can travel only through solid materials.

LONG ANSWER QUESTIONS

Q.1. Describe the major type of volcanoes found in the world.

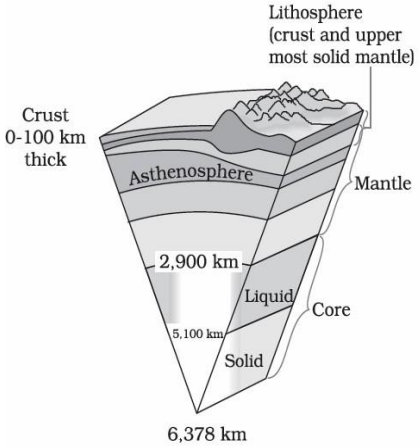
Ans. "Volcanoes are classified on the basis of nature of eruption and the form developed at the surface. Major types of volcanoes are as follows:

1. **Shield Volcanoes:** The shield volcanoes are the largest of all the volcanoes on the earth. These volcanoes are mostly made up of basalt, a type of lava that is very fluid when erupted. For this reason, these volcanoes are not steep.
2. **Composite Volcanoes:** These volcanoes are characterised by eruptions of cooler and moreviscouslavasthanbasalt.Thesevolcanoesoftenresultinexplosiveeruptions.Alongwithlava, large quantities of pyroclastic material and ashes find their way to the ground. This material accumulates in the vicinity of the vent openings leading to formation of layers, and this makes the mounts appear as composite volcanoes.
3. **Caldera:** These are the most explosive of the earth's volcanoes. They are usually so explosive that when they erupt they tend to collapse on themselves rather than building any tall structure. The collapsed depressions are called calderas.
4. **Flood Basalt Provinces:** These volcanoes outpour highly fluid lava that flows for long distances. Some parts of the world are covered by thousands of sq. km of thick basalt lava flows. There can be a series of flows with some flows attaining thickness of more than 50 m. The Deccan Traps from India, are a much larger flood basalt province.
5. **Mid-Ocean Ridge Volcanoes:** These volcanoes occur in the oceanic areas. There is a system of mid-ocean ridges more than 70,000 km long that stretches through all the ocean basins. The central portion of this ridge experiences frequent eruptions.

Q.2 Describe the interior structure of the earth with diagram.

Ans. The earth's interior is divided into three layers:

1. The Crust: It is the outermost solid part of the earth, the thickness of the crust varies under the oceanic and continental areas. The mean thickness of oceanic crust is 5 km where as that of the continental is around 30 km. It has very low density and majorly made up of silica and aluminium.
2. The Mantle: The portion of the interior beyond the crust is called the mantle. The mantle extends from Moho's discontinuity to a depth of 2,900 km. The upper portion of the mantle is called asthenosphere. The word astheno means weak. It is considered to be extending upto400 km. It is the main source of magma that finds its way to the surface during volcanic eruptions. The crust and the uppermost part of the mantle are called lithosphere. Its thickness ranges from 10-200 km. The lower mantle extends beyond the asthenosphere. It is in solid state.
3. The Core; The innermost layer of earth is called core. The outer core is in liquid state while the inner core is in solid state. The core is made up of very heavy material mostly constituted by nickel and iron. lt is sometimes referred to as the nife because of its composition.



Q.3 What are plutonic rocks? Describe major intrusive volcanic landforms.

Ans. The cooling of magma may take place either on reaching the surface or also while the lava is still in the crustal portion. When cooling of magma takes place below or within crust they forms plutonic rocks. On the basis of shapes intrusive landforms can be classified as:

1. **Batholiths:** A large body of magmatic material that cools in the deeper depth of the crust develops in the form of large domes. These are granitic bodies. Batholiths are the cooled portion of magma chambers.
2. **Lacoliths:** These are large dome-shaped intrusive bodies with a level base and connected by a pipe-like conduit from below. It resembles the surface volcanic domes of composite volcano.
3. **Lapolith:**A sand when the lava moves upwards, a portion of the same may tend to move in a horizontal direction wherever it finds a weak plane It may get rested in different forms. In case it develops into a saucer shape, concave to the sky body, it is called lapolith.
4. **Phacolith:** A wavy mass of intrusive rocks, at times, is found at the base of synclines or at the top of anticline in folded igneous country. Such wavy materials have a definite conduit to source beneath in the form of magma chambers (subsequently developed as batholiths).These are called the phacoliths.
5. **Sills:** The near horizontal bodies of the intrusive igneous rocks are called sill or sheet, depending on the thickness of the material. The thinner ones are called sheets while the thick horizontal deposits are called sills.
6. **Dykes:** When the lava makes its way through cracks and the fissures developed in the land, it solidifies almost perpendicular to the ground. These vertical structures are called dyke.

CHAPTER 4

DISTRIBUTION OF OCEANS AND CONTINENTS

GIST OF THE LESSON

Oceans:

- Cover about 71% of the Earth's surface

- Divided into five oceans: Pacific, Atlantic, Indian, Arctic, and Southern

- Pacific Ocean is the largest, covering about 46% of the Earth's water surface

- Oceans are vital for regulating climate, providing food, and serving as a means of transportation

Continents:

- There are seven continents: Asia, Africa, North America, South America, Antarctica, Europe, and Australia

- Asia is the largest continent, covering about 30% of the Earth's land surface

- Africa is the second-largest continent, covering about 20% of the Earth's land surface

- Continents are classified based on geological and geographical features

Earth's surface is composed of landmasses (continents) and water bodies (oceans).

There are seven continents: Asia, Africa, North America, South America, Antarctica, Europe, and Australia.

There are five major oceans: Pacific, Atlantic, Indian, Southern (Antarctic), and Arctic.

Distribution of Continents:

Continents are unevenly distributed across the Earth's surface.

Most continents are in the Northern Hemisphere, with a significant portion of Asia and Europe.

Distribution of Oceans:

Oceans cover about 71% of the Earth's surface.

Pacific Ocean is the largest and deepest ocean, followed by the Atlantic, Indian, Southern (Antarctic), and Arctic Oceans.

Ocean-Continent Distribution:

Continents and oceans have distinct features and compositions.

Continental crust is thicker and less dense compared to oceanic crust.

Understanding the distribution of continents and oceans is crucial for understanding Earth's geography and its impact on climate, ecosystems, and human settlements.

Geographical Features:

Various geographical features such as mountains, plains, and plateaus are found on continents.

Oceans have features like trenches, ridges, and abyssal plains.

Impact on Climate and Life:

Oceans regulate global climate patterns through ocean currents and heat distribution.

Continents support diverse ecosystems and human civilizations due to their varied climates and landscapes.

Overall, the chapter covers the basic geographic distribution of continents and oceans, their characteristics, and their importance in shaping Earth's environment and human activities.

MULTIPLE CHOICE QUESTIONS

Q1.As the sea floor widens out and gets separated from the mid- oceanic ridge, it carries a record of

(a) Magnetic reversal (b) Electric Reversal

(c) Thermal reversal (d) Static

ANS- A

Q 2.The process by which magma rises forming new oceanic lithosphere layers is called

(a) Sea reversal (b) Sea flooring

(c) Sea floor spreading (d) Sea bed spreading

ANS- C

Q 3.The place where sea-floor spreading occurs is termed as

(a) Ditches (b) Mid-ocean ridges (c) Ocean basin (d) Craters

ANS- B

Q 4 . Which one of the following terms is related to the polar fleeing force?

(a) Revolution of the Earth (b) Gravitation

(c) Rotation of the Earth (d) Tides

ANS- C

Q.5. Who was the profounder of plate tectonic theory?

(a) Arthur Holmes (b) McKenzie, Parker and Morgan

(c) Admans Heinz (d) Alfred Wegener.

ANS- B

Q.6. Tillite is formed due to

(a) Deposits on mountains (b) Deposits of volcanoes

(c) Deposits of glaciers (d) Deposits of gold

ANS- C

Q.7. A specific zone with active volcanoes in Pacific Ocean is called:

(a) Ring of Fire (b) Ball of Fire

(c) Fire rain area (d) Volcanic area

Ans- A

Q.8. How do we know to correlate the rock formation across different continents?

(a) The radiometric dating methods (b) Carbon 14 method

(c) Radioactive method (d) Flradiometric

Ans- Carbon 14 method

Q.9.Which of the following type of plate boundary of the Indian plate is responsible for the formation of Himalayan Mountains?

(a) Ocean-continent convergence (b) Divergent boundary

(c) Transform boundary (d) Continent convergence

Ans - D

Q.10. Mention the name given by Alfred Wegener to a large continent surrounded with water?

(a) Pangaea (b) Panthalassa

(c) Angaraland (d) Gondwanaland

ANS- A

Q.11. Which one of the following is not a minor plate?

(a) Nazca (b) Arabia (c) Philippines (d) Antartica

ANS- D

SHORT ANSWER TYPE QUESTIONS 3 MARKS

Q1.According to Wegener, what are the causes for the drifting of continents?

Ans-The processes of seafloor spreading, rift valley formation, and subduction (where heavier tectonic plates sink beneath lighter ones) were not well-established until the 1960s. These processes were the main geologic forces behind what Wegener recognized as continental drift.

Q2. What do you mean by "sea floor spreading"?

Ans.-Seafloor spreading is the geologic process that takes place when tectonic plates diverge, resulting in the creation of new ocean floors. Divergent plates contribute to seafloor spreading, as magma bubbles up from below the earth's crust and then cools, resulting in gains in ground area.

Q3.Explain the basic concept of continental drift theory?

Ans.-The continental drift theory states the movement of tectonic plates, which drift apart from the land which sits on top, is the cause for this shift. When the land spread apart, it formed individual smaller landmasses known as continents. Continental drifts are caused by the spreading of the seafloor.

Q4.Differentiate between divergent and convergent plate boundaries.

Ans.-Divergent boundaries -- where new crust is generated as the plates pull away from each other. Convergent boundaries -- where crust is destroyed as one plate dives under another. Transform boundaries -- where crust is neither produced nor destroyed as the plates slide horizontally past each other.

Q5.Which are the Three Different types of boundaries that form as a result of tectonic.

Ans.-Most seismic activity occurs at three types of plate boundaries—divergent, convergent, and transform. As the plates move past each other, they sometimes get caught and pressure builds up.

LONG ANSWER TYPE QUESTIONS

Q1.What are the evidence in support of the continental drift theory?

Ans.-**EVIDENCES TO SUPPORT THE CONTINENTAL DRIFT**

1. The matching of continents (jig-saw fit)

A. the shorelines of S. America and Africa have remarkable match

B. a map was produced by Bullard in 1964 to show the jigsaw fit of these two continents.

C. it was fit around 1000 fathom line of the shoreline

2. ROCKS OF SAME AGE ACROSS THE OCEANS- The belt of ancient rocks of 2000 my from Brazil coast matches with those of Western Africa

B. Marine deposits of South America and Africa belong to Jurassic age.

3. TILLITE

A. Sedimentary rock formed out of glacial deposits

B. Sediments from India have similar counter parts at different continents of south.

C. Tillile indicates prolonged glaciations

D. The same glaciations is found in Africa, Falklands, Madagascar, Antarctica and Australia

E. the glacial tillite indicates that unambiguous evidence of palaeo climates and drifting of continents.

4. PLACER DEPOSITS

a. Formation of placer deposits of gold in Ghana coast has no source rock.

a. The gold bearing veins of rocks are found in Brazil

5. DISTRIBUTION OF FOSSILS

 Identical species of animals and plants are found along the coastal regions of the different continents.

 lemurs occurs in India , Madagascar and Africa.

 The contiguous land mass was called LEMURIA

 The fossils of mesosaurus were found in only South Africa and Brazil.

Q2.Bring about the basic difference between the drift theory and plate tectonics.

Ans.-

Plate tectonics	Continental drift
1. Modern theory	1. Early theory
2. Provide imperial suggestions	2. Provide non imperial suggestions
3. Forces are well defined and proven	3. Forces don't support the theory
4. Proposed by parker and Makenzie	4. Proposed by Wagner
5. Well accepted	5. No more accepted

Q3. Name all the Major and Minor plates.

Ans.-The seven major plates listed from largest to smallest are the Pacific, North American, Eurasian, African, Antarctic, Indo-Australian, and the South American Plate. There are also eight smaller minor plates. Tectonic plates move towards, away from, or past each other because of heat transfer coming from the core.

Minor plates

Amurian Plate – A minor tectonic plate in eastern Asia
Arabian Plate – Minor tectonic plate – 5,000,000 km2 (1,900,000 sq mi)
Burma Plate – Minor tectonic plate in Southeast Asia – 1,100,000 km2 (420,000 sq mi)
Caribbean Plate – A mostly oceanic tectonic plate including part of Central America and the Caribbean Sea – 3,300,000 km2 (1,300,000 sq mi)
Caroline Plate – Minor oceanic tectonic plate north of New Guinea – 1,700,000 km2 (660,000 sq mi)
Cocos Plate – Young oceanic tectonic plate beneath the Pacific Ocean off the west coast of Central America – 2,900,000 km2 (1,100,000 sq mi)
Nazca Plate – Oceanic tectonic plate in the eastern Pacific Ocean basin – 15,600,000 km2 (6,000,000 sq mi)
New Hebrides Plate – Minor tectonic plate in the Pacific Ocean near Vanuatu – 1,100,000 km2 (420,000 sq mi)
Okhotsk Plate – Minor tectonic plate in Asia
Philippine Sea Plate – Oceanic tectonic plate to the east of the Philippines – 5,500,000 km2 (2,100,000 sq mi

CHAPTER 5

GEOMORPHIC PROCESS

GIST OF THE LESSON

Geomorphic Processes

The earth's crust is dynamic. That means, the earth's surface is being continuously subjected to by external forces originating within the earth's atmosphere and by internal forces from within the earth. The external forces are known as exogenic forces and the internal forces are known as endogenic forces.

Endogenic Processes

- Caused by energy from within the earth

- Examples:

 Diastrophism: movement of the earth's crust that builds up landforms

 Volcanism: movement of molten rock to the earth's surface

Diastrophism

Includes processes that move the earth's crust vertically or horizontally

Examples:

 Orogeny: mountain building

 Epeirogeny: continental building

 Earthquakes: local movements

 Plate tectonics: horizontal movements of crustal plates

Exogenic Processes

- Caused by energy from outside the earth

Examples:

 Weathering: breakdown of rocks

 -Mass wasting: downslope movement of rocks

 Erosion: removal and transportation of rocks

 Deposition: settling of rocks in a new location

Weathering

- Breakdown of rocks into smaller pieces

Types:

 Chemical weathering

 Physical weathering

 Biological weathering

Mass Movements

- Downslope movement of rocks under gravity

Examples:

 Landslides

 Rockfalls

 Slumps

Erosion and Deposition

 Erosion: removal and transportation of rocks

 Deposition: settling of rocks in a new location

- Examples:

 running water

 Groundwater

 Glaciers

 Wind

 Waves

Soil Formation

- Soil is a dynamic natural body that supports plants

Factors:

 Parent material

 Topography

 Climate

 Biological activity

 Time

MULTIPLE CHOICE QUESTIONS

Q1. Which force helps in Geomorphic Processes?

a. Endogenic Forces

b. Exogenic Forces

c. Both a& b

d. None

Ans: (c) Both a and b

Q2.Which of the following processes is degradational process?

a. Deposition b. Diastrophism

c. Volcanism d. Erosion

Ans: (d) Erosion

Q3.Debris avalanche can be included in which category-

a. Landslide b. Slow Flow Mass Movements

c. Rapid Flow Mass Movements d. Subsidence

Ans: (c Rapid flow mass movements

Q4. Which one of the following materials is affected by hydration process?

a. Granite b. Clay

c. Quartz d. Salts

Ans- d) Salts

Q5. Which of the following is a type of mass movements?

a. Slow movements b. Rapid movements

c. Landslides d. All of the above

Ans-(d) All of the above

Q6. The expansion of the salt depends on-

a. temperature. b hails.

c. atmospheric pressure. d. winds.

Ans- (a) temperature.

Q7. Which of the following is the source of energy for endogenic gemorphic processes?

(a) Radioactivity (b) Rotational and tidal friction

(c) Primordial heat from origin of earth (d) All of the above

Ans (d) All of the above

Q8. Which of the following is not correct with respect to epeirogenic processes?

(a) Uplifting or warping of earth's crust b) Involved in continental building

(c) Crust is severely deformed into folds (d) It is a form of diastrophism

Ans (c) Crust is severely deformed into folds

Q.9 Which of the factors influences geomorphic process?

(a) Climate (b) Vegetation

(c) Structure of rocks (d) All of the above

Ans (d) All of the above

Q.10 Which of the following factors favours mass movement?

(a) Weak unconsolidated material (b) Thinly bedded rocks

(c) Scarcity of vegetation (d) All of the above

Ans (d) All of the above

Q.11 Which of the following is not a reason for landslide in Western Ghat and Nilgiri region?

(a) Steeper slopes (b) Mechanical weathering due to temperature changes

(c) Heavy rainfall (d) Tectonic instability

Ans (d) Tectonic instability

Q.12 Which of the geomorphic agents of erosion is not controlled by climate?

(a) Wind (b) Running water

(c) Wave (d) Glacier

Ans (c) Wave

Q.13 Which of the following is not correct about deposition?

(a) It is a consequence of erosion (b) Finer material gets deposited first and then coarser material.

(c) It is an endogenic process. (d) Both (b) and (c)

Ans (d) Both (b) and (c)

Q.14 Which of the following is not a passive control factor of soil formation?

(a) Parent material (b) Topography

(c) Time (d) Biological activity

Ans (d) Biological activity

Q.15 Consider the following statements. Which of the given statements is correct?

1. Earth materials experience only gravitational stress.

2. Shear stress results in angular displacement of rocks.

Codes

(a) Only 1 (b) Both 1 and 2

(c) Only 2 (d) None of these

Ans (c) Only 2

Q.16 Consider the following statements. Which of the given statements is incorrect?

1. Temperature and precipitation determine density, type and distribution of vegetation.

2. The variations in thermal gradients lead to different climatic regions.

3. Rocks with differences in their structure under similar climatic conditions offer similar

resistance to various geomorphic processes.

Codes

(a) 1 and 2 (b) Only 2

(c) Only 3 (d) 1 and 3

Ans (c) Only 3

Q.17 Consider the following statements. Which of the given statements is correct?

1. Weathering is a pre-requisite for mass movement.

2. Mass movement is transfer of mass of rock, debris, soil down the slopes under direct influence of gravity.

Codes

(a) Only1 (b) Both 1 and 2 (c) Only 2 (d) None of these

Ans (c) Only 2

Q.18 Consider the following statements.

Which of the given statements is correct?

1. Soil is a static medium.

2. Biological activity is slowed if soil becomes too cold or too dry.

Codes

(a) Onlv1 (b) Both 1 and 2

(c) Only 2 (d) None of these

Ans (c) Only 2

Q.19 Weathering is an . ... process.

(a) Ex situ (b) On-site

(c) In-situ (d) Both (b) and (c)

Ans (d) Both (b) and (c)

Q.20.Arrange in Sequence

Arrange the following steps of soil formation in sequence.

1. Formation of mature soil.

2. Growth of minor grasses and fern.

3. Mass of material becomes porous.

4. Penetration of plant roots.

5. Colonization of weathered material by bacteria.

6. Humus accumulation due to dead remains of organisms and plants.

Codes

(a) 5-6-4-3-2-1 (b) 6-5-2-4-3-1

(c) 5-6-2-4-3-1 (d) 5-6-3-2-4-1

Ans (c) 5-6-2-4-3-1

3 MARKS QUESTIONS

Q1.What is geomorphic processes? Describe briefly.

Answer: The endogenetic and exogenetic forces causing physical; stresses and chemical actions on earth materials and bringing about changes in the configuration of the earth's surface are known as geomorphic processes. Diastrophism and volcanism are endogenetic geomorphic processes.

Q2.Distinguish between exogenetic and endogenetic forces.

Ans- Exogenetic forces: The earth's surface is being continuously subjected to external forces induced basically by the energy (sun). These external forces are known as exogenic forces. Endogenic forces: The forces originating within the earth from its interior are known as endogenic forces. They are responsible for building up and wearing down of the earth's surface

Q 3.What is directional force and what is its role?

Ans-Gravity is a directional force. It activates the movements of matter and also causes stresses on the earth materials. Indirect gravitational stresses activate wave and tide induced currents and winds. Without gravity and gradients, there would be no mobility and hence no erosion.

Q 4- What are mass movements that are real rapid and perceptible? List

Answer: Mass movements transfer the mass of rock debris down the slopes under the direct influence of gravity. No geomorphic agent like running water, glaciers, wind, waves and currents participate in the process of mass movements.

The mass movements that are real rapid and perceptible are:

- Earth flow
- Mud flow
- Landslide

Q.5 What do you understand by oxidation & carbonation?

Ans-When atmospheric oxygen combines with minerals of rocks (especially with iron) to form oxides, the process is known as oxidation, Rocks get rusted due to the presence of air andwater. The rocks begin to decay and crumble to a powder mass of brown dust.

Carbonation is the process in which rainwater gets mixed with carbon dioxide. It dissolves limestone, chalk and marble rock to form carbonates or bicarbonates with minerals. Calcium carbonates and magnesium carbonates are dissolved in carbonic acid.

5 marks questions

Q1.What is the rock weathering? Discuss various ways in which it takes place.

Ans-Rock weathering is the chemical decomposition and physical disintegration of rocks.

Weathering takes place in three ways:
1. Chemical weathering
2. Physical or mechanical weathering
3. Biological action

1. **Chemical weathering**: Chemical weathering is the decomposition of rocks by chemical methods. It results from the action of weak acids and gases like oxygen, carbon dioxide and hydrogen. Chemical weathering produces a chemical change in the minerals of rocks. High temperatures and humidity cause the rocks to decompose.

2. **Physical or Mechanical weathering**: The physical wear and tear of rocks is called mechanical weathering. In the middle and high latitude climates, and at high altitudes, alternate freezing and melting of water called frost action provide a powerful mechanism for breaking up of rocks.

Water that penetrates joint planes and other natural openings in the rock expands when transformed into ice crystals. The pressure of the growing mass of such crystals causes joint blocks to be heaved up and pried free of the parent mass.

In the dry climates of low and middle latitudes, an important agent of rock disintegration is salt.

The dry climates have long droughts in which evaporation can occur continuously causing water deep in the rock to be drawn surface ward by capillary force. Near the rock surface, the moisture steadily evaporates permitting dissolved salts to be deposited in the opening of the rock. The growing salt crystals in this manner are capable of exerting pressure and disintegrating rocks.

The action of roots of growing plants exerting pressure upon the confining walls of rocks is yet another kind of mechanical weathering.

Biological weathering: When the breakdown of rocks and minerals is due to plants, animals and bacteria, it is called biological weathering. The main contribution of animals to weathering seems to be repeated mixing of soil material, thus bringing fresh material into exposure to the weathering agents. Snails are common in lime-rich areas and can wear deep holes in the limestone. Bird droppings may provide ‘organic matter for the slant of soil formation and weathering.

Grazing by large animals loosens the soil, thus increasing surface runoff and soil erosion. Larger plants affect weathering in a number of ways. Cracks may be widened by root pressure. The accumulation of elements by plants and their return to the surface of the soil affects the nature of the soil and weathering profiles and the course of weathering. , Vegetation litter and decaying vegetation are important in conserving moisture which in turn enhances weathering.

Q 2.Describe the geomorphic processes and how the gravity force affects the materials.

Ans-The endogenic and exogenic forces causing physical stresses and chemical action on earth materials and bringing about changes in the configuration of the surface of the earth are known as geomorphic processes. The common geomorphic processes are diastrophism, volcanism, weathering, mass wasting, erosion and deposition.

Any Exogenic element of nature (like ice, wind, water, etc.) capable of acquiring and transporting earth materials can be called a geomorphic agent. When these elements become mobile due to gradients, they remove the materials and transport them over slopes. An agent is a mobile medium which removes,

transports and deposits ‘earth materials. Running water, ground water, glaciers, wind, waves and currents, etc. can be called geomorphic agents.

Gravity is a directional force activating all downslope movements of matter and also causes stresses on the earth materials. Gravitational stresses activate wave and tide induced currents and winds. Without gravity and gradients, there would be no mobility and hence no erosion, transportation and deposition are possible. So, the gravitational stresses are as important as the other geomorphic processes. Gravity force keeps us in contact with the surface and switches on the movement of all surface earth materials.

Qu 3.Write short notes on:-

1. Diastrophism,
2. Volcanism,
3. Exfoliation.

Answer:

1. Diastrophism: These are endogenetic processes. They include

1. Orogenic processes, involving mountain building through severe folding and affecting long and narrow belts of earth’s crust,
2. Epeirogenic processes, involving uplift or warping of large parts of the earth’s crust,
3. Earthquakes, involving local, relatively minor movement, and
4. Plate tectonics, involving horizontal movements of the crustal plates. In the process of orogeny, the crust is severely deformed into folds. Due to Epeirogency, there may be simple deformation. Orogeny is a mountain building process, whereas epeirogeny is a continental building process. Through the processes of orogeny, epeirogeny earthquakes and plate tectonics, there can be faulting and fracturing of the crust. All these processes cause pressure, volume and temperature (PVT) changes which in turn induce metamorphism of rocks.

2. Volcanism: Volcanism includes the movement of molten rocks towards the surface of the earth and also the formation of many intrusive and extrusive volcanic forms. In the process of volcanism, a host of landforms are created, including rock deformation, resulting in Domal folds and metamorphism of surrounding rocks due to intense heat.

3. Exfoliation: This is a type of physical weathering process unloading, thermal contraction and expansion and salt weathering. Exfoliation is a result and not a process. Spalling or flaking off of more or less curved sheets of shells from rocks or bedrocks results in smooth and rounded surfaces. Exfoliation can occur due to expansion and contraction induced by unloading and temperature changes. Exfoliation domes and tors result due to unloading and thermal expansion respectively. Granular exfoliation or disintegration, taking place especially due to salt weathering processes, also results in smooth and rounded surfaces.

Qu.4.Discuss the factors responsible for soil formation and also the processes involved.

Ans: Soil forming factors: There are five factors that influence soil formation, viz., parent material, climate, biota, topography and time.

1. Parent material: Parent material in soil science is weathered bedrock or the transported glacial or alluvial material. Soils from weakly cemented sandstone will be sandy and soils from shales will be shallow and fine-textured. Similarly, clay formation is favoured more by a high percentage of decomposable dark mineral and less by quartz.

2. Climate: Climate is an important active factor in soil formation. Several processes are involved in soil formation and may to some extent affect the soil profile.

3. Biota: Biota is the collective term for the animal and plant life of a specific area as per the period of time. The decomposition of organic wastes and residues and the activities of living plants and animals have marked influence on soil development. Burrowing animals such as moles, prairie dogs, earthworms, ants and termites help soil development slowly by decomposing organic matter and forming weak acids that dissolve minerals faster. The roots of living plants and decomposed plant material release weak organic acids that help in weathering and soil development.

4. Topography: Topography means relief features. Steep hillsides have thin soil cover because of surface runoff that results in the erosion of the surface. On the other hand, gentle hillside preserves appreciable soil cover due to the luxuriant vegetation and sufficient water passing in vertically to deeper levels. The landlocked depressions receive a high amount of runoff water that favours appreciable vegetation cover but slower decomposition because of oxidation deficiency. This results in the formation of soil that is rich in organic water. Thus, topography influences soil formation through its relationship with water and temperature.

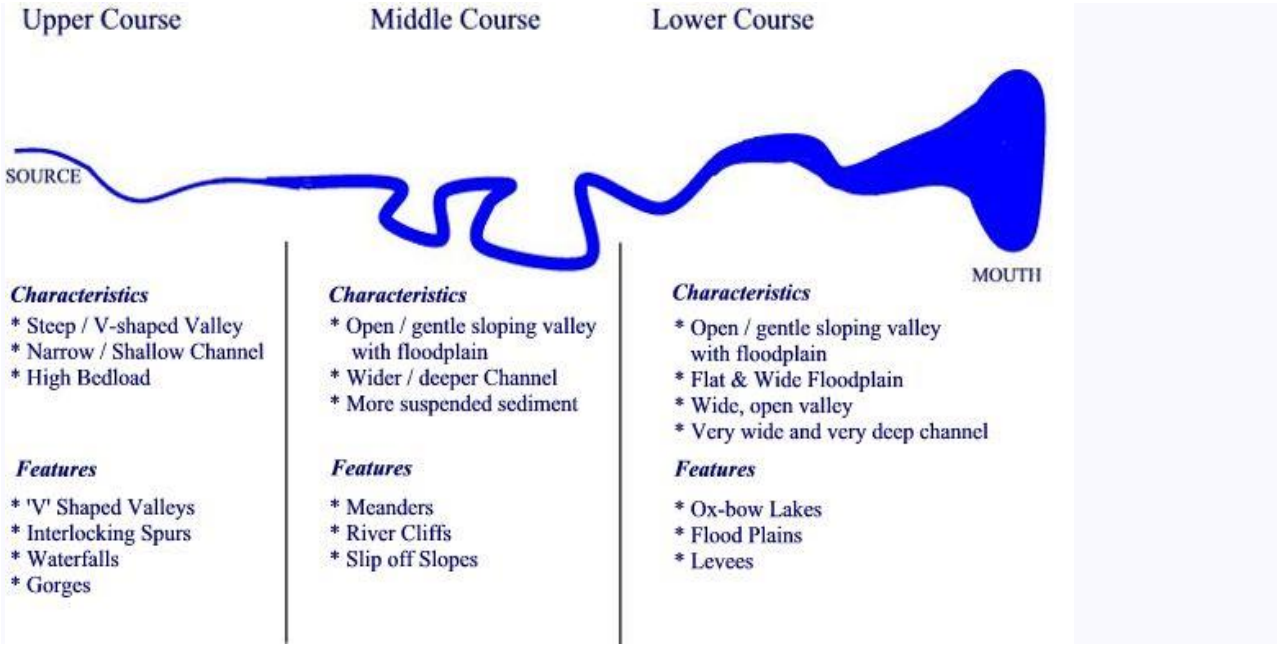
5. Time: Soil formation is a very slow process. It may take a few hundred to a few thousand years. This period of time, however, varies from place to place, depending upon other factors discussed above (plant material, -biota, topography, climate). Under ideal conditions, a recognisable soil profile may develop in 200 years and under less favourable circumstances, itmay extend to several thousand years.

CHAPTER 6

LANDFORMS AND THEIR EVOLUTION

GIST OF THE CHAPTER:

- Each landform has its own physical shape, size, materials and is a result of the action of certain geomorphic processes and agent. Several landforms together are called landscape.
- Landforms are the physical features of the Earth's surface shaped by various geomorphic agents like running water, wind, glaciers, and waves.
- Geomorphic agents contribute to erosion by wearing down rocks and sediments and to deposition by transporting and depositing these materials in new locations.
- Tectonic movements, like land uplift or subsidence, can create new landforms such as mountains, valleys, and rift valleys.
- River valleys may deepen and widen over time due to erosion, forming meanders, oxbow lakes, and floodplains.
- Geomorphic processes and agents act slowly over time, leading to the gradual formation and transformation of landforms.



RUNNING WATER:

Stages of the river
YOUTH
1. Less Streams
2. Less Integration
3. V-shaped Valleys Are Common
4. Stream Divides Are Swampy, Marshy Areas
5. Water Falls and Rapids Are Common

MATURE
1. More Streams
2. More Integration of Streams
3. Wider Flood Plains
4. Meanders Are Present
5. Rapids and water walls disappear

OLD
1. Smaller Tributaries
2. Few in Number
3. Flood Plains Are Common
4. Natural Levees and Oxbow Lakes Are Also Present.
5. Most of the Landscapes are just above sea level.

1 .RUNNING WATER	
EROSIONAL LANDFORMS	**DEPOSITIONAL LANDFORMS**
Valleys	Alluvial Fans

Potholes and Plunge Pools	Deltas
Incised or Entrenched Meanders	Floodplains, Natural Levees and Point Bars
River Terraces	Meanders

EROSIONAL LANDFORMS

Valleys- A Valley is an elongated low area often running between hills or mountains, which will typically contain a river or stream running from one end to the other.

Pot holes
1. They are circular depressions
2. Formed by abrasion
3. Pebbles and boulders get collected in these holes and rotated and make depression wider and deep
4. They keep valley deepened
5. At the foot of the water falls they become plunge pools.

PLUNGE POOLS
- Found at the bottom of the Water Falls
- Formed Due to Soft Rocks
- They Are Below the Level of River Bed.

MEANDERS
1. Lateral erosion is common in the lower course of the rivers
2. Due to low kinetic energy water is changing its course
3. Generally found in the flood plains
4. When meanders are found in deep and hard rocky areas, they are called incised or entrenched meanders
5. Same meanders develop loops which later on converted into oxbow lakes

RIVER TERRACES
Marking old valley floor, they represent flood plain levels They may consist of stream deposits They are formed due to vertical erosion There may be number of formal flood plains If they are at the same level they are called paired terraces If they are found at different levels they are called unpaired terraces.

UNPAIRED TERRACES
Unpaired terraces are found in the areas of slow upliftment areas. Reasons for the formation of river terraces are
1. Receding water after a peak flow
2. Change in hydrological regime due to climatic change.
3. Tectonic uplift of land
4. Sea level changes in case of rivers closer to the sea.

ALLUVIAL FANS
1. Found near the foot of the hills
2. The river breaks into number of channels
3. Low gradient
4. Coarse load is deposited
5. Low gradient
6. Cone shaped deposit

ALLUVIAL PLAIN

Formed along the river banks

1. Made of alluvial soils
2. They are divided into two types' Khadar and Banger
3. Khadar soils are found near the river and banger soils are found away from the river
4. They are very fertile.

NATURAL LEVEES

Natural levees are found along the flood plains of large rivers. They are low linear, parallel ridges made of coarse material found along the river bank. When river shift laterally series of natural levees are formed.

POINT BARS

1. They are also called as meander bars.
2. Found along the convex side of meanders of large rivers.

They are uniform in profile. If there are more than one ridge narrow and elongated depressions are found in between the point bars.

OXBOW LAKES

Found along the river bank on the convex side of the meander. They grow long loops the curve is cutoff and formed into Oxbow lakes.

BRAIDED CHANNEL

When rivers carry coarse material, there can be selective deposition of coarser materials causing formation of a central bar, which diverts the flow towards the banks; and this flow increases lateral erosion on the banks. As the valley widens, the water column is reduced and more and more materials are deposited as islands and lateral bars developing a number of separate channels of water flow.

DELTAS

1. Found near by the mouth of the river.
2. Made of fine alluvial soils.
1. They are in triangular shape.
5. Similar to Greek letter Delta.
6. Divided by distributaries.
7. Deposited material is stratified on the basis of size. Coarse material is deposited first and then fine material

FLOOD PLAINS

1. Major landforms in the river deposition
2. Big boulders are deposited first and then fine material is carried to the longer distance.
3. The flood plains in deltas are called delta plains.

2.GROUNDWATER/ KARST TOPOGRAPHY	
EROSIONAL LANDFORMS	**DEPOSITIONAL LANDFORMS**
Pools	Stalactites
Sinkholes	Stalagmites

Lapies and Limestone Pavements	Pillars
Caves	

Karst topography is a type of landscape that is formed by the dissolution of soluble rocks such as limestone, dolomite, and gypsum. Conditions that promote karst development are well-jointed, dense limestone near the surface; moderate to heavy rainfall; and good groundwater circulation.
This unique topography is characterized by sinkholes, disappearing streams, caves, and underground drainage systems.
Karst topography is found in many regions around the world and has significant ecological, geological, and human importance.

EROSIONAL LANDFORMS

Sinkholes:
Sinkholes are circular depressions in the ground that are formed when the overlying soil and rock collapse into underground cavities.
Caves:
Caves are underground chambers and passages that are formed by the dissolution of rock. These can range from small cavities to large, complex systems that span many miles.
Mammoth Cave National Park, Kentucky, USA:
This park is home to the world's longest known cave system, with over 650 km of explored passageways.
Lapies:
It is formed due to differential solution activity along parallel to sub-parallel joints.
They are also called grooved, fluted and ridge-like features in an open limestone field.

DEPOSITIONAL LANDFORM
The following depositional features are formed within caves.
1. Curtains- Rain water drips from long crack in a cave roof forms a continuous strip of calcites. It is called as curtains.
2. Stalactite drops of water containing dissolved limestone seep down through cracks in the cave roof. Drops of water lose carbon dioxide and deposit calcite. Overtime deposition of calcite forms pillars hanging down from the roof of the cave. It is called as stalactite and where the stalactite stretches towards the sides are known as Helictites.
3. Stalagmite Deposition of calcite forming icicles growing upward from the cave floor is called as stalagmite. Stalactites are calcium carbonate deposits hanging as icicles while Stalagmites are calcium carbonate deposits which rise up from the floor.
4. Pillar:
When both the stalagmite and stalactite join together, it is known as pillers. Ha Long Bay, Vietnam:
This UNESCO World Heritage Site is known for its tower-like limestone formations, which are formed by Karst Topography.

3.GLACIERS	
EROSIONAL LANDFORMS	**DEPOSITIONAL LANDFORMS**
Cirque	Moraines

Sinkholes	Eskers
Glacial Valleys/Troughs	Drumlins
Horns and Serrated Ridges	

EROSIONAL LANDFORMS

CIRQUE-

Starting location for mountain glaciers.

Cirques are the most common of land forms in glaciated mountains.

The cirques quite often are found at the heads of glacial valleys.

The accumulated ice cuts these cirques whilemoving down the mountain tops.

They are deep, long and wide troughs or basins with very steep concave to vertically dropping high walls at its head as sides.

TARN LAKE-

A lake formed in the base of the cirque after the ice has melted. These are called Tarn Lake.

HORNS AND SERRATED RIDGES

Horns form through head ward erosion of the cirque walls. They are sharp- pointed and steep-sided peaks. They are formed by head ward erosion of the cirque wall. Horns form when three or more radiating glaciers cut the head ward until their cirques meet high, sharp-pointed and steep-sided peaks.

Horns formed through head ward erosion of radiating cirques are – The highest peak in the Alps; Matterhorn; The highest peak in the Himalayas Everest.

Horn

Arete

GLACIAL VALLEYS/TROUGHS

Glacial valley, also called glacial trough, stream valley that has been glaciated, usually to a typical catenary, or U-shaped, cross section. U- shaped valleys occur in many parts of the world and are characteristic features of mountain glaciation. These glacial troughs may be several thousand feet deep and tens of miles long.

DEPOSITIONAL LANDFORMS

MORAINES

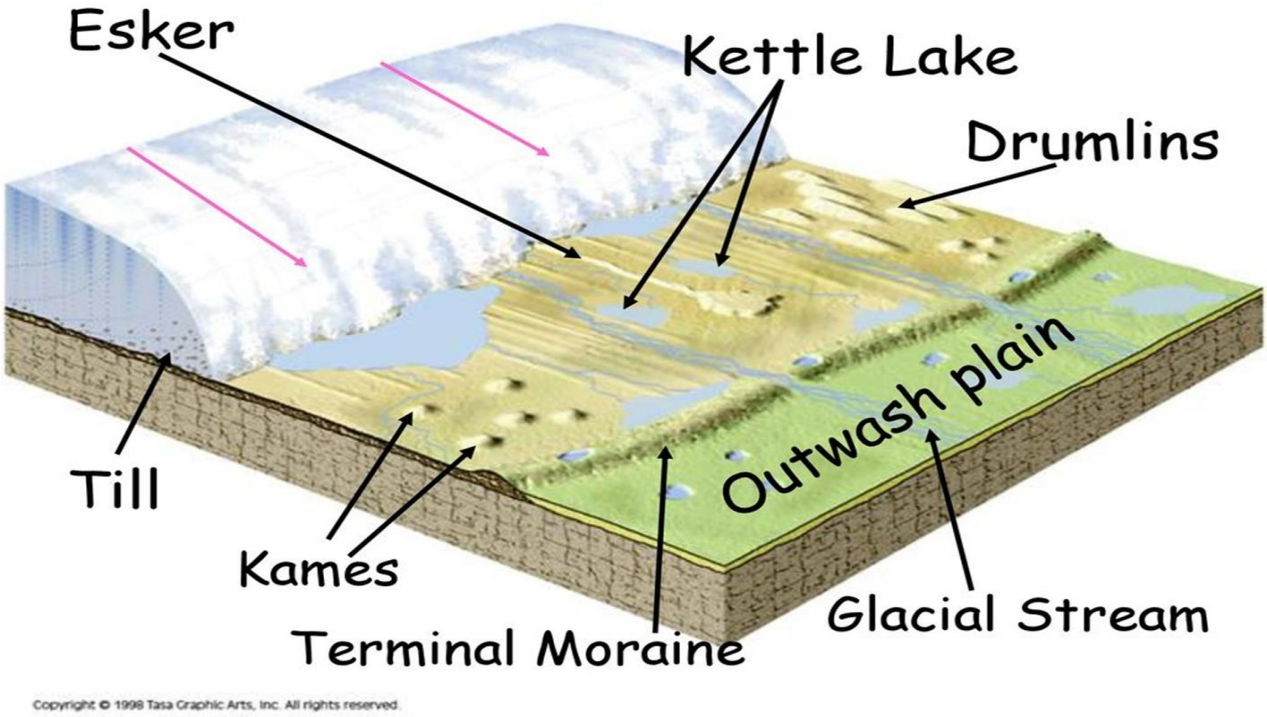
A moraine is a type of landform that is formed by the deposition of glacial till. Till is a mixture of rock, sand, and clay that is carried by a glacier. When a glacier melts, it leaves behind its load of till, which can form moraines. Moraines can be found in many different places around the world. They are often found in mountainous areas. Moraines can be a significant feature of the landscape. They can be used to learn about the history of glaciation in an area.

ESKERS

When glaciers melt in summer, the water flows on the surface of the ice or seeps down along the margins or even moves through holes in the ice. These waters accumulate beneath the glacier and flow like streams in a channel beneath the ice. Such streams flow over the ground (not in a valley cut in the ground) with ice forming its banks. Very coarse materials like boulders and blocks along with some minor fractions of rock debris carried into this stream settle in the valley of ice beneath the glacier and after the ice melts can be found as a sinuous ridge called esker

OUTWASH PLAINS-

The plains at the foot of the glacial mountains or beyond the limits of continental ice sheets are covered with glacio-fluvial deposits in the form of broad flat alluvial fans which may join to form outwash plains of gravel, silt, sand and clay.



4.WAVES AND CURRENTS	
EROSIONAL LANDFORMS	**DEPOSITIONAL LANDFORMS**
Cliffs	Beaches
Terraces	Dunes

Caves	Bars
Stacks	Barriers and Spits

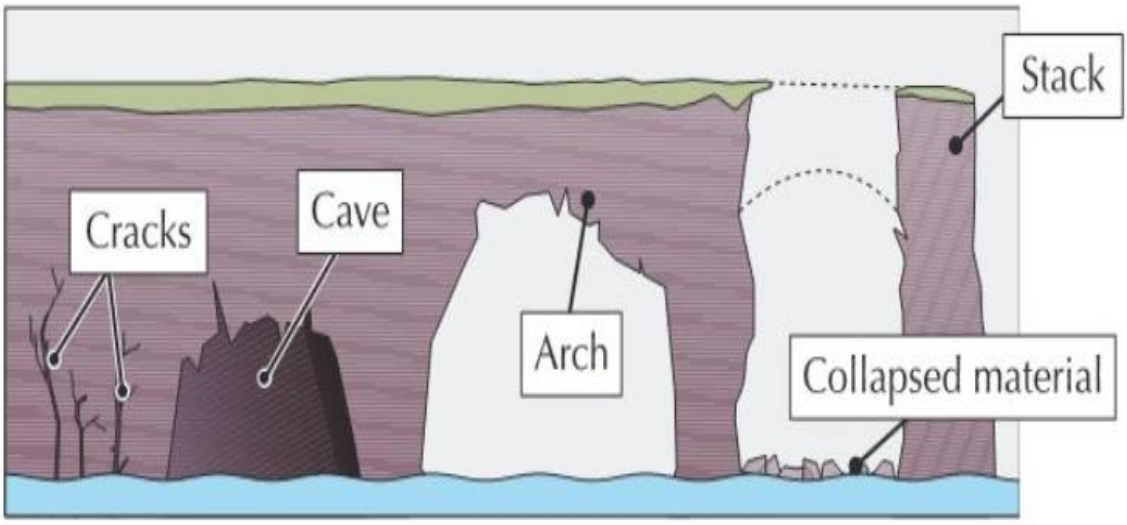
Coastal processes are among the most dynamic geologic processes since changes in the morphology of many coasts can be seen on an annual (or shorter) timescale.
Other than the action of waves, the coastal landforms depend upon:
Erosional Coastal Landforms
Cliffs:
A sea cliff is a vertical precipice created by waves crashing directly on a steeply inclined slope. Hydraulic action, abrasion, and chemical solution all work to cut a notch at the high water level near the base of the cliff. Constant undercutting and erosion causes the cliffs to retreat landward.

Sea Caves:
Sea caves form along lines of weakness in cohesive but well-jointed bedrock. Sea caves are prominent headlands where wave refraction attacks the shore.

Sea Stacks:
A sea arch forms when sea caves merge from opposite sides of a headland. If the arch collapses, a pillar of rock remains behind as a sea stack.

Sea Terraces:
It is a rock terrace formed where a sea cliff, with a wave-cut platform before it, is raised above sea level.

Depositional Coastal Landforms
Beaches:
Beaches are deposits of loose sediment adjacent to a body of water. In addition to sand, beaches around the world have a remarkable diversity of sediment size, from boulders to fine silt.
Spits:
A sand spit is a linear accumulation of sediment that is attached to land at one end.
They usually develop where the coastline bends inland from the longshore drift direction. The spit follows the longshore direction of the updrift coast.
Bars:
Sandbar, also known as Offshore Bar, is a ridge built by waves offshore from the beach, usually submerged or partially exposed.



5.WINDS	
EROSIONAL LANDFORMS	**DEPOSITIONAL LANDFORMS**
Pediments and Pediplains	Sand Dunes
	barchans
Playas	Parabolic dunes
	Seif

Wind is a geomorphic agent in all terrestrial environments. It is more active in arid regions with fine-textured soils and sediments and little or no vegetation.
Wind can erode desert rocks in two ways:
Deflation: The removal of fine, loose particles from the surface of rocks.

Abrasion:
Small particles being carried by the wind scrape of particles from the rock surface. It then transports the eroded material by three processes:
Suspension:
Very small particles (<0.15mm) are picked up and carried by the wind.
Saltation:
Small particles (0.15-0.25mm) are temporarily lifted from the ground and bounce along the surface.
Surface Creep:
Larger particles (>0.25mm) are hit and pushed along the ground by particles being moved by saltation.
Attrition:
Sand particles carried by winds start a friction process within itself and because of this their size reduces. This is known as attrition.
Erosion process of high-speed winds is also fast.
Soft rocks break down easily but on the other hand the erosion process is long in case of hard rocks.

EROSIONAL LANDFORMS
Deflation Hollows:

Deflation basins, called blowouts, are hollows formed by the removal of particles by wind.
Blowouts are generally small, but may be up to several kilometers in diameter.

Caves:
As wind-borne sand impacts the rock faces, some of the blow-outs become deeper and wider and fit to be called caves.

Yardangs:
Yardangs are parallel troughs cut into softer rock running in the direction of the wind, separated by ridges.
The direction of the yardangs can indicate the direction of the prevailing wind.

Zeugen:
A zeugen is a tabular mass of resistant rock, standing prominently in the desert.
It is usually composed of alternating layers of hard and soft rocks.

Playas:
Playa is a flat-bottom depression found in interior desert basins and adjacent to coasts in arid and semiarid regions, periodically covered by water.
It slowly filtrates into the groundwater system or evaporates into the atmosphere, causing salt, sand, and mud deposition along the bottom and around the depression's edges.

DEPOSITIONAL LANDFORMS
Ripples:
They are regular, wavelike undulations lying at right-angles to the prevailing wind direction.
Loess:
Loess is terrestrial sediment composed largely of windblown silt particles made of quartz

Dunes:
Dunes are collections of loose sand built piecemeal by the wind.
It is usually composed of quartz, which is extremely hard and doesn't easily decay.

Most Common types of Dunes:
Barchans:
Barchans have crescent-shaped points or wings that face away from the wind, or downwind, and where sand is moving over an almost uniform surface from where the wind is constant.
Seif:

It is also called linear dunes is similar to barchans with a small difference as it has only one wing or point.

MULTIPAL CHOICE QUESTION
1. In which of the following stages of landform development, downward cutting is dominated?
(a) Youth stage (b) Late mature stage
(c) Early mature stage (d) Old stage
ANS- (a) Youth stage
2. A deep valley characterized by steep step-like side slopes is known as
(a) U-shaped valley (b) Gorge
(c) Blind valley (d) Canyon
ANS- (d) Canyon

3. In which one of the following regions the chemical weathering process is more dominant than the mechanical process?
(a) Humid region (b) Limestone region
(c) Arid region (d) Glacier region
ANS- (b) Limestone region

4. A deep, long and wide trough or basin with very steep concave high walls at its head as well as in sides is known as:
(a) Cirque (b) Glacial valley
(c) Lateral Moraine (d) Esker
ANS- (a) Cirque
5. Which one of the following processes is a gradational process?
(a) Deposition (b) Diastrophism
(c) Volcanism (d) Erosion.
ANS- (d) Erosion

Q.6.-Which one of the following sentences best defines the term 'Lapies'?

(i) A small to medium sized shallow depression.

(ii) A landform whose opening is more or less circular at the top and funnel shaped towards bottom.

(iii) A landform formed due to dripping water from the surface.

(iv) An irregular surface with sharp pinnacles, grooves and ridges.

Ans: (iv) An irregular surface with sharp pinnacles, grooves and ridges.

SHORT ANSWER TYPE QUESTION
Q.1 How does wind forms geomorphic landforms or how does wind performs its tasks in the desert areas?
Ans: Wind move along the desert floors with great speed and the obstructions in their path create turbulence. Wind causes deflations, abrasion and impact. Deflation includes lifting and removal of dust and smaller particles from the surface of rocks. In the transportation process sand and silt act as effective tools to abrade the land surface. The impact is simply sheer force of momentum which occurs when sand is blown into or against a rock surface.

Q2.Explain the depositional landforms formed by groundwater.
Refer to the gist- depositional landforms formed by groundwater.

Q3. How are river terrace formed?
Answer:
River terrace are basically products of erosion as they result due to vertical erosion by the stream intoits own depositional flood plains. The terraces may result due to:-

- Receding water after a peak flow.
- Change in hydrological regimes due to climatic changes.
- Tectonic uplift of land.

Sea level changes in case of rivers closer to the sea
Q4. What do incised meanders in rocks and meanders in plains of alluvium indicate?
Ans. A meander, in general, is a bend in a sinous watercourse or river. A meander forms when moving water in a stream erodes the outer banks and widens its valley, and the inner part of the river has less energy and deposits silt. In streams that flow rapidly over steep gradients, normally erosion is

concentrated on the bottom of the stream channel. In the case of steep gradient streams lateral erosion on the sides of the valleys is not much when compared to the streams flowing on low and gentle slopes. Because of active lateral erosion, streams flowing over gentle slopes, develop sinuous or meandering courses. It is common to find meandering courses over flood plains and delta plains where stream gradients are very gentle. But very deep and wide meanders can also be found cut in hard rocks. Meander loops develop over original gentle surfaces in the initial stages of development of streams and the same loops get entrenched into the rocks normally due to erosion or slow, continued uplift of the land over which they start. They widen and deepen over time and can be found as deep gorges and canyons in hard rock areas. They give an indication on the status
of original land surfaces over which streams have developed.

Q5. Differentiate between gorge and Canyon.
Answer: Gorge and Canyon
A gorge is a deep valley with very steep to straight sides and a canyon is characterized by steep step- like side slopes and may be as deep as a gorge.
A gorge is almost equal in width at its top as well as its bottom. In contrast, a canyon is wider at its top than at its bottom. In fact, canyon is a variant of gorge.
.

LONG ANSWER TYPE QUESTION

Q1. Glacial valleys show up many linear depositional forms. Give their locations and names.
Ans. Glacial valleys show up many linear depositional forms. Their locations and names are as follows:
Refer to gist glacial landform
Q2. Limestone behave differently in humid and arid climates. Why? What is the dominant and almost exclusive geomorphic process in limestone areas and what are its results?
Ans. Many depositional forms develop within the limestone caves. The chief chemical in limestone is calcium carbonate which is easily soluble in carbonated water i.e. carbon dioxide absorbed rainwater. This calcium carbonate is deposited when the water carrying it in solution evaporates or loses its carbon dioxide as it trickles over rough rock surfaces. Stalactites, Stalagmites and Pillars Stalactites hang as icicles of different diameters. Normally they are broad at their bases and taper towards the free ends showing up in a variety of forms. Stalagmites rise up from the floor of the caves. In facts, stalagmites form due to dripping water from the surface or through the thin pipe, of the stalactite, immediately below it. The results of the work of groundwater cannot be seen in all types of rocks. But in rocks like limestone or dolomites rich in calcium carbonate, the surface water as well as groundwater through the chemical process of solution and precipitation deposition develop varieties of landforms. These two processes of solution and precipitation are active in limestone or dolomites occurring either exclusively or interbedded with other rocks.
Therefore, underground flow of water is more common than surface run off in limestone areas.
Q3. How do glaciers accomplish the work of reducing high mountains into low hills and plains?
Ans. Masses of ice moving as sheets over the land or as linear flows down the slopes of mountains in broad trough-like valleys are called glaciers. A glacier in its valley is slow unlike water flow. The movement could be a few centimeters to a few meters a day or even less or more. Glaciers move basically because of the force of gravity.
Erosion by glaciers is tremendous because of friction caused by sheer weight of the ice. The material plucked from the land by glaciers get dragged along the floors or sides of the valleys and cause great damage through abrasion and plucking. Glaciers can cause significant damage to even un-weathered rocks and can reduce high mountains into low hills and plains.
As glaciers continue to move, debris gets removed, divides get lowered and eventually the slope is reduced to such an extent that glaciers will stop moving leaving only a mass of low hills and vast outwash plains along with other depositional features.
Q4. Explain the landform created by erosion through wind.

Ans- refer to the gist- Wind erosional landform.
Q5. Explain the depositional landform created by running water.
Ans- Refer to the gist- depositional landform created by running water.

CHAPTER 7

COMPOSITION AND STRUCTURE OF ATMOSPHERE

GIST OF THE LESSON

Gases

1) Carbon dioxide is meteorologically a very important gas as it is transparent to the Incoming solar radiation but opaque to the outgoing terrestrial radiation.

2) It absorbs a part of terrestrial radiation and reflects back some part of it towards the earth‘s surface. It is largely responsible for the greenhouse effect.

3) The volume of carbon dioxide has been rising in the past few decades mainly because of the burning of fossil fuels. This has also increased the temperature of the air.

4) Ozone is another important component of the atmosphere found between 10 and 50 km above the earth‘s surface and acts as a filter and absorbs the ultra-violet rays radiating from the sun and prevents them from reaching the surface of the earth.

Water Vapour

1) Water vapour is also a variable gas in the atmosphere, which decreases with altitude. In the warm and wet tropics, it may account for four per cent of the air by volume, while in the dry and cold areas of desert and polar regions, it may be less than one per cent of the air.

2) Water vapour also decreases from the equator towards the poles. It also absorbs parts of the

insolation from the sun and preserves the earth‘s radiated heat. It thus, acts like a blanket allowing the earth neither to become too cold nor too hot.

3) Water vapour also contributes to the stability and instability in the air.

Dust Particles

1) Atmosphere has a sufficient capacity to keep small solid particles, which may originate from different sources and include sea salts, fine soil, smoke-soot, ash, pollen, dust and disintegrated particles of meteors.

2) Dust particles are generally concentrated in the lower layers of the atmosphere; yet, convectional air currents may transport them to great heights.

3) The higher concentration of dust particles is found in subtropical and temperate regions due to dry winds in comparison to equatorial and Polar Regions.

STRUCTURE OF THE ATMOSPHERE

1. The atmosphere consists of different layers with varying density and temperature.

2. Density is highest near the surface of the earth and decreases with increasing altitude.

3. The column of atmosphere is divided into five different layers depending upon the temperature condition.

Name the layers of atmosphere

They are: troposphere, stratosphere, mesosphere, thermosphere and exosphere.

The Troposphere

1. It is the lowermost layer of the atmosphere.

2. Its average height is 13 km

3. It extends roughly to a height of 8 km near the poles and about 18 km at the equator.

4. Thickness of the troposphere is greatest at the equator because heat is transported to great heights by strong convectional currents.

5. This layer contains dust particles and water vapour.

6. All changes in climate and weather take place in this layer.

7. The temperature in this layer decreases at the rate of 1 °C for every 165 m of height.

8. This is the most important layer for all biological activity.

9. The zone separating the troposphere from stratosphere is known as the tropopause.

The Stratosphere

1. It is found above the tropopause and extends up to a height of 50 km.

2. One important feature of the stratosphere is that it contains the ozone layer.

3. This layer absorbs ultra-violet radiation and shields life on the earth from intense, harmful form of energy.

The Mesosphere

1. It lies above the stratosphere,

2. It extends up to a height of 80 km.

3. In this layer, once again, temperature starts decreasing with the increase in altitude and up to minus 100°C at the height of 80 km.

4. The upper limit of mesosphere is known as the mesopause.

The Ionosphere

1 .It is located between 80 and 400 km above the mesopause.

2. It contains electrically charged particles known as ions, and hence, it is known as ionosphere.

3. Radio waves transmitted from the earth are reflected back to the earth by this layer.

4. Temperature here starts increasing with height.

Exosphere

1. The uppermost layer of the atmosphere above the thermosphere is known as the exosphere.

2. This is the highest layer but very little is known about it.

3. Whatever contents are there, these are extremely rarefied in this layer, and it gradually merges with the outer space.

Elements of Weather and Climate

The main elements of atmosphere which are subject to change and which influence human life on earth are

1. Temperature,

2. Pressure,

3. Winds,

4. Humidity,

5. Clouds

6. Precipitation

MCQ

1) Atmospheric layer important for human beings is:

a) Stratosphere b) Mesosphere c) Troposphere d) Ionosphere

Ans. c) Troposphere

2) Sea salt, pollen, ash, smoke soot, fine soil- these are associated with:

a) Gases b) Dust particles c) Water vapour d) Meteors

Ans. b) Dust particles

3) Which one of the following gases constitutes the major portion of the atmosphere?

a) Oxygen b) Nitrogen c) Argon d) Carbon dioxide

Ans. b) Nitrogen

4) Ozone gas is present in –

a) Troposphere b) Stratosphere c) Mesosphere d) Ionosphere

Ans. b) Stratosphere

5) Which one of following gases is transparent to incoming solar radiation and opaque to outgoing terrestrial radiation?

a) Oxygen b) Helium c) Nitrogen d) Carbon dioxide

Ans . d) Carbon dioxide

SHORT ANSWER TYPE QUESTIONS 3 MARKS

1) Mention the main elements of weather and climate.

Ans. The main elements of atmosphere which are subject to change and which influence human life on earth are

1. Temperature,

2. Pressure,

3. Winds,

4. Humidity,

5. Clouds

6. Precipitation.

2) Which is the most important layer of the atmosphere? Discuss its characteristics.

Ans. The Troposphere is the most important layer of the atmosphere

1. It is the lowermost layer of the atmosphere.

2. Its average height is 13 km

3. It extends roughly to a height of 8 km near the poles and about 18 km at the equator.

4. Thickness of the troposphere is greatest at the equator because heat is transported to great heights by strong convectional currents.

5. This layer contains dust particles and water vapour.

6. All changes in climate and weather take place in this layer.

7. The temperature in this layer decreases at the rate of 1 °C for every 165 m of height.

8. This is the most important layer for all biological activity.

9. The zone separating the troposphere from stratosphere is known as the tropopause.

The air temperature at the tropopause is about minus 80°C over the equator and about minus

45°C over the poles. The temperature here is nearly constant, and hence, it is called the tropopause.

3) Describe the composition of the atmosphere.

Ans. The atmosphere is composed of gases, water vapour and dust particles. The proportion of gases changes in the higher layers of the atmosphere in such a way that oxygen will be almost in negligible quantity at the height of 120 km. Similarly, carbon dioxide and water vapour are found only up to 90 km from the surface of the earth.

Carbon dioxide is meteorologically a very important gas as it is transparent to the

Incoming solar radiation but opaque to the outgoing terrestrial radiation.

Ozone is another important component of the atmosphere found between 10 and 50 km above

the earth‘s surface and acts as a filter and absorbs the ultra-violet rays radiating from the sun and prevents them from reaching the surface of the earth.

Water Vapour

Water vapour is also a variable gas in the atmosphere, which decreases with altitude. In the warm and wet tropics, it may account for four per cent of the air by volume, while in the dry and cold are as of desert and polar regions, it may be less than one per cent of the air, it may be less than one per cent of the air.

Dust Particles

Atmosphere has a sufficient capacity to keep small solid particles, which may originate from different sources and include sea salts, fine soil, smoke-soot, ash, pollen, dust and disintegrated particles of meteors.

4) Mention the important layers of the atmosphere.

Ans : The important layers of the atmosphere are followings:-

1) Troposphere

2) Stratosphere

3) Mesosphere

4) Thermosphere

5) Exosphere.

LONG ANSWER TYPE QUESTION

1) Explain the important layers of the atmosphere.

Ans. 1.The atmosphere consists of different layers with varying density and temperature.

2. Density is highest near the surface of the earth and decreases with increasing altitude.

3. The column of atmosphere is divided into five different layers depending upon the temperature condition.

The layers of atmosphere

They are: Troposphere, Stratosphere, Mesosphere, Thermosphere and Exosphere.

The Troposphere

1. It is the lowermost layer of the atmosphere.

2. Its average height is 13 km

3. It extends roughly to a height of 8 km near the poles and about 18 km at the equator.

4. Thickness of the Troposphere is greatest at the equator because heat is transported to great heights by strong convectional currents.

5. This layer contains dust particles and water vapour.

6. All changes in climate and weather take place in this layer.

7. The temperature in this layer decreases at the rate of 1 °C for every 165 m of height.

8. This is the most important layer for all biological activity.

9. The zone separating the Troposphere from Stratosphere is known as the tropopause.

The Stratosphere

1. It is found above the Tropopause and extends up to a height of 50 km.

2. One important feature of the Stratosphere is that it contains the ozone layer.

3. This layer absorbs ultra-violet radiation and shields life on the earth from intense, harmful form of energy.

The Mesosphere

1. It lies above the Stratosphere,

2. It extends up to a height of 80 km.

3. In this layer, once again, temperature starts decreasing with the increase in altitude and up to minus 100°C at the height of 80 km.

4. The upper limit of Mesosphere is known as the mesopause.

The Ionosphere

1 .It is located between 80 and 400 km above the mesopause.

2. It contains electrically charged particles known as ions, and hence, it is known as ionosphere.

3. Radio waves transmitted from the earth are reflected back to the earth by this layer.

4. Temperature here starts increasing with height.

Exosphere

1. The uppermost layer of the atmosphere above the thermosphere is known as the exosphere.

2. This is the highest layer but very little is known about it.

3. Whatever contents are there, these are extremely rarefied in this layer.

CHAPTER 8

SOLAR RADIATION, HEAT BALANCE AND TEMPERATURE

Gist of the lesson

Incoming solar radiation is termed as Insolation. The factors that cause variations in insolation are:

1) The rotation of earth on its axis

2) The angle of inclination of the sun's rays

3) The length of the day

4) The transparency of the atmosphere

5) The configuration of land

There are three different ways of heating and cooling of atmosphere:

1) Conduction

2) Convection

3) Advection

Heat budget means the amount of heat received in the form of Insolation equals the amount lost by the earth through terrestrial radiation.

Factors controlling temperature distribution:

1) The latitude

2) The altitude

3) Distance from the sea

4) Air mass and ocean currents

Inversion of Temperature: Normally temperature decreases with increase in elevation. It is called

Normal lapse rate. At times, the situations are reversed and the normal lapse rate is inverted. It is called inversion of temperature.

Multiple Choice Questions

1)The earth radiates energy to the atmosphere in:

(a) Long wavelengths (b) Radiation (c) Insolation (d) Short wavelengths

Ans-a) Long wavelengths

2. The days are longest at

(a) Thiruvananthapuram. (b) Hyderabad. (c) Chandigarh. (d) Nagpur

Ans-(c) Chandigarh

3) Differences in pressure on the earth surface causes:

(a) Winds (b) Precipitation (c) Hail (d) Seasons

Ans-(a) Winds

4) What is Isotherm?

(a) The line joining the places of equal temperature.

(b) The incoming short wave radiation.

(c) The line joining the places of equal pressure.

(d) None of the above

Ans-(a) The line joining the places of equal temperature.

5) Higher latitudes are not permanently frozen because of

(a) Presence of warm and cold currents

(b) Very less insolation

(c) Redistribution of surplus heat energy pole wards from tropics

(d) Local aspects

Ans-(c) Redistribution of surplus heat energy pole wards from tropics

6) The envelop of the air is called _____

(a) Atmosphere (b) Troposphere (c) Stratosphere (d) None of the above

Ans-(a) Atmosphere

8) Maximum insolation is received over the _____

(a) Equator (b) Tropical areas (c) Sub-tropical areas (d) Poles

Ans-(c) Sub-tropical areas

9) This process of vertical heating of the atmosphere is known as

(a) Psychomotor (b) Convection (c) Evaporation (d) None of the above

Ans-(b) Convection

10) The sun is vertically over head at noon on 21st June at

(a) The equator. (b) 23.5 degree N. (c) 23.5 degree S. (d) 66.5 degree N.

Ans - (b) 23.5 degree N

SHORTANSWER QUESTIONS

Q.1. What is solar radiation?

ANS- 1. Solar radiation refers to the energy emitted by the sun in the form of electromagnetic waves.

2. It includes a range of wavelengths, such as visible light, ultraviolet light, and infrared radiation.

3. This radiation is the primary source of energy for the Earth's climate system.

Q. 2. How does the Earth's atmosphere interact with incoming solar radiation?

ANS.- 1. About 30% of incoming solar radiation is reflected back to space by clouds, aerosols, and the Earth's surface (albedo effect).

2. The remaining 70% is absorbed by the Earth's surface and atmosphere, which heats theplanet.

3. The atmosphere also scatters some radiation, causing the sky to appear blue and sunsets to appear red.

Q 3. What is the greenhouse effect?

ANS- 1. The greenhouse effect is the process by which certain gases in the Earth's atmosphere trap heat, preventing it from escaping into space.

2. Greenhouse gases like carbon dioxide, methane, and water vapor absorb infrared radiation emitted by the Earth's surface and re-radiate it back.

3. This effect keeps the Earth's surface warmer than it would be without an atmosphere, making life possible.

Q 4. Explain the concept of the Earth's heat balance.

ANS- 1. The Earth's heat balance refers to the equilibrium between incoming solar radiation and outgoing terrestrial radiation.

2. To maintain a stable climate, the amount of energy received from the sun must equal the amount of energy radiated back into space.

3. Disruptions to this balance, such as increased greenhouse gas emissions, can lead to global warming or cooling.

Q 5. What factors influence the distribution of temperature on Earth?

ANS-1. Latitude: Areas near the equator receive more direct solar radiation and are warmer, while polar regions receive less direct sunlight and are colder.

2. Altitude: Higher altitudes have thinner atmospheres and less capacity to retain heat, leading to cooler temperatures.

3. Ocean currents: Warm currents can raise temperatures in coastal areas, while cold currents can lower them.

Q 6. How does solar radiation vary with the seasons?

ANS -1. The tilt of the Earth's axis causes different parts of the Earth to receive varying amounts of solar radiation throughout the year.
2. During summer, the hemisphere tilted towards the sun experiences longer days and more direct sunlight, leading to warmer temperatures.
3. Conversely, during winter, the hemisphere tilted away from the sun has shorter days and receives less direct sunlight, resulting in cooler temperatures.

LONG ANSWER QUESTION

Q 1. Explain the process of solar radiation reaching the Earth and its impact on the climate system.

ANS-1. Solar radiation travels through space in the form of electromagnetic waves and reaches the Earth's atmosphere.

2. About 30% of this incoming solar radiation is reflected back to space by clouds, aerosols, and the Earth's surface (albedo effect).

3. The remaining 70% is absorbed by the Earth's surface and atmosphere, heating the planet and driving weather patterns.

4. Absorbed solar radiation is converted into heat, which warms the air, land, and water bodies, influencing temperature and climatic conditions.

5. This energy balance is crucial for sustaining life on Earth, as it supports various ecosystems and weather systems.

Q2. Describe the different ways in which the Earth's atmosphere interacts with incoming solar radiation.

ANS-1. Reflection: Approximately 30% of incoming solar radiation is reflected back into space by clouds, aerosols, and the Earth's surface.

2. Absorption: The Earth's surface and atmosphere absorb about 70% of the solar radiation, which heats the planet.

3. Scattering: Some of the solar radiation is scattered by molecules and particles in the atmosphere, which causes phenomena like the blue sky and red sunsets.

4. Transmission: Solar radiation that is not absorbed or scattered passes through the atmosphere and reaches the Earth's surface.

5. Re-radiation: The Earth's surface absorbs solar radiation and then emits it as infrared radiation, which is partially absorbed by greenhouse gases and contributes to the greenhouse effect.

Q 3. What is the greenhouse effect and how does it affect the Earth's temperature?

ANS-1. The greenhouse effect is a natural process where certain gases in the Earth's atmosphere trap heat, preventing it from escaping into space.

2. Greenhouse gases such as carbon dioxide, methane, and water vapor absorb infrared radiation emitted by the Earth's surface.

3. These gases then re-radiate the absorbed energy back towards the Earth's surface, warming it further.

4. This effect maintains the Earth's average temperature at a level suitable for life, making it habitable.

5. Human activities, such as burning fossil fuels and deforestation, increase theconcentration of greenhouse gases, enhancing the greenhouse effect and leading to globalwarming.

Q4. Discuss the concept of the Earth's heat balance and the factors that can disrupt this balance.

ANS-1. The Earth's heat balance refers to the equilibrium between incoming solar radiation and outgoing terrestrial radiation.

2. For a stable climate, the amount of energy received from the sun must equal the amount of energy radiated back into space.

3. Factors such as volcanic eruptions, changes in solar output, and variations in Earth's orbit can influence the heat balance.

4. Human activities, such as increased greenhouse gas emissions and land use changes, can disrupt this balance, leading to climate change.

5. Disruptions to the heat balance can result in global warming, shifts in weather patterns, and impacts on ecosystems and human societies.

CHAPTER 9

ATMOSPHERIC CIRCULATION AND WEATHER SYSTEMS

GIST OF THE LESSON

- Atmospheric circulation and weather systems are fundamental concepts in understanding how Earth's atmosphere behaves.

Atmospheric Circulation

1. Global Circulation Patterns:

a) Equatorial Low: At the equator, warm air rises, creating a low-pressure zone.

b) Subtropical Highs: The rising air at the equator moves towards the poles and sinks at about 30° N and S, creating high-pressure zones.

c) Subpolar Lows: Around 60° N and S, air rises again, creating low-pressure zones.

d) Polar Highs: At the poles, cold air sinks, creating high-pressure zones.

2. Wind Belts:

a) Trade Winds: Blow from the subtropical highs to the equatorial low.

b) Westerlies: Blow from the subtropical highs to the subpolar lows.

c) Polar Easterlies: Blow from the polar highs to the subpolar lows.

3. Coriolis Effect:

The Earth's rotation causes moving air to turn to the right in the Northern Hemisphere and to the left in the Southern Hemisphere, affecting wind direction.

Weather Systems

1. Air Masses:

Large bodies of air with uniform temperature and humidity. They are classified based on their origin, such as continental polar (cP), maritime polar (mP), continental tropical (cT), and maritime tropical (mT).

2. Fronts:

a) Cold Front: A cold air mass moves into a warmer area, leading to thunderstorms and cooler temperatures.

b) Warm Front: A warm air mass moves into a cooler area, causing steady rain and warmer temperatures.

c) Stationary Front: A front that stays in one place, often leading to prolonged periods of precipitation.

d) Occluded Front: Occurs when a cold front overtakes a warm front, combining their weather patterns.

3. Cyclones and Anticyclones:

a) Cyclones (Low-pressure systems): Air converges and rises, often leading to clouds and precipitation.
b) Anticyclones (High-pressure systems): Air diverges and sinks, generally bringing clear skies and stable weather.
Understanding these patterns and systems helps explain why different regions experience different weather and climates.

MULTIPLE CHOICE QUESTIONS:

1. In which category of wind Monsoon is kept:

(a) Local winds (b) Seasonal winds (c) Planetary winds (d) Periodic winds

ANS. (b) Seasonal winds

2. Subtropical high pressure belt lies between.

(a) 30° N and 30° S. (b) 40° N and 40° S.

(c) 45° N and 45° S. (d) 50° N and 50° S.

ANS. (a) 30° N and 30° S.

3. By which instrument Air pressure is measured?

(a) Thermometer. (b) Hygrometer. (c) Barometer. (d) Isobars.

ANS. (c) Barometer.

4. A wind circulation around a low pressure centre is called.....

(a) A cyclone. (b) An anticyclone. (c) Chinook. (d) Trade winds.

ANS. a) a cyclone.

5. Isobars are the lines of:

(a) Equal temperature (b) Equal pressure (c) Equal height (d) Equal rainfall

ANS. (b) Equal pressure

6. Horizontal distribution of pressure is studied by drawing:

(a) Isotherms. (b) Isobars. (c) Isohyet. (d) Isochrones.

ANS. (b) isobars.

7. If an air mass is fully lifted above the land surface, it is called:

(a) Warm front (b) Cold front (c) Occluded front (d) Anticyclones

ANS. (c) Occluded front

8. Tropical cyclone in the Western Australia is known as:

(a) Hurricane. (b) Typhoons. (c) Monsoon. (d) Willy-Willies

ANS. (d) Willy-Willies

9. Which one of the followings is a monsoonal country?

(a) India. (b) Turkey. (c) Canada. (d) Brazil.

ANS. (a) India.

10. Which one of the followings is a standard sea level pressure in Milibars?

(a) 101.32 mb (b) 1013.25 mb (c) 1000 mb (d) 10130.25 mb

ANS. (b) 1013.25 mb

SHORT ANSWER TYPE QUESTION 3 MARKS

Q 1.While the pressure gradient force is from north to south, i.e. from the subtropical high pressure to the equator in the northern hemisphere, why are the winds north easterlies in the tropics?

Ans: Rotation of the earth also affects the wind movement. The force exerted by the rotation of the earth is known as the Coriolis force. Due to this effect, winds move to the right from their original direction in northern hemisphere and to the left in the southern hemisphere. The deflection is more when the wind velocity is high.

Coriolis force is directly proportional to the angle of latitude. It is maximum at the poles and is absent at the equator. The Coriolis force acts perpendicular to the pressure gradient force. The pressure gradient force is perpendicular to an isobar. The higher the pressure gradient force, the more is the velocity of the wind and the larger is the deflection in the direction of wind. As a result of these two forces operating perpendicular to each other, in the low-pressure areas the wind blows around it. Therefore, when pressure gradient force is from south to North then winds move from south to North easterlies.

Q 2. What are the geostrophic winds?

Ans: The velocity and direction of the wind are the net result of the wind generating forces. The winds in the upper atmosphere, 2-3 km above the surface, are free from frictional effect of the surface and are controlled mainly by the pressure gradient and the Coriolis force. When isobars are straight and when there is no friction, the pressure gradient force is balanced by the Coriolis force and the resultant wind blows parallel to the isobar.

This wind is known as the geostrophic wind.

Q 3.Explain the land and sea breezes.

Ans: During the day the land heats up faster and becomes warmer than the sea. Therefore, over the land the air rises giving rise to a low pressure area, whereas the sea is relatively cool and the pressure over sea is relatively high.

Thus, pressure gradient from sea to land is created and the wind blows from the sea to the land which is known as sea breeze. In the night the reversal of condition takes place. The land loses heat faster and is cooler than the sea.

The pressure gradient is from the land to the sea. This breeze is known as land breeze.

Q 4. Discuss the factors affecting the speed and direction of wind.

Answer: Air is set in motion due to the differences in atmospheric pressure. The air in motion is called wind, which blows from high pressure to low pressure. The wind at the surface experiences friction. In addition, rotation of the earth also affects the wind movement. The force exerted by the rotation of the earth is known as the Coriolis force. Thus, the horizontal winds near the earth surface respond to the combined effect of three forces - The pressure gradient force, the frictional force and the

Coriolis force. In addition, the gravitational force acts downward.

1. Pressure gradient force: The differences in atmospheric pressure produce a force. The rate of change of pressure with respect to distance is the pressure gradient. The pressure gradient is strong where the isobars are close to each other and is weak where the isobars are apart.

2. Frictional force: It affects the speed of the wind. It is greatest at the surface and its influence generally extends upto an elevation of 1 – 3 km. Over the sea surface the friction is minimal.

3. Coriolis force: The rotation of the earth about its axis affects the direction of the wind. This force is called the Coriolis force. It deflects the wind to the right direction in the northern hemisphere and in nature. They oscillate with the apparent movement of the sun. In the northern hemisphere in winter they move southwards and in the summer northwards.

Q5. Draw a simplified diagram to show the general circulation of the atmosphere over the globe. What are the possible reasons for the formation of subtropical high pressure over 30° N and S latitudes?

Ans: The general circulation of the atmosphere also sets in motion the ocean water circulation which influences the earth's climate. The general circulation of the atmosphere also affects the oceans. The large-scale winds of the atmosphere initiate large and slow moving currents of the ocean, which in turn provide input of energy and water vapour into the air. These interactions take place rather slowly over a large part of the ocean. The air at the Inter Tropical Convergence Zone (ITCZ) rises because of convection caused by high insolation and a low pressure is created. The winds from the tropics converge at this low pressure zone. The converged air rises along with the convective cell. It reaches the top of the troposphere up to an altitude of 14 km. and moves towards the poles. This causes accumulation of air at about 30° N and S. Part of the accumulated air sinks to the ground and forms a subtropical high. Another reason for sinking is the cooling of air when it reaches 30° N and S latitudes.

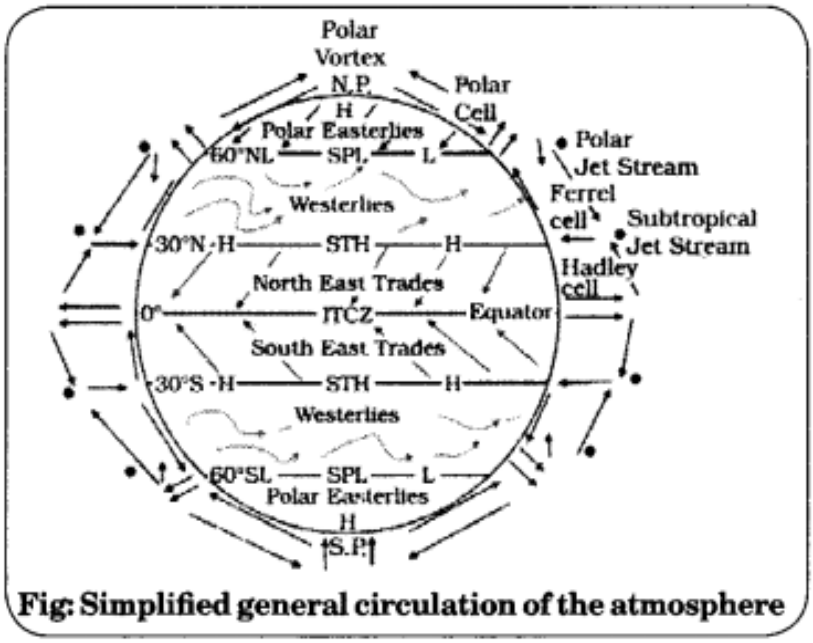


Fig: Simplified general circulation of the atmosphere

Q6. Why does tropical cyclone originate over the seas? In which part of the tropical cyclone do torrential rains and high velocity winds blow and why?

Answer: At the equator, the Coriolis force is zero and the wind blows perpendicular to the isobars. The low pressure gets filled instead of getting intensified. That is the reason why tropical cyclones are not formed near the equator.

Torrential rain occurs in the eye of the cyclone. The strong spirally circulating wind around the center is called the eye. The diameter of the circulating system can vary between 150 and 250 km. The eye is a region of calm with subsiding air. Around the eye is the eye wall, where there is a strong spiraling ascent

of air to greater height reaching the tropopause. The wind reaches maximum velocity in this region, reaching as high as 250 km per hour.

From the eye wall rain bands may radiate and trains of cumulus and cumulonimbus clouds may drift into the outer region. Due to torrential rain, wind blowing from those regions are humid. It brings precipitation in oceanic regions. Due to torrential rains, heavy rain takes place on eastern coast of India and north east coast of China.

Q 7. What are winds? Explain different types of winds.

Answer: Wind is the flow of a huge amount of air, usually from a high pressure area to a low pressure area.

These are the types of wind:

1. Seasonal wind: The wind pattern keeps on changing in different seasons due to the shifting of regions of maximum heating, pressure and wind belts.

2. Local wind: Due to the differences in the heating and cooling of earth surfaces and the cycles those develop daily or annually can create several common, local or regional winds.

3. Mountain and valley wind: In valley regions, during the day the slopes get heated up and air moves upslope. It is called mountain wind and descending wind that fills the gap is called valley winds

Q8. What do you mean by air mass? Name the source regions of air mass.

Answer: The air with distinctive characteristics in terms of temperature and humidity is called an air mass. In other words, it is defined as a large body of air having little horizontal variation in temperature and moisture.

The homogenous surfaces, over which air masses form, are called the source regions. The air masses are classified according to the source regions into five major source regions. These are:

A. Warm tropical and subtropical oceans: Maritime tropical (mT);

B. The subtropical hot deserts: Continental tropical (cT);

C. The relatively cold high latitude oceans: Maritime polar (mP);

D. The very cold snow covered continents in high latitudes: Continental polar (cP);

E. Permanently ice covered continents in the Arctic and Antarctica: Continental arctic (cA).

Q9. What is a front? How many types of front are there? Explain all of them.

Ans: When two different air masses meet, the boundary zone between them is called a front.

The process of formation of the fronts is known as frontogenesis. There are four types of fronts:

1. Cold;

2. Warm;

3. Stationary;

4. Occluded.

1. Cold front: When the cold air moves towards the warm air mass, its contact zone is called the cold front,

2. Warm front: If the warm air mass moves towards the cold air mass, the contact zone is a warm front.

3. Stationary front: When the front remains stationary, it is called a stationary front.

4. Occluded front: If an air mass is fully lifted above the land surface, it iscalled the occluded front.

The fronts occur in middle latitudes and are characterised by steep gradient in temperature and pressure.

 They bring abrupt changes in temperature and cause the air to rise to form clouds and cause precipitation.

Q10. What do you mean by geostrophic wind? On what factors does their pattern depend?

Answer: When isobars are straight and when there is no friction, the pressure gradient force is balanced by the Coriolis force and the resultant wind blows parallel to the isobar. This wind is known as the geostrophic wind.

The pattern of these winds largely depends on:

A. Latitudinal variation of atmospheric heating;

B. Emergence of pressure belts;

C. The migration of belts following apparent path of the sun;

D. The distribution of continents and oceans;

E. The rotation of earth.

Q11. What is a tropical cyclone? Give its two examples. What are the favourable conditions for its formation?

Ans: Tropical cyclones are violent storms that originate over oceans in tropical areas and move over to the coastal areas bringing about large scale destruction caused by violent winds, very heavy rainfall and storm surges. This is one of the most devastating natural calamities. Cyclones in the Indian Ocean and Hurricanes in the Atlantic are its biggest examples. Tropical cyclones originate and intensify over warm tropical oceans. The conditions favourable for the formation and intensification of tropical storms are.

A. Large sea surface with temperature higher than 27 C;

B. Presence of the Coriolis force;

C. Small variations in the vertical wind speed;

D. A pre-existing weak low-pressure area or low-level-cyclonic circulation;

E. Upper divergence above the sea level system.

Q12. Explain about mountain and valley winds.

Ans: In mountainous regions, during the day the slopes get heated up and air moves upslope and to fill the resulting gap the air from the valley blows up the valley. This wind is known as the valley breeze. During the night the slopes get cooled and the dense air descends into the valley as the mountain wind. The cool air, of the high plateaus and ice fields draining into the valley is called katabatic wind. Another type of

warm wind occurs on the leeward side of the mountain ranges. The moisture in these winds, while crossing the mountain ranges condense and precipitate. When it descends down the leeward side of the slope the dry air gets warmed up by adiabatic process. This dry air may melt the snow in a short time.

Q13.What is atmospheric pressure? Name the standard unit to measure the atmospheric pressure. Write the average atmospheric pressure at sea level.

Ans: The weight of a column of air contained in a unit area from the mean sea level to the top of the atmosphere is called the atmospheric pressure. The atmospheric pressure is expressed in units of millibar. At sea level the average atmospheric pressure is

1,013.2 Milibars. Due to gravity the air at the surface is denser and hence has higher pressure.

LONG ANSWER TYPE

Question 1:

Explain the Coriolis effect and its impact on global wind patterns.

Answer: The Coriolis effect is a phenomenon caused by the Earth's rotation, which deflects the path of moving objects, including air currents, to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. This deflection influences global wind patterns by creating distinct wind belts:

1. Trade Winds: Blow from the northeast in the Northern Hemisphere and from the southeast in the Southern Hemisphere, between the equator and 30 degrees latitude.

2. Westerlies: Found between 30 and 60 degrees latitude, these winds blow from the southwest in the Northern Hemisphere and from the northwest in the Southern Hemisphere.

3. Polar Easterlies: Occur between 60 degrees latitude and the poles, blowing from the east.

The Coriolis effect is crucial in the formation of large-scale weather systems and ocean currents, shaping the climate and weather patterns we experience globally.

Q 2: Describe the role of the Intertropical Convergence Zone (ITCZ) in global weather systems.

Ans: The Intertropical Convergence Zone (ITCZ) is a region near the equator where the trade winds from the Northern and Southern Hemispheres converge. This area is characterized by low atmospheric pressure and is a significant factor in global weather systems due to its role in driving convection and precipitation. The ITCZ is often associated with:

1. High Rainfall: As the warm, moist air rises at the ITCZ, it cools and condenses, leading to frequent and intense thunderstorms and heavy rainfall.

2. Climate Regulation: The movement of the ITCZ influences seasonal weather patterns, including the monsoons in Asia and Africa.

3. Migration: The ITCZ shifts north and south with the seasons, affecting the distribution of precipitation and the development of tropical cyclones.

Understanding the ITCZ helps meteorologists predict weather patterns and climate variations across different regions of the world.

Q 3:**Explain the formation and characteristics of tropical cyclones.**

Ans: Tropical cyclones, also known as hurricanes or typhoons, are intense circular storms that originate over warm tropical oceans. Their formation involves several key processes:

1. Warm Ocean Water: Sea surface temperatures above 26.5°C provide the necessary heat and moisture.

2. Coriolis Effect: The Earth's rotation induces a spin in the developing system, essential for cyclone formation.

3. Low Wind Shear: Weak vertical wind shear allows the cyclone to organize and strengthen without being torn apart.

Characteristics of tropical cyclones include:

A. Low-Pressure Center (Eye): A calm, clear region at the storm's core, surrounded by the eye wall, where the most intense weather occurs.

B. Strong Winds: Wind speeds can exceed 120 kilometers per hour, causing extensive damage.

C. Heavy Rainfall: Leading to severe flooding and landslides.

D. Storm Surge: Elevated sea levels driven by the cyclone's winds, causing coastal flooding.

Understanding tropical cyclones' formation and characteristics helps in disaster preparedness and mitigation efforts.

Q 4: **Explain the three-cell model of atmospheric circulation.**

Ans: The three-cell model of atmospheric circulation describes how air circulates in three large cells: **the Hadley cell, the Ferrel cell, and the Polar cell.**

1. Hadley Cell: This cell extends from the equator to about 30° latitude. Warm air rises at the equator, creating a low-pressure zone known as the Inter tropical Convergence Zone (ITCZ). The rising air moves pole ward at high altitudes, cools, and descends at around 30° latitude, creating high-pressure zones. The descending air returns to the equator as the trade winds.

2. Ferrel Cell: Located between 30° and 60° latitude, this cell is driven by the movement of the Hadley and Polar cells. Air flows pole ward near the surface and equator ward at higher altitudes. This cell is less distinct and characterized by westerly winds in the mid-latitudes.

3. Polar Cell: This cell extends from 60° latitude to the poles. Cold air descends at the poles, creating high-pressure zones. The air flows equator ward near the surface and rises at around 60° latitude, where it meets warmer air from the Ferrel cell, creating a low-pressure zone.

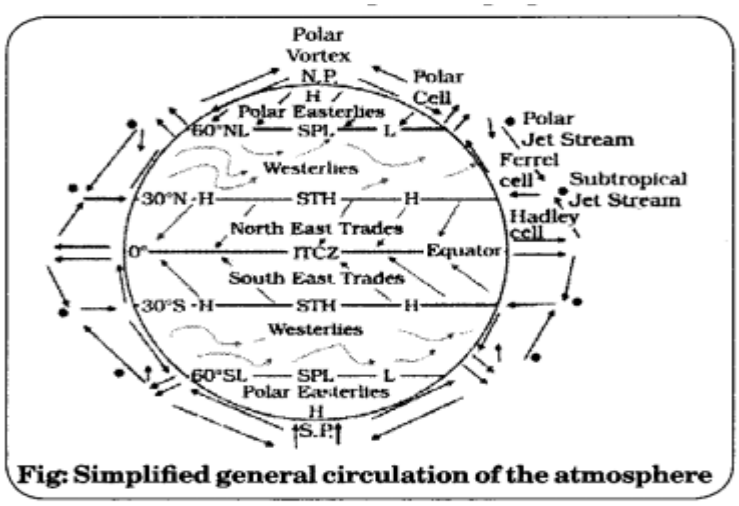


Fig: Simplified general circulation of the atmosphere

These cells help explain the distribution of climatic zones and wind patterns on Earth.

Q 5: **What is Coriolis effect? Discuss the role of the Coriolis effect in atmospheric circulation.**

Ans: The Coriolis effect is a result of Earth's rotation and affects the direction of wind and ocean currents. It causes moving air and water to turn and twist rather than move in a straight line.

1. **Northern Hemisphere:** The Coriolis effect deflects moving air to the right. This deflection creates the trade winds, westerlies, and polar easterlies, which follow a curved path rather than a straight one.
2. **Southern Hemisphere:** The Coriolis effect deflects moving air to the left. This deflection similarly affects the trade winds, westerlies, and polar easterlies, but in the opposite direction compared to the Northern Hemisphere.

   The Coriolis effect is crucial in the formation of large-scale weather systems like cyclones and anticyclones. For example, it causes cyclones to spin counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere. The effect increases with the speed of the moving air and is zero at the equator, becoming stronger toward the poles.

Q 6: How do cyclones form? What are their main characteristics?

Ans: Cyclones, also known as hurricanes or typhoons in different regions, are intense low-pressure systems that form over warm ocean waters.

Formation:

1. **Warm Sea Surface:** Cyclones form over sea surfaces with temperatures of at least 26.5°C, providing the heat and moisture needed for the storm.

2. Low-Pressure Area: A pre-existing low-pressure area allows warm, moist air to rise, creating thunderstorms.

3. Coriolis Effect: The Coriolis effect causes the rising air to rotate, forming the cyclonic structure.

4. Upper-Level Winds: Weak upper-level winds help the storm to organize and intensify.

Characteristics:

1. Eye: The center of the cyclone, characterized by calm weather and clear skies.

2. Eye Wall: Surrounding the eye, it contains the most intense winds and heavy rainfall.

3. Rainbands: Spiral bands of clouds and thunderstorms that extend outward from the eye wall.

Cyclones can cause severe weather, including heavy rainfall, strong winds, storm surges, and flooding, leading to significant damage and loss of life.

Q 7. **Draw a simplified diagram to show the general circulation of the atmosphere over the globe. What are the possible reasons for the formation of subtropical high pressure over 30° N and S latitudes?**

Answer: The general circulation of the atmosphere also sets in motion the ocean water circulation which influences the earth's climate. The general circulation of the atmosphere also affects the oceans. The large-scale winds of the atmosphere initiate large and slow moving currents of the ocean, which in turn provide input of energy and water vapour into the air.

These interactions take place rather slowly over a large part of the ocean. The air at the Inter Tropical Convergence Zone (ITCZ) rises because of convection caused by high insolation and a low pressure is created. The winds from the tropics converge at this low pressure zone. The converged air rises along with the convective cell. It reaches the top of the troposphere up to an altitude of 14 km. and moves towards the poles. This causes accumulation of air at about 30° N and S. Part of the accumulated air sinks to the ground and forms a subtropical high. Another reason . for sinking is the cooling of air when it reaches 30° N and S latitudes.

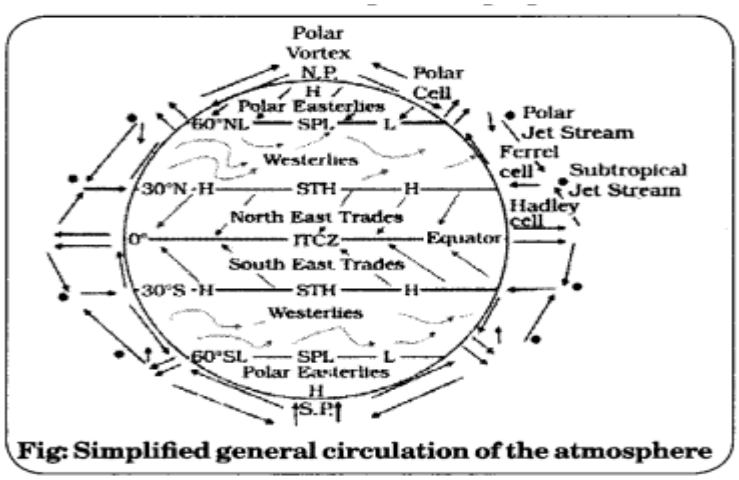


Fig: Simplified general circulation of the atmosphere

Q 8.

Why does tropical cyclone originate over the seas? In which part of the tropical cyclone do torrential rains and high velocity winds blow and why?

Ans: At the equator, the Coriolis foroe is zero and the wind blows perpendicular to the isobars. The low pressure gets filled instead of getting intensified. That is the reason why tropical cyclones are not formed near the equator.

Torrential rain occurs in the eye of the cyclone. The strong spirally circulating wind around the centre is called the eye. The diameter of the circulating system can vary between 150 and 250 km. The eye is a region of calm with subsiding air. Around the eye is the eye wall, where there is a strong spiralling ascent

of air to greater height reaching the tropopause. The wind reaches maximum velocity in this region, reaching as high as 250 km per hour.

From the eye wall rain bands may radiate and trains of cumulus and cumulonimbus clouds may drift into the outer region. Due to torrential rain, wind blowing from those regions are humid. It brings precipitation in oceanic regions. Due to torrential rains, heavy rain takes place on eastern coast of India and north east coast of China.

Q9. What are winds? Explain different types of winds.
Ans- Wind is the flow of a huge amount of air, usually from a high pressure area to a low pressure area. These are the types of wind:

1. Seasonal wind: The wind pattern keeps on changing in different seasons due to the shifting of regions of maximum heating, pressure and wind belts.
2. Local wind: Due to the differences in the heating and cooling of earth surfaces and the cycles those develop daily or annually can create several common, local or regional winds.
3. Mountain and valley wind: In valley regions, during the day the slopes get heated up and air moves upslope and to fill the resulting gap the air from the valley blows up the valley.

Qu10. **What is air mass? In how many categories are air masses categorized on the basis of their source regions?**
Ans: The air with distinctive characteristics in terms of temperature and humidity is called an air mass. In other words, it is defined as a large body of air having little horizontal variation in temperature and moisture.
The homogenous surfaces, over which air masses form, are called the source regions. The air masses are classified according to the source regions into five major source regions. These are:

1. Warm tropical and subtropical oceans: Maritime tropical (mT);
2. The subtropical hot deserts: Continental tropical (cT);
3. The relatively cold high latitude oceans: Maritime polar (mP);
4. The very cold snow covered continents in high latitudes: Continental polar (cP);
5. Permanently ice covered continents in the Arctic and Antarctica: Continental arctic (cA).

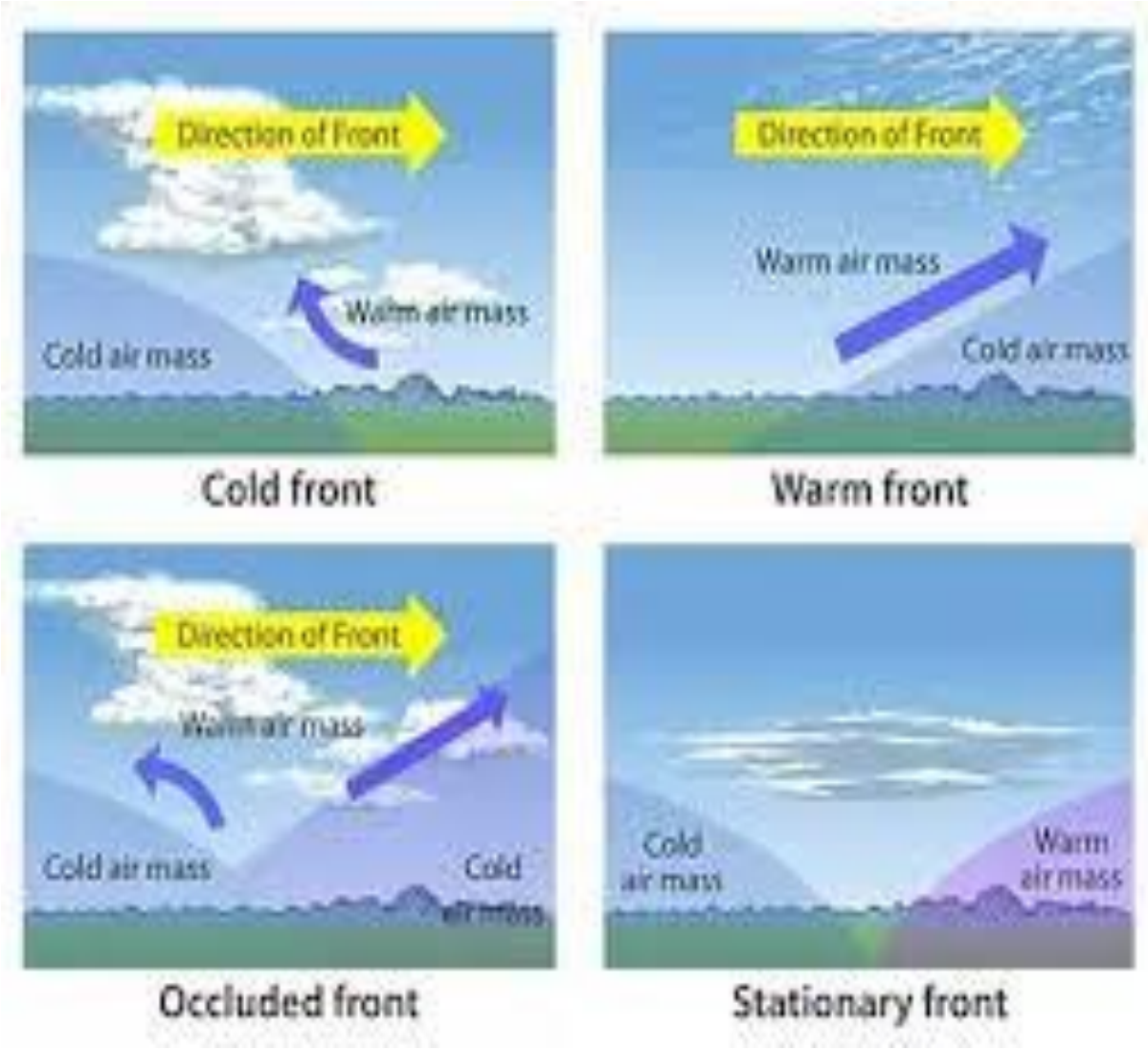
Qu11. **What is a front? How many types of front are there? Explain all of them.**
Ans: When two different air masses meet, the boundary zone between them is called a front.
The process of formation of the fronts is known as frontogenesis. There are four types of fronts:

1. Cold;
2. Warm;
3. Stationary;
4. Occluded.

1. Stationary front: When the front remains stationary, it is called a stationary front.
2. Cold front: When the cold air moves towards the warm air mass, its contact zone is called the cold front,
3. Warm front: If the warm air mass moves towards the cold air mass, the contact zone is a warm front.

4. Occluded front: If an air mass is fully lifted above the land surface, it is called the occluded front. The fronts occur in middle latitudes and are characterised by steep gradient in temperature and pressure.

They bring abrupt changes in temperature and cause the air to rise to form clouds and cause precipitation.



CHAPTER 10

WATER IN THE ATMOSPHERE

GIST OF THE LESSON

- Water is present in the atmosphere in three forms namely gaseous liquid and solid
- Water vapour present in the air is known as humidity the actual amount of water vapour present in the atmosphere is known as absolute humidity.

- The percentage of master present in the atmosphere as compared to its full capacity at a given temperature is known as the relative humidity
- The air containing moisture to its full capacity at a given temperature it said to be saturated the temperature at which saturation occurs in a given sample of air is known as dew point .
- Evaporation and condensation: -----
- Evaporation is a process by which water is transform from liquid to gaseous state
- The transformation of water vapour into water is called condensation condensation is caused by the loss of heat. If it directly condenses into solid form, it is known as sublimation.
- Particles of dust smoke and salt from the ocean are particularly good nuclei because they absorb water. Condensation also takes place when the moist air comes into contact with some colder object and it may also take place when the temperature is close to the dew point.
- Condensation influenced by the volume of air, temperature, pressure and humidity.
- After condensation the water vapour or the moisture in the atmosphere takes one of the following forms - Dew, Frost, Fog and clouds. Condensation takes place when the dew point is lower than the freezing point as well as higher than the freezing point.
- Dew: - when the moisture is deposited in the form of water droplets on cooler surface of solid objects such as stones, grass blades and plant leaves, is known as dew.
- Frost: -Frost forms on cold surfaces when condensation takes place below freezing point (0^0). The access moisture is deposited in the form of minute ice crystal instead of water droplet.
- Fog and Mist- the fog is a cloud with its base at or very near to the ground.Because of the fog and mist the visibility becomes poor to zero. Condition when fog is mixed with smoke is described as smog. The only difference between the mist and fog is that mist contains more moisture than the fog. Fogs are drier than mist and they are prevalent where warm currents of air come in contact with cold currents.
- Clouds:- Cloud is a mass of minute water droplets or tiny crystals of ice formed by the condensation of the water vapour in free air at considerable elevations. According to their height expanse, density and transparency or opaqueness clouds are grouped under four types :-
  (I)Cirrus (ii) Cumulus (iii) Stratus (iv) Nimbus.

Cirrus: - Cirrus. Clouds are formed at high altitudes (8000 to 12000m).

Cumulus: - This clouds look like cotton wool. They are generally formed at a height of 4000 to 7000 m.

Stratus: - These clouds are generally formed either due to loss of heat or the mixing of air masses with different temperatures.

Nimbus- Nimbus clouds are black or dark grey. These are extremely dance and opaque to the rays of the Sun. Nimbus clouds are shapeless masses of thick vapour.

A combination of these four basic types can give rise to the following types of clouds: High clouds - Cirrus, Cirrostratus, Cirrocumulus,

Middle clouds---altostratus, altocumulus and

Low clouds -Stratocumulus and nimbostratus.

Precipitation:-

After the condensation of water vapour, the release of moisture is known as 'precipitation'. This may take place in liquid or solid form. The precipitation in the form of water is called rainfall.

Besides rain and snow, other forms of precipitation are sleet and hail. Sleet is frozen raindrops and frozen melted snow- water.

Types of rainfall:-

On the basis of origin rainfall maybe classified into three main type

The Convectional rainfall, Orographic or relief rainfall, and Cyclonic or frontal rainfall.

World distribution of rainfall-

Different places on the earth's surface receive different amount of rainfall in a year and that too in different seasons.

In general as the proceed from the equator towards the poles rainfall goes on decreasing steadily rainfall is more over the oceans than on the land masses of the world because of being great sources of water.

Multiple choice question/ answer

1. Which of the following process is responsible for transforming water vapour into solid?

A) Condensation (B) Transpiration (C) Sublimation (D). Precipitation

And:- (c) sublimation

2. The air that contains moisture to its full capacity---

A) Relativehumidity (B) specific humidity D). Absolute humidity (D). Saturated air

Ans:- D) saturated air

3. Which of the following is the most important constituent of the atmosphere for human beings

(A) Water vapour. (B) Nitrogen. (C) Dust particles (D) oxygen

Ans:- (A)water vapour

4. Which one of the following is the highest cloud in the sky?

(A) Cirrus. (B) Stratus (c) Nimbus (D) Cumulus

Ans:- (A) Cirrus

5. Which of the following process is responsible for transforming liquid into vapour----

(A) Transpiration (B) Condensation

(C) Evaporation. (D) Precipitation

Ans:- (C) evaporation

6. Assertion: water covers a very big area of the Earth surface.

Reason: the hydrosphere comprises water in all its forms that is ice water and water vapour

A. Both assertion and reason are correct and reason is the correct explanation for assertion.

B both assertion and reason are correct and reason is not the correct explanation of assertion

C. Assertion is correct but reason is incorrect

D both assertion and reason are incorrect.

Ans - A

7. Assertion: the temperature at which the water starts evaporating is referred to as the latent heat of vaporization

Reason: When water vapour condenses they lose their latent heat of vaporization and increase the temperature of atmosphere.

A both assertion and reason are correct and reason is the correct explanation of assertion.

B both assertion and reason are correct and reason is not the correct explanation of assertion.

C. Assertion is correct but reason is incorrect.

D Both assertion and reason are incorrect

Ans- B both assertion and reason are correct and reason is not the correct explanation of assertion

SHORT ANSWER QUESTIONS 3 MARKS

1. Explain relative humidity.

Ans:-- At a certain temperature amount of water vapour present in comparison to its full capacity is called relative humidity.

2. Why does amount of water vapour decreases with increase of altitude?

Ans:--Water vapour in the atmosphere is the result of the evaporation of water from the Earth's surface, Since the air becomes thinner with the altitude so also does the water vapour.

3. Describe various sources of atmospheric moisture on the earth.

Ans:-- The surface of the ocean is the greatest source of atmospheric moisture. Besides, smaller water bodies, vegetation and damp surfaces also contribute significant amount of moisture.

4. What is precipitation? What are the conditions to determine the forms of precipitation?

Ans:- Precipitation is a process of condensation of water vapour in the atmosphere which falls to the earth in the form of rain snow hail or sleet These are the various forms of precipitation.

Conditions for precipitation:-

1. There should be evaporation so that the relative humidity is high in the air.

2 There should be adiabatic cooling of the moist air.

3. There should be dust particles in the air.

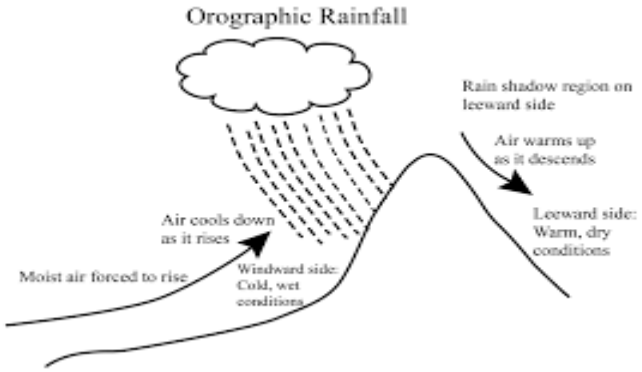
LONG ANSWER TYPE QUESTIONS

Que 1. Why does dew not form on cloudy, windy nights and shady places?

Ans:- Dew is formed when objects radiate heat thoroughly so that the moist air coming into contact with them may be sufficiently cooled down and the water vapour condenses into water droplets. The clouds act as a blanket for the earth’s surface. They check the radiation of heat so it does not radiate heat thoroughly. Hence, dew is not formed on cloudy night and in shady places.

Que. 2

Source Based Question Answer::



1. Study the following diagram and answer the following questions.

A. Identify the type of rainfall.

Ans:-orographic rainfall

B. How is orographic rain caused?

Ans:- It is caused when masses of air pushed by wind are forced up the side of elevated land formation such as large mountains.

C. What is rainshadow area?

Ans:- Backside of the mountain which receives least amount of rainfall is called rain shadow area.

CHAPTER 11

WORLD CLIMATE AND CLIMATE CHANGE

(To be tested through internal assessments in the form of project and presentation)

CHAPTER 12

WATER (OCEANS)

GIST OF THE LESSON

HYDROLOGICAL CYCLE

Definition: Circulation of water within the earth' hydrosphere in different forms i.e. the liquid, solid, and gaseous phases.

Components: Oceans (71% of planetary water), freshwater in glaciers, icecaps, groundwater, lakes, soil moisture, atmosphere, streams, and within life.

Nearly 59 per cent of the water that falls on land returns to the atmosphere through evaporation from over the oceans as well as from other places.

Processes: Evaporation, condensation, precipitation, runoff, infiltration, and glacier formation.

It is to be noted that the renewable water on the earth is constant while the demand is increasing tremendously. This leads to water crisis in different parts of the world — spatially and temporally.

RELIEF OF THE OCEAN FLOOR

Divisions of the Ocean Floors

The ocean floors can be divided into four major divisions:

1) The Continental Shelf;

2) The Continental Slope;

3) The Deep Sea Plain;

4) The Oceanic Deeps.

Besides, these divisions there are also major and minor relief features in the ocean floors like ridges, hills, sea mounts, guyots, trenches, canyons, etc.

Continental Shelf

1. The continental shelf is the extended margin of each continent occupied by relatively shallow seas and gulfs.

2. It is the shallowest part of the ocean showing an average gradient of 1° or even less.

3. The shelf typically ends at a very steep slope, called the shelf break.

4. The width of the continental shelves vary from one ocean to another.

5. The average width of continental shelves is about 80 km.

6. The shelves are almost absent or very narrow along some of the margins like the coasts of Chile, the west coast of Sumatra, etc.

7. On the contrary, the Siberian shelf in the Arctic Ocean, the largest in the world, stretches to 1,500 km in width.

8. The depth of the shelves also varies. It may be as shallow as 30 m in some areas while in some areas it is as deep as 600 m.

9. The continental shelves are covered with variable thicknesses of sediments brought down by rivers, glaciers, wind, from the land and distributed by waves and currents.

10. Massive sedimentary deposits received over a long time by the continental shelves, become the source of fossil fuels.

Continental Slope

1. The continental slope connects the continental shelf and the ocean basins.

2. It begins where the bottom of the continental shelf sharply drops off into a steep slope.

3. The gradient of the slope region varies between 2-5°.

4. The depth of the slope region varies between 200 and 3,000 m.

Deep Sea Plain

1. Deep sea plains are gently sloping areas of the ocean basins.

2. These are the flattest and smoothest regions of the world.

3. The depths vary between 3,000 and 6,000 m.

4. These plains are covered with fine-grained sediments like clay and silt.

Oceanic Deeps or Trenches

1. These areas are the deepest parts of the oceans.

2. The trenches are relatively steep sided, narrow basins.

3. They are some 3-5 km deeper than the surrounding ocean floor.

4. They occur at the bases of continental slopes and along island arcs and are associated with active volcanoes and strong earthquakes.

5. That is why they are very significant in the study of plate movements.

6. As many as 57 deeps have been explored so far; of which 32 are in the Pacific Ocean; 19 in the Atlantic Ocean and 6 in the Indian Ocean.

Mid-Oceanic Ridges

1. A mid-oceanic ridge is composed of two chains of mountains separated by a large depression.

2. The mountain ranges can have peaks as high as 2,500 m and some even reach above the ocean‘s surface.

3. Iceland, a part of the mid Atlantic Ridge, is an example.

Seamount

It is a mountain with pointed summits, rising from the seafloor that does not reach the surface of the ocean. Seamounts are volcanic in origin. These can be 3,000-4,500 m tall. The Emperor seamount, an extension of the Hawaiian Islands in the Pacific Ocean, is a good example.

Submarine Canyons

These are deep valleys, some comparable to the Grand Canyon of the Colorado River. They are sometimes found cutting across the continental shelves and slopes, often extending from the mouths of large rivers. The Hudson Canyon is the best known submarine canyon in the world.

Guyots

It is a flat topped seamount. They show evidences of gradual subsidence through stages to become flat topped submerged mountains. It is estimated that more than 10,000 seamounts and guyots exist in the Pacific Ocean alone.

Atoll

These are low islands found in the tropical oceans consisting of coral reefs surrounding a central depression. It may be a part of the sea (lagoon), or sometimes form enclosing a body of fresh, brackish, or highly saline water.

TEMPERATURE OF OCEAN WATERS

Ocean waters get heated up by the solar energy just as land.

The process of heating and cooling of the oceanic water is slower than land.

Factors Affecting Temperature Distribution ON THE OCEANS

The factors which affect the distribution of temperature of ocean water are :

(i) Latitude: the temperature of surface water decreases from the equator towards the poles because the amount of insolation decreases pole ward.

(ii) Unequal distribution of land and water: the oceans in the northern hemisphere receive more heat due to their contact with larger extent of land than the oceans in the southern hemisphere.

(iii) Prevailing wind: the winds blowing from the land towards the oceans drive warm surface water away from the coast resulting in the upwelling of cold water from below. It results into the longitudinal variation in the temperature. Contrary to this, the onshore winds pile up warm water near the coast and this raises the temperature.

(iv) Ocean currents: warm ocean currents raise the temperature in cold areas while the cold currents decrease the temperature in warm ocean areas. Gulf stream (warm current) raises the temperature near the eastern coast of North America and the West Coast of Europe while the Labrador current (cold current) lowers the temperature near the north-east coast of North America.

(v) Horizontal and Vertical Distribution of Temperature: The temperature-depth profile for the ocean water shows how the temperature decreases with the increasing depth. The profile shows a boundary region between the surface waters of the ocean and the deeper layers. The boundary usually begins around 100 -400 m below the sea surface and extends several hundred of metres downward .This boundary region, from where there is a rapid decrease of temperature, is called the thermocline. About 90 per cent of the total volume of water is found below the thermocline in the deep ocean. In this zone, temperatures approach 0° C. The temperature structure of oceans over middle and low latitudes can be described as a three-layer system from surface to the bottom.

The first layer represents the top layer of warm oceanic water and it is about 500m thick with temperatures ranging between 20° and 25° C. This layer, within the tropical region, is present throughout the year but in mid -latitudes it develops only during summer.

The second layer called the thermocline layer lies below the first layer and is characterized by rapid decrease in temperature with increasing depth. The thermocline is 500 -1,000 m thick. The third layer is very cold and extends up to the deep ocean floor. In the Arctic and Antarctic circles, the surface water temperatures are close to 0° C and so the temperature change with the depth is very slight. Here, only one layer of cold water exists, which extends from surface to deep ocean floor.

SALINITY OF OCEAN WATERS

Salinity is the term used to define the total content of dissolved salts in sea water It is calculated as the amount of salt (in gm) dissolved in 1,000 gm (1 kg) of seawater. It is usually expressed as parts per thousand (o/) or ppt. Salinity is an important property of sea water. Salinity of 24.7°/oo has been considered as the upper limit to demarcate _brackish water‘.

Factors affecting ocean salinity are mentioned below:

(i) The salinity of water in the surface layer of oceans depend mainly on evaporation and precipitation.

(ii) Surface salinity is greatly influenced in coastal regions by the fresh water flow from rivers, and in Polar Regions by the processes of freezing and thawing of ice.

(iii) Wind, also influences salinity of an area by transferring water to other areas.

(iv) The ocean currents contribute to the salinity variations. Salinity, temperature and density of water are interrelated. Hence, any change in the temperature or density influences the salinity of water in an area.

MULTIPLE CHOICE QUESTIONS

1. Which of the following is the deepest part of the world’s oceans?

(A) Mariana Trench (B) Tonga Trench

(C) Java Trench (D) Philippine Trench

Ans- (A) mariana trench

2. The salinity of ocean water is generally measured in which unit?

(A) Grams per liter (B) Parts per million

(C) Parts per thousand (D) Kilograms per cubic meter

Ans – (C) parts per thousand

3. A major portion of sea level is found at:

(A) 10-12 km below sea level

(B) 6-9 km below sea level

(C) 3-6 km below sea level

(D) 1-2 km below sea level

Ans – (C) 3-6 km below sea level

4. The geographers have divided the oceanic part of the earth into _____ oceans.

(A) Two (B) Three (C) Four (D) Five

Ans – (D) five

5. What is the average salinity of seawater?

(A) 25‰ (B) 30‰ (C) 35‰ (D) 40‰

Ans – (C) 35‰

6. Which of the following statements is true about the continental shelf?

(A) It is the steep slope at the edge of the continent.

(B) It is the gently sloping area next to the continent.

(C) It is the deepest part of the ocean.

(D) It is a mountain range under the ocean.

Ans – (B) It is the gently sloping area next to the continent.

7. The average depth of continental slope varies between:

(A) 2-20 m (B) 200-2,000 m

(C) 20-200 m (D) 2,000-20,000 m

Ans – (B) 200-2,000 m

8. Identify the element which is not a part of the hydrological cycle:

(A) Evaporation (B) Hydration

(C) Precipitation (D) Condensation

Ans – (B) Hydration

9. A mid-ocean ridge is an underwater mountain system formed by

(A) Plate tectonics. (B) Earthquake.

(C) Ocean currents. (D) Submarine landslides.

Ans – (A) Plate tectonics.

10. The factor affecting the distribution of temperature of ocean water is

(A) Evaporation. (B) Precipitation. (C) Hydration. (D) Ocean currents.

Ans – (D) Ocean currents

11. The salinity increases with depth and there is a distinct zone called

(A) isohaline. (B) halocline. (C) salocline. (D) thermocline.

Ans –(B) halocline.

12. Which one of the following is not minor relief feature in the oceans?

(A) sea mount (B) oceanic deep (C) atoll (D) guyot

Ans –(B) oceanic deep

13. Salinity is expressed as the amount of salt in gram dissolved in sea water per

(A) 10 gm (B) 100 gm (C) 1000gm (D) 10000 gm

Ans –(C) 1000gm

14. Which one of the following is the smallest ocean?

(A) Indian ocean (B) Atlantic ocean (C) Arctic ocean (D) Pacific ocean

Ans –(C) Arctic ocean

15. Which of the following reservoir contains the largest amount of water

(A) Ice cap and glacier (B) Streams and rivers

(C) Lakes (D) Atmosphere

Ans – (A) Ice cap and glacier

16. Which of the following ocean as the largest number of ocean deeps

(A) Pacific (B) Indian

(C) Atlantic (D) Arctic

Ans – (A) Pacific

17. Which one of the following is not the major division of ocean floor-

(A) Continental shelf (B) Continental slope

(C) Mid oceanic ridge (D) Oceanic deeps

Ans – (C) Mid oceanic ridge

18. The average depth of the deep sea plain varies between

(A) 300-1000 m (B) 1000-3000m

(C) 3000-6000 m (D) 6000- 8000 m

Ans –(C) 3000-6000 m

19. Which of the following shelf is the largest in the world-

(A) The Siberian shelf in the Atlantic Ocean

(B) The European shelf in the Mediterranean Sea

(C) The North American shelf in the Pacific Ocean

(D) The African shelf in the Indian Ocean

Ans –(A) The Siberian shelf in the Atlantic Ocean

20. The boundary from where there is a rapid decrease of temperature with the increasing

depth in the ocean , called-

(A) Pycnocline (B) thermocline

(C) halocline (D) isocline

Ans –(B) thermocline

21. About _____ percent of the total volume of water is found below the thermocline in the deep ocean.

(A) 25 (B) 60 (C) 75 (D) 90

Ans –(D) 90

22. The thickness of the thermocline is –

(A) 500- 1000 m (B) 1000-2000m (C) 2000-3000m (D) 4000-5000m

Ans –(A) 500- 1000 m

23. Which of the following water bodies has the highest salinity in the world-

(A) Van lake (B) Dead sea (C) Great salt lake (D) Assal lake

Ans –(A) Van lake

24. The salinity for normal open ocean ranges between-

(A) 15 ‰ – 22 ‰ (B) 22 ‰ – 32 ‰

(C) 33 ‰ - 37 ‰ (D) 38 ‰ – 45 ‰

Ans –(C) 33 ‰ - 37 ‰

25. The average salinity of the Indian ocean is

(A) 31 ‰ (B) 35 ‰

(C) 38 ‰ (D) 41 ‰

Ans –(B) 35 ‰

3 MARKS QUESTIONS

Q1.Differentiate between continental shelf and continental slope.

Ans: **Continental shelf:**

1. It is an extended margin of each continent occupied by shallow sea, gulfs, etc. It is asubmerge part of the land adjoining the coast.

2. It is shallow and is about 800m deep with an average gradient 1° or even less.

3. Its edges extended upto the depth of 150-200 m. ‘

4. It contains the sediments deposited with land its average width is 80km.

5. The largest continental shelf is a Siberian shelf in Arctic Ocean which stretches upto 1500 km of width.

6. About one-fourth of the petroleum is produced from oil wells on the continental shelfs.

7. It is important for coastal transport and trade.

Continental slopes:

1. It represents the edge of continental block.

2. It connects continental shelf and ocean basin.

3. The depth varies from 200-300 m.

4. Its average gradient is 2-5°.

5. It has a steep slope linking continental shelf and deep sea §ow lying at an average depth of 3600m.

6. Canyons are formed here.

Q2. The average temperature of water on oceans floor keeps on falling from equator to poles systematically. Explain.

Ans: 1. The average temperature of surface water of the- oceans is about 27°C and it gradually decreases from the equator towards the poles.

2. The rate of decrease of temperature with increasing latitude is generally 0.5°C per latitude.

3. The average temperature is around 22°C at 20° latitudes, 14° C at 40° latitudes and 0° C near poles.

4. The oceans in the northern hemisphere record relatively higher temperature than in the southern hemisphere.

5. The highest temperature is not recorded at the equator but slightly towards north of it.

6. The average annual temperatures for the northern and southern hemisphere are around 19°

C and 16° C respectively. This variation is due to the unequal distribution of land and water

in the northern and southern hemispheres.

Q3.Explain about horizontal distribution of salinity.

Ans: **Horizontal distribution of salinity:**

- The salinity for normal Open Ocean ranges between 33% and 37%. In the land locked Red

Sea records higher salinity due to high evaporation. Salinity is, however, very low in Black Sea due to enormous fresh water influx by rivers.

- The average salinity of the Indian Ocean is 35 %.
- The low salinity trend is observed in the Bay of Bengal due to influx of river water.

On the contrary, the Arabian Sea shows higher salinity due to high evaporation and low influx of fresh water.

Q4. Read the passage and answer the following questions

Continental shelf is the extended margin of each continent occupied by relatively shallow seas and gulfs. It is the shallowest part of the ocean showing an average gradient of 1° or even less. The shelf typically ends at a very steep slope, called the shelf break. The width of the continental shelves vary from one ocean to another. The average width of continental shelves is about 80 km. The shelves are almost absent or very narrow along some of the margins like the coasts of Chile, the west coast of Sumatra, etc. On the contrary, the Siberian shelf in the Arctic Ocean, the largest in the world, stretches to 1,500 km in width. The depth of the shelves also varies. It may be as shallow as 30 m in some areas while in some areas it is as deep as 600 m. The continental shelves are covered with variable thicknesses of sediments brought down by rivers, glaciers, wind, from the land and distributed by waves and currents. Massive sedimentary deposits received over a long time by the continental shelves, become the source of fossil fuels.

Q1) Continental Shelf ending at a steep slope is termed as

A) Shelf break B) Shelf gap C) Shelf Trench D) Shelf ridge

Ans- (A) shelf break

Q2) Continental shelves are present or have a very wider area along the coasts of

A) Sumatra B) Siberia C) Chile D) none of the above

Ans- B) Siberia

Q3) Continental shelf is the

A) Shallowest part of the ocean B) Deepest part of the ocean

C) Equal to depth of a Trench D) All of the above

Ans- A) Shallowest part of the ocean

LONG ANSWER TYPE

Q1. Explain about vertical distribution of salinity.

Answer: Vertical distribution of salinity

Salinity changes with depth, but the way it changes depends upon the location of the sea.

Salinity at the surface increases by the loss of water to ice or evaporation, or decreased by the input of fresh waters, such as from the rivers.

Salinity at depth is very much fixed, because there is no way that water is 'lost', or the salt is 'added.'

There is a marked difference in the salinity between the surface zones and the deep zones of the oceans. The lower salinity water rests above the higher salinity dense water.

Salinity, generally, increases with depth and there is a distinct zone called the halocline, where salinity increases sharply.

Other factors being constant, increasing salinity of seawater causes its density to increase.

High salinity seawater, generally, sinks below the lower salinity water. This leads to stratification by salinity.

Q2. Explain about vertical distribution of temperature.

Answer: The temperature structure of oceans over middle and low latitudes can be described as three-layer system from surface to the bottom.

The first layer represents the top layer of warm oceanic water and it is about 500 m thick with temperatures ranging between 20° and 25° C. This layer, within the tropical region, is present throughout the year but in mid-latitudes it develops only during summer.

The second layer called the thermocline layer lies below the first layer and is characterised by rapid decrease in temperature with increasing depth. The thermocline is 500 – 1,000 m thick.

The third layer is very cold and extends upto the deep ocean floor. In the Arctic and Antarctic circles, the surface water temperatures are close to 0 C and so the temperature change with the depth is very slight.

Q3. "Ocean seems to be water body but it has many types of landforms within it". Justify the statements by giving some examples.

Ans: The statement is absolutely right. Like the surface of the earth ocean flow is neither level or flat, it is undulating and varying. It comprises of different types of landforms below it. Some of these are:

Continental shelf: It is an extended margin of each continent occupied by shallow sea, gulfs, etc. It is a submerge part of the land adjoining the coast. Continental slopes: It represents the edge of continental block. It connects continental shelf and ocean basin. The depth varies from 200-300 m.

Abyssal Plains (The Deep Sea Plains): These are the world's §attest and smoothest regions.

About 40% of the oceanic floor is flat. It is formed accumulation of sediments on the seafloor. Its depth varies from 3000-6000m.

Sub Marine Ridges: Oceanic floors have sub-marine narrow and elongated ridges. They resemble mountain ridges on the earth surface. Peak of these ridges may rise above the sea level to form islands. Eg- Philippines Ice land is a mid-Atlantic ridge.

Oceanic deeps of sub-marine trenches: Deep narrow steep sided depression found along the abyssal plain. The depth of these trenches may vary from 6,000 to 11,000 m. Example, Marina trenches is the deepest trench in Pacific Ocean.

Q4. Explain hydrological cycle.

Ans: The hydrological cycle is a conceptual model that describes the storage and movement of water between the biosphere, atmosphere, lithosphere, and the hydrosphere.

Water on our planet can be stored in any one of the following major reservoirs: atmosphere, oceans, lakes, rivers, soils, glaciers, snowfields, and groundwater.

Water moves from one reservoir to another by way of processes like evaporation,condensation, precipitation, deposition, runoff, infiltration, sublimation, transpiration, melting, and ground water flow.

The oceans supply most of the evaporated water found in the atmosphere. Of this evaporated water, only 91% of it is returned to the ocean basins by way of precipitation. The remaining

9% is transported to areas over landmasses where climatologically factors induce the formation of precipitation.

The resulting imbalance between rates of evaporation and precipitation over land and ocean is corrected by runoff and groundwater flow to the oceans

CHAPTER 13
MOVEMENTS OF OCEAN WATER

CHAPTER AT A GLANCE

1. The ocean water is dynamic.
2. The physical characteristics of ocean water like temperature, salinity, density and the external forces like the sun, moon and the winds influence the movement of the ocean water.
3. The horizontal motion refers to the ocean currents and waves.
4. The vertical motion refers to tides.
5. Ocean currents are the continuous flow of huge amount of water in a different direction while the waves are the horizontal motion of water.

6. Waves are actually the energy, not the water as such, which moves across the ocean surface.
7. Most of the waves are caused by the wind driving against water.
8. A wave size and shape reveal its origin.
9. Steep waves are fairly young ones and are probably formed by local wind.
10. The maximum wave height is determined by the strength of the wind.
11. The periodical rise and fall of the sea level, once or twice a day, mainly due to the attraction of the sun and the moon, is called a tide.
12. Movements of water caused by meteorological effect are called surges.
13. Centrifugal force is the force that acts to counter balance the gravity.
14. Centrifugal force is also responsible for causing tide.
15. The tide generating force is the difference between the gravitational attraction of the moon and the centrifugal force.
16. When the tide is channeled between islands or into bays and estuaries, they are called tidal currents.
17. Tides vary in their frequency, direction and movement from place to place and also from time to time.
18. Once in a month, when the moon's orbit is closest to the earth, perigee, unusually high and low tides occur and two weeks later, when the moon is farthest from earth, apogee, the moon gravitational force is limited and the tidal ranges are less than their average heights.
19. The time between the high tide and low tide, when the water is falling, is called the ebb.
20. The time between the low tide and high tide when the tide is rising, is called the flow or flood.

1. MCQ

Q1. Primary force which affects the ocean currents:
(a) Heating by solar energy
(b) Wind
(c) Gravity
(d) All of these.
Answer: (d) All of these

Q2. What per cent of ocean water is in the form of deep-water currents?
(a) 50% (b) 60% (c) 80% (d) 90%.
Answer: (d) 90%

Q3. What is the unit for measuring speed of waves?
(a) Km (b) Knot (c) Cm (d) Millibars.
Answer: (b) Knot

Q4. Read the above given statements and select the option that is true.
Assertion [A]: There is no fixed direction of rotation of the ocean currents in the northern part of the Indian Ocean.
Reason [R]: The seasonal winds change direction every season.

(a)Both A and R are true. R is the correct explanation for A.
(b)Both A and R are true. R is the incorrect explanation for A.
(c)A is true but R is false.
(d)Both A and R are false.
Answer: (c) A is true but R is false.
Q5. Match the following about movement of water on ocean surface and choose the correct option.

A.	Cold OceanCurrents	(i)	Alternate rise and fall of water on ocean surface.
B.	Tides	(ii)	Rhythmic rise and fall of Ocean water twice in a day.
C.	Waves	(ii)	Originated near the equator.
D.	Warm Ocean Currents	(iv)	Carry water form polar to tropical latitudes

1. (A)-(iii), (B)-(i), (C)-(iv), (d)-(ii)
2. (A)-(ii), (B)-(iv), (C)-(iii), (d)-(i)
3. (A)-(i), (B)-(iii), (C)-(ii), (d)-(iv)
4. (A)-(iv), (B)-(ii), (C)-(i), (d)-(iii)

Answer: 4. (A)-(iv), (B)-(ii), (C)-(i), (d)-(iii)

2. SA

Q6. Classify the Ocean currents.
Answer: The Ocean Currents are broadly classified into (i) Cold Currents and, (ii) Warm Currents

Q7. Which forces influence the movement of ocean water?
Answer: The external forces like the sun, moon and the winds influence the movement of ocean water.

Q8. Give another name of Tropical easterlies
Answer: Tropical easterlies are also known as trade winds.

Q9. What are tides?
Answer: The periodical rise and fall of the sea level, once or twice a day, mainly due to the attraction of the sun and the moon, is called a tide. Tides vary in their frequency, direction and movement from place to place and also from time to time.

Q10. What types of movements take place in ocean water?
Answer: The horizontal and vertical motions are common in ocean water bodies. The horizontal motion refers to the ocean currents and waves. The vertical motion refers to tides.

Q11. Explain how wind, gravitation and Coriolis force affect the ocean currents.
Answer:

- Wind: Wind blowing on the surface of the ocean pushes the water to move. Friction between the wind and the water surface affects the movement of the water body in its course.
- Gravity: Gravity tends to pull the water down the pile and create gradient variation.
- The Coriolis force: The Coriolis intervenes and cause the water to move to the right in the northern hemisphere and to the left in the southern hemisphere.

Q12. Define Ocean currents.
Answer: Ocean currents are the continuous flow of huge amount of water in a definite direction. Ocean currents are like river flow in oceans. They represent a regular volume of water in a definite path and direction.
Q13. Differentiate between warm currents and cold currents. [5]
Answer:

S.no.	Warm currents	Cold currents
1.	They flow from equatorial regions to high latitudes.	They flow from polar region to low latitudes.
2.	Its temperature is higher than the surrounding water.	Its temperature is below than the surrounding water.
3.	It raises the temperature of coastal areas and are observed normally on the east coast of lower and middle latitude.	It reduces the temperature of the coastal area and are observed on the west of continent in lower and middle latitudes.
4.	Winds passing over warm currents absorb a good amount of moisture and bring heavy rainfall on the coastal areas.	Winds passing over cold currents become dry and little rainfall on the coastal area.

5.	Warm currents are of great help to navigation because they melt ice bergs.	Cold currents hinder navigation because they create ice bergs.
6.	Warm currents keep the ports open in the polar regions free from ice.	Cold currents make the parts unoperational in lower latitudes as they are ice bound.

Q14. White the characteristics of waves in the oceanic water. [5]
Answer: Characteristics of waves in the oceanic water are given below:

- The highest and lowest points of a wave are called the crest and trough.
- Wave height is the vertical distance from the bottom of a trough to the top of a crest of a wave.
- Wave amplitude is one-half of the wave height.
- Wave period is merely the time interval between two successive wave crests.
- Wavelength is the horizontal distance between two successive crests.
- Wave speed is the rate at which the wave moves through the water, and is measured in knots.
- Wave frequency is the number of waves passing a given point during a one- second time interval.

CHAPTER 14

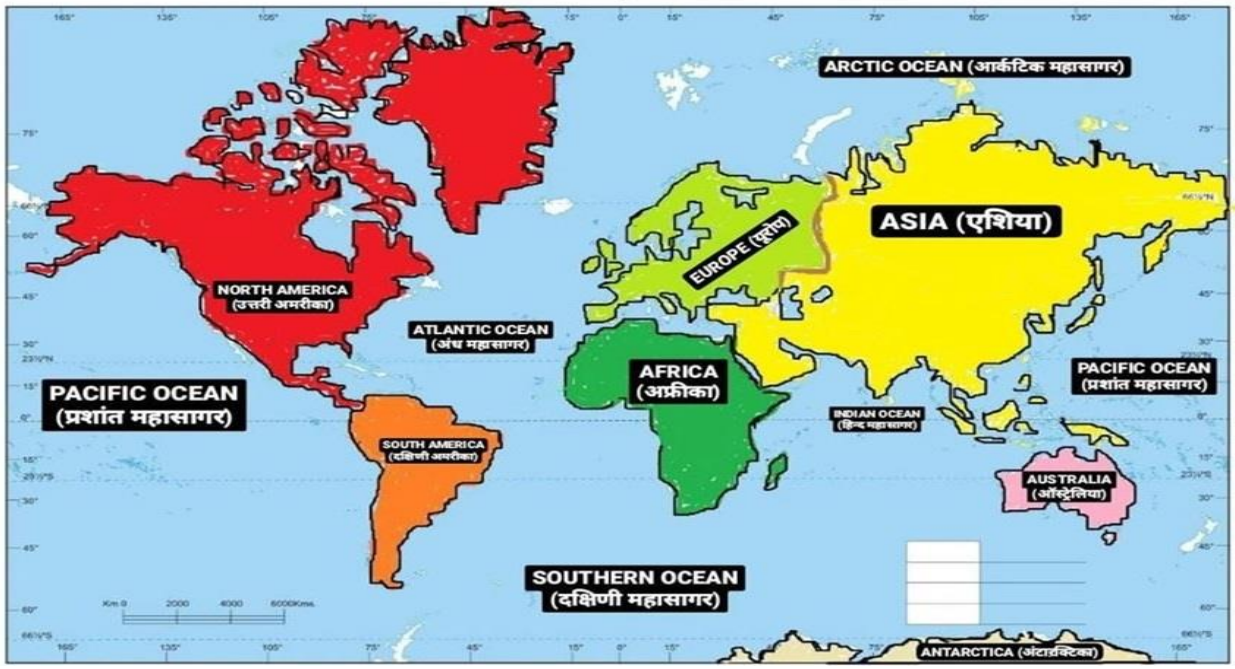
BIODIVERSITY AND CONSERVATION

(To be tested through internal assessments in the form of project and presentation)

MAP WORK

WORLD POLITICAL

CONTINENTS AND OCEANS (महाद्वीप और महासागर)

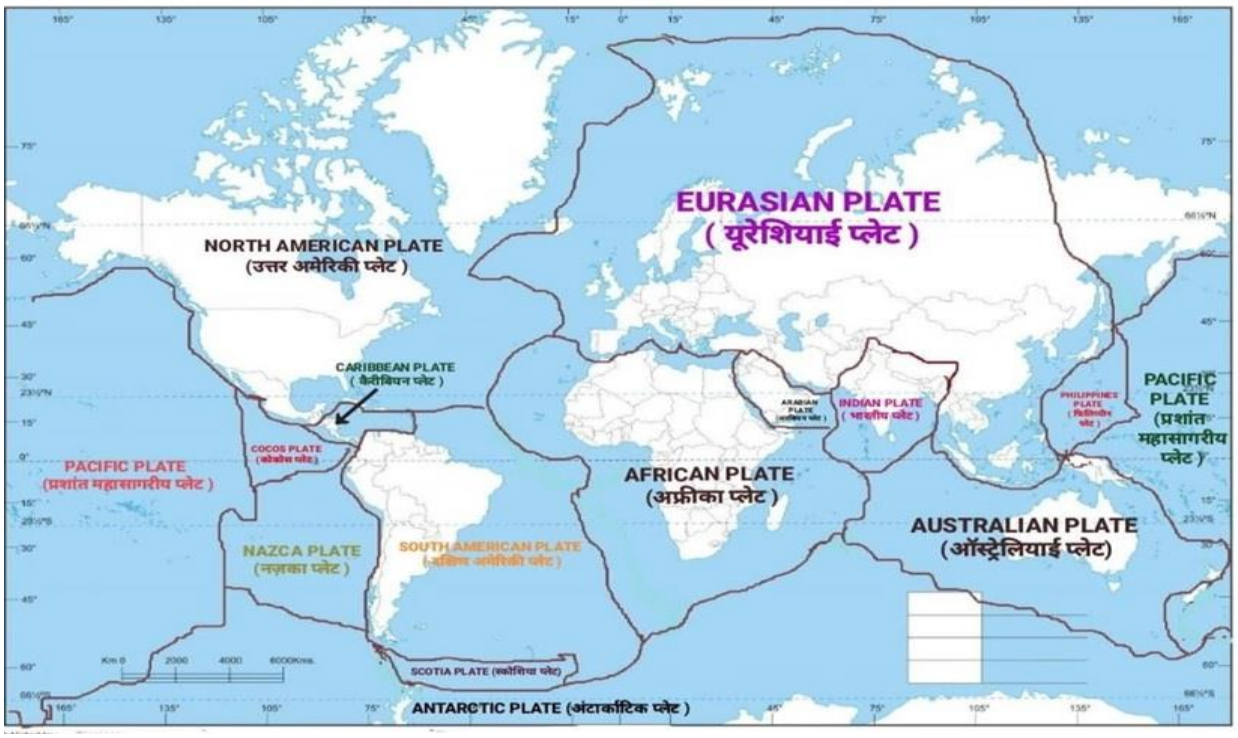


WORLD POLITICAL

INTERIOR OF THE EARTH (पृथ्वी की आंतरिक संरचना) & DISTRIBUTION OF OCEANS & CONTINENTS (महासागरों और महाद्वीपों का वितरण)

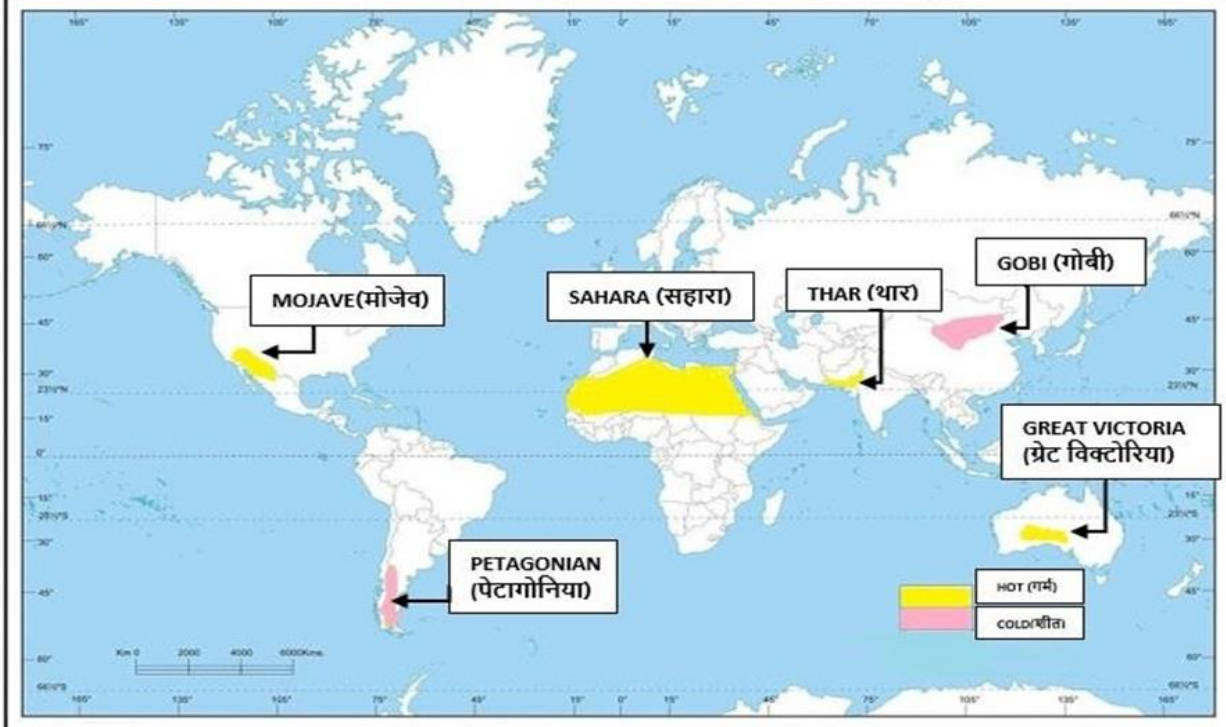
WORLD POLITICAL

MAJOR PLATES OF THE EARTH
(संसार की प्रमुख प्लेटें)

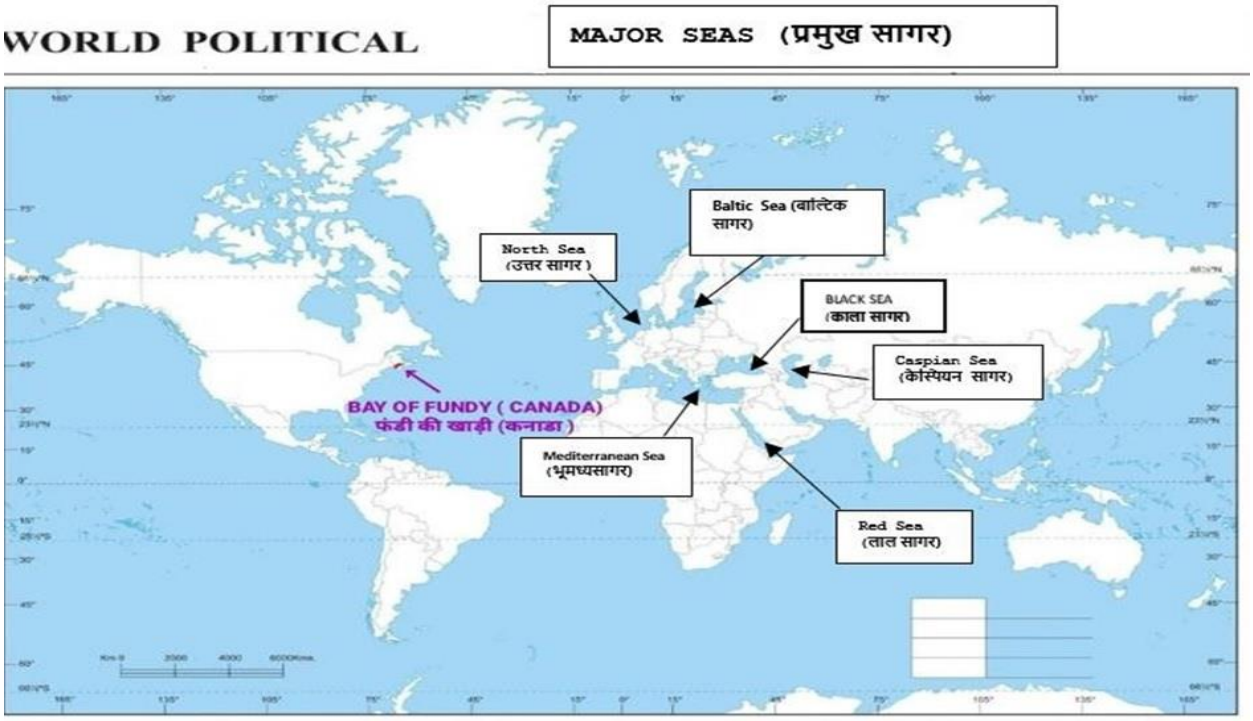


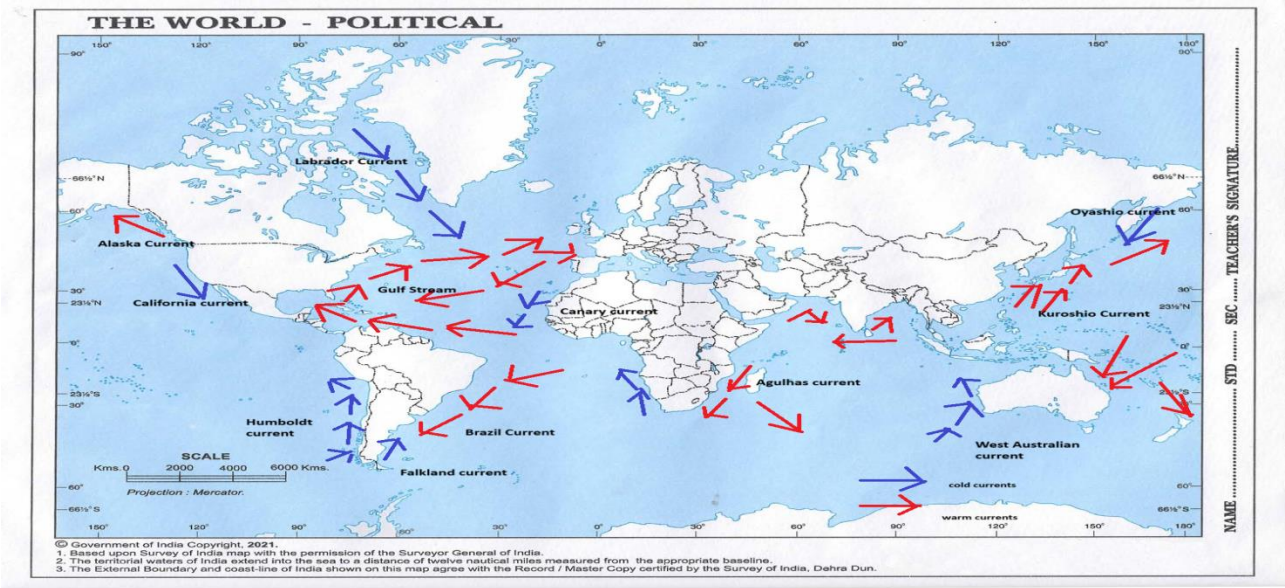
WORLD POLITICAL

DESERTS (मरुस्थल)



WORLD POLITICAL





INDIA PHYSICAL ENVIRONMENT

CHAPTER 1

INDIA LOCATION

GIST OF THE LESSON

Location:

1. India is located in South Asia.

2. It lies between latitudes 8°4’ N and 37°6’N and longitudes 68°7’ E and 97°25’E.

3. Bounded by the Himalayas in the north, it tapers southward to the Indian Ocean, dividing into the Bay of Bengal to the east and the Arabian Sea to the west.

4. India extends from Kashmir in the north to Kanniyakumari in the south and Arunachal Pradesh in the east to Gujarat in the west.

5. India’s territorial limit further extends towards the sea up to 12 nautical miles (about 21.9 km) from the coast.

Size:

1. India covers an area of about 3.287 million square kilometers, making it the seventh-largest country in the world by land area.

2. It has a land frontier of about 15,200 kilometers and a coastline of about 7,516 kilometers, including the mainland, Lakshadweep Islands, and the Andaman and Nicobar Islands.

India and Its Neighbors

1. Pakistan: To the northwest, with a border length of about 3,323 kilometers.

2. China: To the north and northeast, with a border length of about 3,488 kilometers.

3. Nepal: To the north, with a border length of about 1,751 kilometers.

4. Bhutan: To the northeast, with a border length of about 699 kilometers.

5. Bangladesh: To the east, with a border length of about 4,096 kilometers.

6. Myanmar: To the east, with a border length of about 1,643 kilometers.

Additionally, India shares maritime borders with:

1. Sri Lanka: Separated by the narrow Palk Strait.

2. Maldives: Situated to the southwest in the Indian Ocean.

Indian Standard Time (IST) and Its Implications

- IST is the time observed throughout India and Sri Lanka.
- It is 5 hours and 30 minutes ahead of Coordinated Universal Time (UTC+5:30).
- The reference point for IST is the 82.5°E longitude, passing through Mirzapur near Allahabad in

Uttar Pradesh.

Implications of India’s Location

India’s strategic location in the Indian Ocean has significant implications across various dimensions, including economic, geopolitical, cultural, and environmental aspects.

1. Economic Implications: Trade and Commerce, Energy Security, Fisheries and Marine Resources

2. Geopolitical Implications: Strategic Military Presence, Influence and Diplomacy, Regional Stability and Security.

3. Cultural and Historical Implications: Cultural Exchange, Diaspora and Migration

4. Environmental Implications: Marine Ecosystems, Climate and Weather Patterns

MULTIPLE CHOICE QUESTI0NS

1. Choose the right answer from the four alternatives given below:

(i) Which one of the following latitudinal extent is relevant for the extent of India's area?

(a) 8°41'N – 35°7' N (b) 8°4'N – 37°6' N

(c) 8°4'N – 35°6' N (d) 6°45'N – 37°6' N.

Answer: (b) 8°4'N – 37°6' N

(ii) Which one of the following countries shares the longest land frontier with India?

(a) Bangladesh (b) China

(c) Pakistan (d) Myanmar.

Answer: (a) Bangladesh

(iii) Which one of the following countries is larger in area than India?

(a) China (b) Egypt

(c) France (d) Iran.

Answer: (a) China

(iv) Which one of the following longitudes is the standard meridian for India?

(a) 69°30' E (b) 82°30' E

(c) 75°30' E (d) 90°30' E.

Answer: (b) 82°30' E

SHORT ANSWER TYPE QUESTIONS

Q. 1. Does India need to have more than one standard time? If yes, why do you think so?

Answer: Yes, I think India needs to have more than one standard time.

- There is time variation of 2 hours between Easternmost and the westernmost parts of our country. The sun rises two hours earlier in Arunachal Pradesh as compared to Gujarat.
- This is because the earth is tilted and also it rotates in east to west direction. So while rotation, the Eastern parts of the world experiences the sun rays earlier as compared to the western parts of the world.
- Many countries like USA, Canada and Russia have more than one standard time because their longitudinal extent is large. India's longitudinal extent is also 30° approximately. Therefore, it is advisable to use more than one standard time.

Q. 2. How is the latitudinal spread of India advantageous to India ?

Answer: There are three major advantages of latitudinal extent-

1. Tropic of cancer (23 1/2°.) – It divides India into two parts. Southern part is in the tropical zone while northern part is in the temperate zone. Therefore biodiversity in India is exceptional.

2. It also brings climatic diversity in India which has many advantages.

3. As we move from Kanyakumari to Jammu and Kashmir duration of day and night decreases by more than 4 hours 30 minutes.

4. We have places of all climates. It makes India a subcontinent.

Q. 3. While the sun rises earlier in the east, say Nagaland and also sets earlier, how do the watches at Kohima and New Delhi show the same time?

Answer: While the sun rises earlier in the east, say Nagaland and also sets earlier but the watches at Kohima and New Delhi show the same time because India follows one standard time all over its land. It is time shown at standard meridian of India. There is a general understanding among the countries of the world to select the Standard Meridian in multiples of 7° 30′ of longitude. Hence, 82°30′ E is chosen as the Standard Meridian of India and the time along the Standard Meridian of India passing through Mirzapur is taken as the Standard Time for the whole country.

CHAPTER 2

STRUCTURE AND PHYSIOGRAPHY

GIST OF THE LESSON

1. The Peninsular Plateau is a prominent physiographic division in India.

2. The Indian Desert is a significant arid region in the northwest part of the country.

3. The Coastal Plains play a crucial role in India's geography and economy.

4. The Islands of India are divided into two major groups in the Bay of Bengal and the Arabian Sea.

5. The North and Northeastern Mountains include the Himalayas and Northeastern hills.

6. The Himalayas consist of parallel mountain ranges with different orientations in various regions.

7. The Great Himalayan range is the central axial range with a length of approximately 2,500 km.

8. The Andaman and Nicobar Islands are the two principal island groups in the Bay of Bengal.

9. The Andaman and Nicobar Islands are separated by the Ten degree channel.

10. The islands in the Bay of Bengal are believed to be an elevated portion of submarine mountains.

11. The Western Ghats are comparatively higher in elevation than the Eastern Ghats.

12. The average elevation of the Western Ghats is about 1,500 m.

13. The Western Ghats exhibit an increase in height from north to south.

14. The physiography of India includes various relief features and landforms.

15. The concept of water sheds is essential in understanding the drainage systems of India.

16. The Himalayan drainage system and the peninsular drainage system are significant in India.

17. The Dodabeta peak is situated in the Nilgiri hills.

18. The Western Coastal Plain is devoid of any delta due to specific geological reasons.

19. The Arabian Sea and Bay of Bengal island groups have distinct characteristics.

20. Geomorphological features in river valley plains include floodplains, meanders, and levees.

21. Major Himalayan peaks can be identified from west to east using an atlas.

22. The physiography of different states in India influences the major economic activities practiced there.

23. The physiographic features of India have a significant impact on its climate and biodiversity.

24. The movement of tectonic plates has shaped the physiography of India over millions of years.

25. Understanding the physiography of India is crucial for various fields such as geography, geology, and environmental science.

MULTIPL CHOICE QUESTIONS

Q1. Which of the following forces have played a significant role in shaping the Earth's surface features?

a) Endogenic forces b) Exogenic forces

c) Both a and b d) None of the above

Answer: c) Both a and b

Q 2. How old is the Earth estimated to be?

a) 100 million years b) 1000 million years

c) 4600 million years d) 10,000 million years

Answer: c) 4600 million years

Q 3. What was the Indian plate's position in relation to the equator millions of years ago?

a) North of the equator b) South of the equator

c) At the equator d) Cannot be determined

Answer: b) South of the equator

Q.4.Which plate was a part of the Indian plate millions of years ago?

a) Eurasian plate b) Australian plate

c) African plate d) Antarctic plate

Answer: b) Australian plate

Q5. What direction has the Indian plate been moving over millions of years?

a) Eastward b) Westward

c) Northward d) Southward

Answer: c) Northward

Q6. What are some important consequences of the northward movement of the Indian plate?

a) Formation of the Himalayas

b) Changes in climate patterns

c) Shifts in river courses

d) All of the above

Answer: d) All of the above

Q.7.What is the concept of water sheds related to?

a) Plate tectonics b) Drainage systems

c) Mountain formation d) Soil erosion

Answer: b) Drainage systems

Q.8.How is the Himalayan and Peninsular drainage systems connected?

a) Through underground rivers b) Through waterfalls

c) Through water sheds d) Through canals

Answer: c) Through watershed.

Q 9. What is the general elevation of the peninsular plateau?

a) 100-300 m b) 400-600 m

c) 600-900 m d) 1000-1200 m

Answer: c) 600-900 m

SHORT ANSWER TYPE

1. What are the three major zones of the northern plains in South Asia?

Ans.Bhabar, Tarai, alluvial plains (Bhangar and Khadar)

2. Name the two principal island groups in India and the waterbody that separates them.

Ans. Andaman and Nicobar; Ten degree channel

3. Which rivers contribute to the formation of the northern plains in South Asia?

Ans. Indus, Ganga, Brahmaputra

4. What are the major landforms of the Peninsular Plateau in India?

Ans. Hazaribagh plateau, Palamu plateau, Ranchi plateau, Malwa plateau, Coimbatore plateau,

Karnataka plateau

5.In which direction do the Himalayas act as a barrier between the Indian subcontinent and Central and East Asian countries?

Ans. From northwest to southeast

6. What are the two categories into which the Bay of Bengal island groups are divided?

Ans. Andaman in the north and Nicobar in the south

7. Which belt in the northern plains of South Asia is known for its marshy and swampy conditions?

Ans. Tarai belt

8. What is the approximate length of the Great Himalayan range in India?

Ans. 2,500 km from east to west

9. Which states in India form a water divide between the Indus and Ganga river systems?

Ans. Haryana and Delhi

10. What are the two types of alluvial deposits found in the northern plains of South Asia?

Ans. Bhangar (old) and Khadar (new)

LONG ANSWER QUESTIONS

Q 1: Discuss the formation and characteristics of the Himalayan mountain range in India.

Answer: The Himalayas, one of the most prominent mountain ranges in the world, were formed as a result of the collision between the Indian Plate and the Eurasian Plate. This collision led to the upliftment of the Himalayas, creating a series of parallel mountain ranges with varying orientations in different regions of India. The Great Himalayas, also known as the central axial range, span approximately 2,500 km from east to west and have a width ranging from 160-400 km from north to south. The Himalayas act as a natural barrier between the Indian subcontinent and Central and East Asian countries, influencing the climate and biodiversity of the region. The range is characterized by diverse ecosystems, including alpine meadows, temperate forests, and snow-capped peaks, making it a hotspot for biodiversity and a crucial source of freshwater for the Indian subcontinent.

Q 2: Explain the physiographic features of the Peninsular Plateau in India and their significance.

Answer: The Peninsular Plateau in India is a vast elevated region characterized by its irregular triangular shape and relatively stable landmass. Rising from approximately 150 m above the river plains to elevations of 600-900 m, the plateau is bordered by prominent features such as the Delhi Ridge, Rajmahal Hills, Gir Range, and Cardamom Hills. This plateau is home to a series of patland plateaus, including the Hazaribagh Plateau, Palamu Plateau, Ranchi Plateau, Malwa Plateau, Coimbatore Plateau, and Karnataka Plateau. The Peninsular Plateau is one of the oldest landmasses in India and plays a

crucial role in influencing the drainage patterns of the region. The general eastward slope of the plateau is reflected in the flow of rivers, which support fertile alluvial soils and sustain agricultural activities, contributing significantly to the economy and livelihoods of the local population.

Q3: Analyze the geomorphological features of the Indian Desert and its impact on the surrounding region.

Answer: The Indian Desert, also known as the Thar Desert, is a vast arid region located in northwestern India, characterized by low precipitation, high evaporation rates, and unique landforms shaped by physical weathering and wind actions. The desert landscape features mushroom rocks, shifting dunes, and ephemeral rivers, with the Luni River being of particular significance in the southern part of the desert. The region experiences inland drainage, where streams disappear into lakes or playas, resulting in brackish water bodies that are a vital source of salt production. The desert's orientation divides it into northern and southern parts sloping towards Sindh and the Rann of Kachchh, respectively. The arid conditions of the Indian Desert pose challenges for agriculture and water availability, making it a water-deficit region.

CHAPTER 3

DRAINAGE SYSTEM

GIST OF THE LESSON

1. DRAINAGE: The flow of water through well-defined channels.
2. DRAINAGE SYSTEM: The network of well-defined channels.
3. Catchment area: A river drains the water collected from a specific area.
4. Drainage basin: An area drained by a river and its tributaries.
5. Watershed: The boundary line separating one drainage basin from the other.
6. River basins: The catchments of large rivers.
7. Important Drainage Patterns: A) Dendritic B) Radial C) Trellis D) Centripetal.
8. On the basis of discharge of water (orientations to the sea), it may be grouped into:
(i) The Arabian Sea drainage; and (ii) the Bay of Bengal drainage.
9. On the basis of the size of the watershed: i) Major rivers ii) Medium rivers iii) Minor rivers.
10. On the basis of the mode of origin, nature and characteristics, the Indian drainage may also be classified into: i) the Himalayan drainage and ii) the peninsular drainage.
11. DRAINAGE SYSTEMS OF INDIA:
I) THE HIMALAYAN DRAINAGE:
a) It mainly includes (A) the Ganga, (B) the Indus and the (C) Brahmaputra river basins.
b) Characteristics: Fed by melting snow, precipitation, perennial, form V- shaped valley, rapids, waterfalls.

12. EVOLUTION OF THE HIMALAYAN DRAINAGE: Origin from Shiwalik or Indo-Brahma River.

Indo– Brahma River was dismembered into three main drainage systems: (i) the Indus and its five tributaries in the western part; (ii) the Ganga and its Himalayan tributaries in the central part; and (iii) the stretch of the Brahmaputra in Assam and its Himalayan tributaries in the eastern part.
13. THE RIVER SYSTEMS OF THE HIMALAYAN DRAINAGE: (I) The Indus System; (II) The Ganga System; III) The Brahmaputra System.
14. THE PENINSULAR DRAINAGE SYSTEM: Older River system; shallow valleys; western ghats act as water divide; Most of the major Peninsular rivers except Narmada and Tapi flow from west to east.
15. The Evolution of Peninsular Drainage System: Three major geological events in the distant past have shaped the present drainage systems of Peninsular India: (i) Subsidence of the western flank of the Peninsula; (ii) Upheaval of the Himalayas; (iii) Slight tilting of the
Peninsular block from northwest to the southeastern.
16. River Systems of the Peninsular Drainage: Mahanadi; Godavari; Krishna; Kaveri; Narmada and Tapi river systems.
17. EXTENT OF USABILITY OF RIVER WATER: carry huge volumes of water per year; perennial rivers; During the rainy season, much of the water is wasted in floods and flows down to the sea. Similarly, when there is a flood in one part of the country, the other area suffers from drought. These problems be solved or minimized by transferring the surplus water from one basin to the water deficit basins.

MULTIPLE CHOICE TYPE QUESTIONS

1. Which one of the following lakes is a salt water lake?
A) Dal lake B) Wular lake C) Sambhar lake D) Nainital lake
ANS- C) Sambhar lake
2. Which one of the following rivers does not originate from the Western Ghats?
A) Godavari B) Krishna C) Mahanadi D) Kaveri
ANS- C) Mahanadi
3. The Chilika Lake region lies in between the deltas of:
A) Ganga and Mahanadi B) Godavari and Krishna
C) Mahanadi and Godavari D) Krishna and Kaveri
ANS- C) Mahanadi and Godavari
4. Which river is known as the “Sorrow of Bengal”?
A) Hooghly B) Damodar C) Subarnarekha D) Teesta
ANS- B) Damodar
5. Which river is known as the “Dakshin Ganga”?
A) Godavari B) Krishna C) Kaveri D) Mahanadi
ANS- A) Godavari
ASSERTION BASED QUESTION
6. ASSERTION (A): The Ganga River system is the largest river system in India.
REASON (R): The Ganga River has the maximum number of tributaries among all Indian rivers.
A) Both A and R are true, and R is the correct explanation of A.
B) Both A and R are true, but R is not the correct explanation of A.
C) A is true, but R is false.
D) A is false, but Ris true.
ANS- A

7. ASSERTION (A): The Himalayan rivers are perennial in nature.
REASON (R): The Himalayan rivers are fed by both rain and melting snow from the glaciers.
A) Both A and R are true, and R is the correct explanation of A.
B) Both A and R are true, but R is not the correct explanation of A.
C) A is true, but R is false.
D) A is false, but Ris true.
ANS- A
8. STATEMENT I: The Ganga River basin is the largest river basin in India.
STATEMENT II: The Ganga River is primarily fed by monsoonal rainfall.

Which one of the following is correct?
A) Both Statement I and Statement II are true, and Statement II is the correct explanation of Statement I.
B) Both Statement I and Statement II are true, and Statement II is not the correct explanation of Statement I.
C) Statement I is true, but Statement II is false.
D) Statement I is false, but Statement II is true.
ANS- B
9. Choose the correct option
Column A Column B
1. Ganga River a) Perennial River
2. Godavari River b) Rift Valley
3. Indus River c) Largest River
4. Narmada River d) Peninsular River

	I	II	III	IV
A	C	D	a	b
B	D	A	b	c
C	C	A	d	b
D	A	C	b	d

ANS- A

SHORT ANSWER TYPES

QUES. 1 Describe the major characteristics of the Himalayan rivers.
ANSWER: The major characteristics of the Himalayan rivers are:
1. Perennial Nature: Himalayan Rivers are perennial, meaning they flow throughout the year. This is due to their sources in the snow-covered mountains, which provide water from melting snow and glaciers, in addition to rainfall.

2. Long Courses: These Rivers have long courses from their source to their mouths. They originate in the Himalayas and traverse across the northern plains.
3. Large Basins: Himalayan rivers have large drainage basins. They have numerous tributaries that join them, contributing to their wide basins.
QUES. 2 Explain the difference between the East-flowing and West-flowing rivers of Peninsular India.
ANSWER: The east-flowing and west-flowing rivers of Peninsular India havedistinct characteristics:
1. Direction of Flow: East flowing rivers, such as Godavari, Krishna and Kaveri flow towards the Bay of Bengal, whereas west flowing rivers, like the Narmada and Tapi, flow towards the Arabian Sea.
2. Delta Formation: East-flowing rivers generally form large deltas at their mouths due to the deposition of sediments, whereas west-flowing rivers form estuaries.
3. Length and Basin Size: East-flowing rivers tend to be longer with larger basins compared to west-flowing rivers, which have shorter courses and smaller basins.
QUES 3: Explain the main features of the Peninsular River system in India.
ANSWER: The main features of the Peninsular River system in India are:
1. Seasonal Flow: Peninsular rivers are mostly seasonal, with their flow dependent on rainfall. They experience high water levels during the monsoon and low levels during the dry season.
2. Fixed Courses: These rivers have well-defined courses with little meandering. They flow through old, stable landscapes, making their courses less variable.

3. Non- Perennial: Most Peninsular rivers are non-perennial. They dry up significantly during the non-monsoonal periods due to the lack of glaciers feeding them.
QUES 4: What are the socio-economic advantages of inter-linking of rivers in India?
ANSWER: The socio-economic advantages of inter-linking of rivers in
India is following:
1. Enhanced Agricultural Productivity:
A) Improved irrigation
B) Drought Mitigation
2. Flood Control: Reduced flood risks
3. Hydro-electric Power Generation: Renewable Energy
4. Inland Navigation and Transportation: Improved transportation
5. Employment generation:
A) Construction jobs
B) Long-term Employment
6. Drinking water-supply: Urban and Rural Supply
7. Industrial growth: Water for industries
8. Environmental benefits: Ecosystem support; Groundwater Recharge.

LONG ANSWER TYPE QUESTIONS: 5 MARKS

QUES.1: Explain the significance of river interlinking in India. Discuss its potential benefits and challenges.
ANSWER: River interlinking in India aims to transfer water from surplus regions to deficit areas, enhancing water availability.
BENEFITS:

1. WATER DISTRIBUTION: Balances water availability across region, aiding agriculture and drinking water supply.
2. FLOOD CONTROL: Reduces flood risks in surplus areas.
3. IRRIGATION: Increases irrigated land, boosting agricultural productivity.
4. HYDROELECTRIC POWER: Potential for hydroelectric power generation.
CHALLENGES:
1. ENVIRONMENTAL IMPACT: Alters ecosystems and affects biodiversity.
2. DISPLACEMENT: Displaces communities due to construction of reservoirs and canals.
3. COST: High financial burden on the government.
4. INTER STATE DISPUTES: Potential for conflicts between states over water sharing.
QUES.2: Describe the characteristics and importance of the Ganga River system in India.
ANSWER: The Ganga River system, originating from the Gangotri Glaciers in the Himalayas, is one of the most significant river systems in India.
CHARACTERISTICS:
1. PERENNIAL RIVER: Receives water from both rain and glaciers.
2. EXTENSIVE BASIN: Covers a large area including northern India.
3. MAJOR TRIBUTARIES: Includes rivers like Yamuna, Ghaghara and
Son.
4. ALLUVIAL PLAINS: Forms fertile plains, beneficial for agriculture.
IMPORTANCE:

1. AGRICULTURE: Supports irrigation, aiding food production.
2. CULTURAL SIGNIFICANCE: Sacred to Hindus, with numerous pilgrimage sites.
3. ECONOMIC ACTIVITY: Facilities fishing, transport and trade.
4. BIODIVERSITY: Supports diverse flora and fauna including endangered species like the Ganga River dolphin.
QUES. 3: Discuss the causes and effects of river pollution in India. Suggest measures to control it.
ANSWER:
CAUSES:
1. INDUSTRIAL DISCHARGE: Release of untreated industrial waste into rivers.
2. SEWAGE DISPOSAL: Dumping of untreated sewage from urban areas.
3. AGRICULTURAL RUNOFF: Runoff of pesticides and fertilizers from farmlands.
4. RELIGIOUS ACTIVITIES: Disposal of religious offerings and ashes.
EFFECTS:
1. HEALTH HAZARDS: Contaminated water leads to diseases like cholera and dysentery.
2. ECOSYSTEM DAMAGE: Affects aquatic life, reducing biodiversity.
3. WATER SCARCITY: Polluted water becomes unusable for drinking and irrigation.
4. ECONOMIC LOSS: Affects fisheries and tourism.
MEASURES:
1. TREATMENT PLANTS: Establishment of sewage and industrial effluents treatment plants.
2. REGULATIONS: Strict enforcement of pollution control laws.
3. PUBLIC AWARENESS: Educating the public on the impact of river pollution.
4. SUSTAINABLE PRACTICES: Promoting organic farming and proper waste disposal.

CHAPTER 4

CLIMATE

GIST OF THE CHAPTER:

Weather and Climate

Weather: The momentary state of the atmosphere, changing rapidly, within days or weeks.

Climate: The average weather conditions over a long period, noticeable over 50 years or more.

• Elements of Weather: Include temperature, pressure, wind direction and velocity, humidity and precipitation.

Monsoon Climate

India experiences a hot monsoonal climate, prevalent in South and Southeast Asia.

Monsoons are characterized by seasonal reversals in wind direction.

• Unity and Diversity:

The monsoon regime unifies India with Southeast Asia.

Despite this unity, regional climatic variations exist, creating sub-types of monsoon climate.

Examples: The climates of Kerala and Tamil Nadu differ significantly from Uttar Pradesh and Bihar, yet all experience monsoonal climate.

Regional Climatic Variations

• Temperature:

Extreme variations exist, such as temperatures reaching 55°C in Rajasthan during summer and dropping to -45°C in Leh during winter.

Examples include Churu in Rajasthan recording over 50°C in June, while Tawang in Arunachal Pradesh stays around 19°C on the same day.

• Rainfall:

Varies significantly across regions, contributing to different climatic sub-types.

The western coast receives heavy rainfall, whereas the interior of the Deccan Plateau remains relatively dry.

Factors Determining the Climate of India

• It can be broadly divided into two groups factors:

→ Factors related to location and relief:

Latitude

The Himalayan Mountains

Distance from the Sea

Distribution of Land and Water

Difference in Altitude

Relief

→ Factors related to air pressure and winds

Distribution of air pressure and winds on the surface of the earth.

• Upper air circulation caused by factors controlling global weather and the inflow of different air masses and jet streams.

• Inflow of western cyclones generally known as disturbances during the winter season and tropical depressions during the south-west monsoon period into India, creating weather conditions favourable to rainfall.

Seasons in India.

• Meteorologists recognize four main seasons:

A. Cold Weather Season (winter):

▪ Starts by mid-November in northern India, with December and January being the coldest months.

▪ Mean daily temperatures fall below 21°C in northern India.

B. Hot Weather Season (summer):

▪ Begins in March, with the sun moving northward towards the Tropic of Cancer.

▪ April, May, and June are the hottest months in northern India, with temperatures ranging from 30°C to 48°C.

▪ Southern India experiences milder summers due to oceanic influences.

C. Southwest Monsoon Season:

▪ The onset of monsoons begins in early June over the Kerala coast, spreading across India by mid-July.

▪ Characterized by heavy rainfall and significant agricultural dependence.

D. Retreating Monsoon Season (autumn):

▪ Monsoon winds retreat by September, leading to a transition period with decreased rainfall.

Mechanism of the Monsoon

• Factors:

The Inter-Tropical Convergence Zone (ITCZ) and the shift in trade winds play crucial roles.

Monsoon winds are influenced by the Coriolis force, leading to the southwest monsoon.

The Himalayas act as a barrier, causing rainfall across the subcontinent.

Break in the Monsoon

• Characteristics:

Periods when monsoon rainfall ceases for one or more weeks.

Different regions experience breaks for varied reasons, such as lack of rain-bearing storms or winds blowing parallel to the coast Impact of Monsoons

• Agriculture:

The monsoon is crucial for India's agricultural cycle, with 64% of the population relying on agriculture.

Variability in rainfall can lead to droughts or floods, affecting crop yields.

Adequate and timely distributed rainfall is essential for agricultural prosperity.

Global Warming and Climate Change

A. Rising global temperatures due to human activities like industrialization and pollution.

B. Carbon dioxide emissions from fossil fuel combustion are significant contributors to global warming.

C. Climate change impacts weather patterns, leading to more extreme and unpredictable climatic Conditions.

Multiple Choice Questions

Q1. Which of the following is the most significant factor affecting the climate of a place?

A) Latitude B) Longitude

C) Altitude D) Ocean current

Ans- A) Latitude

Q2. Which of the following statements about the south west monsoon is correct?

A) Monsoon winds blow from the land to the sea in summer.

B) Monsoon winds blow from the sea to the land in summer.

C) Monsoon winds blow from the land to the sea in winter.

D) Monsoon winds blow from the sea to the land in winter.

Ans- B) Monsoon winds blow from the sea to the land in summer.

Q3. Which of the following is a greenhouse gas?

A) Oxygen B) Nitrogen C) Carbon dioxide D) Helium

Ans- C) Carbon dioxide

Q4. The phenomenon of El Niño is associated with:

A) Changes in wind patterns in the Atlantic Ocean

B) Changes in the temperature of ocean currents in the Pacific Ocean

C) Changes in precipitation patterns in Europe

D) Changes in atmospheric pressure in the Indian Ocean

Ans- B) Changes in the temperature of ocean currents in the Pacific Ocean

Q5. Which of the following statements about global warming is correct?

A) It is caused by a decrease in greenhouse gases.

B) It is caused by an increase in greenhouse gases.

C) It is caused by the Earth's tilt.

D) It is caused by the ozone layer depletion.

Ans- B) It is caused by an increase in greenhouse gases.

Q6. A farmer notices that the monsoon season is delayed and the rainfall is less than usual. Which of the following actions would be the most effective in addressing the situation?

A) Planting the same crops as usual.

B) Switching to drought-resistant crops.

C) Increasing the use of chemical fertilizers.

D) Irrigating fields using the same methods as in previous years.

Ans- B) Switching to drought-resistant crops.

Q7. If a region experiences a sudden increase in temperature and a decrease in rainfall over a few years, which of the following impacts is most likely?

A) Expansion of forest cover.

B) Increased agricultural yields.

C) Desertification of the area.

D) Increase in water bodies.

Ans - C) Desertification of the area.

Q8. Assertion (A): The Indian subcontinent experiences a monsoon type of climate.

Reason (R): The monsoon climate in India is influenced by the differential heating of land and water.

A) Both A and R are true, and R is the correct explanation of A.

B) Both A and R are true, but R is not the correct explanation of A.

C) A is true, but R is false.

D) A is false, but R is true.

Ans- A) Both A and R are true, and R is the correct explanation of A.

Q9. Assertion (A): The Western Ghats receive heavy rainfall during the monsoon season.

Reason (R): The Western Ghats obstruct the moisture-laden winds coming from the Arabian Sea, causing orographic rainfall.

(A) Both A and R are true, and R is the correct explanation of A.

(B) Both A and R are true, but R is not the correct explanation of A.

(C) A is true, but R is false.

(D) A is false, but R is true.

Ans-(A) Both A and R are true, and R is the correct explanation of A

Q10. Assertion (A): The coastal areas of India have a moderate climate.

Reason (R): The coastal areas are influenced by the moderating effect of the sea, which reducestemperature extremes.

A) Both A and R are true, and R is the correct explanation of A.

B) Both A and R are true, but R is not the correct explanation of A.

C) A is true, but R is false.

D) A is false, but R is true.

Ans- A) Both A and R are true, and R is the correct explanation of A.

SHORT ANSWER TYPE

Q1. Explain the main features of cold weather season.

Ans. -Winter starts around mid-November and lasts till February.

-December and January are the coldest months in northern India.

-Temperature decreases from south to north.

-Days are warm, while nights are cold with clear skies, low humidity, and variable winds.

-This season is crucial for cultivating “rabi” crops.

Q2. Explain the main feature of hot weather season.

The Hot Weather Season (summer):

-From March to May, India experiences rising temperatures and falling air pressure, especially in the north.

-Strong, hot, dry winds known as “loo” blow during the day in north and northwest India.

-Pre-monsoon showers occur towards the end of summer, aiding in the early ripening of mangoes.

Q3. How does El Niño affect the Indian monsoon?

Ans- El Niño affects the Indian monsoon in the following ways:

1. Reduction in Monsoon Rainfall: During El Niño years, the sea surface temperatures in the Pacific Ocean rise significantly, altering global weather patterns. This change often results in a weakening of the Indian monsoon. Regions across India experience below- average rainfall, which can lead to drought conditions in some parts of the country.

2. Impact on Agricultural Output: The reduced monsoon rainfall influenced by El Niño can have severe implications for agriculture in India. Crops dependent on timely and sufficient rainfall may suffer, leading to lower agricultural yields. This affects the livelihoods of millions of farmers and can contribute to food insecurity and economic challenges.

3. Temperature Variations: El Niño can also lead to variations in temperature across different parts of India. Some regions may experience higher temperatures than usual, exacerbating the effects of reduced rainfall on crops and water resources. This temperature variability can further complicate agricultural planning and management during the monsoon season.

Q4. Write the salient features of Advancing Monsoon (The Rainy Season).

Ans- -The southwest monsoon originates from southeast trade winds over warm subtropical areas, crossing the equator and entering India as the southwest monsoon.

-The monsoon covers the country for about a month, with regions like Mawsynram in the Khasi

Hills receiving the highest average rainfall globally.

-The monsoon is characterized by breaks in rainfall, influenced by the movement of the monsoon trough and the frequency and intensity of tropical depressions.

Q5. Differentiate between weather and Climate.

Ans-

Weather	**Climate**
Short-term (hours to days)	Long-term (decades to centuries)
Day-to-day atmospheric conditions like temperature, precipitation, wind.	Average weather patterns over many years
-Changes quickly, can be unpredictable	Changes slowly, more predictable over time

LONG ANSWER TYPE

Q1. How many distinct seasons are found in India as per the Indian Meteorological Department? Discuss the weather conditions associated with any one season in detail.

Ans. In India, as per the Indian Meteorological Department, there are four distinct seasons:

(a) Winter Season (from December to February)

(b) Summer Season (from March to May)

(c) Southwest monsoon season (from June to September)

(d) Retreating Monsoon (from October to November).

Retreating/Post Monsoons (The Transition Season):
- October-November marks the transition from the hot rainy season to dry winter conditions.
- The retreat of the monsoon brings clear skies and rising temperatures.
- Day temperatures are high, while nights are cool and pleasant.
- Towards the end of October, temperatures start to decrease rapidly in northern India.

Q2. Explain any five factors determine the climate of India.

Ans-

- Latitude: India stretches across different latitudes, resulting in varied climates. The southern parts near the equator are tropical with consistently high temperatures, while the northern regions have sub-tropical and temperate climates with more temperature variations.
- HimalayanMountains: The Himalayas act as a barrier that blocks cold northern winds and influences the path of monsoon winds. They cause these winds to release moisture over India, affecting rainfall patterns.
- Land and Water Distribution: India's positioning with the Indian Ocean on three sides affects its climate. Coastal areas have milder climates due to the ocean's moderating influence, while inland regions experience more extreme weather variations.
- Altitude: Temperature decreases as altitude increases. Mountainous regions like Darjeeling, at higher altitudes, are cooler than plains areas like Agra, even if they are at similar latitudes.
- Relief: Geographical features such as mountains and plateaus affect India's climate. Regions like the windward side of the Western Ghats receive heavy rainfall during monsoons, while the leeward side remains dry due to sheltering from rain-bearing winds.

Q3. Describe the distribution of rainfall in India.

Ans- Distribution of Rainfall
- The western coast and northeastern India receive an annual rainfall of over above 200 cm.
- Western Rajasthan and adjoining parts of Gujarat, Haryana, and Punjab experience less than 60 cm of rainfall annually.
- Rainfall is low in the interior of the Deccan plateau and east of the Sahyadris.
- Snowfall occurs mainly in the Himalayan region.
- The annual rainfall varies significantly from year to year.

CHAPTER 5

NATURAL VEGETATION

GIST OF THE LESSON

Meaning: Natural vegetation refers to the plant life that grows naturally in an area without human intervention. It includes all forms of plant life such as forests, grasslands, and shrubs that occur in a region.

Types of Forest in India

1. Tropical Evergreen and Semi Evergreen Forests:

o Found in areas with heavy rainfall.

o Dense and multi-layered with a variety of trees.

o Common in Western Ghats, Andaman and Nicobar Islands, and parts of North-East

India.

2. Tropical Deciduous Forests:

o Also known as monsoon forests.

o Shed their leaves in the dry season to conserve water.

o Found in areas with moderate rainfall.

o Spread across the central and northern parts of India.

3. Tropical Thorn Forests:

o Found in regions with low rainfall.

o Trees are small, thorny, and have thick bark.

o Predominant in Rajasthan, Gujarat, and parts of Haryana.

4. Montane Forests:

o Found in mountainous areas.

o Vary with altitude, including temperate forests and alpine vegetation.

o Common in the Himalayan region.

5. Littoral and Swamp Forests (Mangrove Forests):

o Found in coastal areas and estuaries.

o Trees have stilt roots to survive in salty waters.

o Prominent in the Sundarbans and parts of the Andaman and Nicobar Islands.

Forest Cover in India

As of the latest data, India's forest cover is around 21.71% of its total geographical area. The government categorizes forest cover into three types:

- Very Dense Forests: Canopy density of 70% and above.
- Moderately Dense Forests: Canopy density between 40% and 70%.
- Open Forests: Canopy density between 10% and 40%.

Forest Conservation

India has implemented several measures to conserve its forests:

1. Forest Conservation Act, 1980: Restricts deforestation and the use of forest land for non- forest purposes without central government approval.

2. National Afforestation Programme: Promotes afforestation and reforestation activities.

3. Joint Forest Management: Involves local communities in the protection and management of forests.

Social Forestry

Social forestry aims to involve the local population in forest management and afforestation projects to meet the needs of rural and urban people. It includes:

1. Agro forestry: Combining agricultural crops with tree planting.

2. Community Forestry: Community involvement in raising and protecting trees.

3. Urban Forestry: Planting trees in urban areas to improve the environment.

Farm Forestry

Farm forestry involves farmers growing trees on their own land. This practice helps in meeting the demand for timber, fuel, fodder, and other forest products, reducing the pressure on natural forests.

Wildlife in India

India is home to diverse wildlife, including mammals, birds, reptiles, and amphibians. Notable species include the Bengal tiger, Indian elephant, Indian rhinoceros, and various species of deer and antelope.

It's estimated that around 4-5% of all known plant and animal species on Earth are found in India, owing to its diverse ecosystems preserved over ages. However, human activities have disturbed their habitats, leading to a significant decline in their numbers. Some species are on the verge of extinction.

Several factors contribute to the decline of wildlife:

1. Industrial and technological advancements have led to increased exploitation of forest resources.

1. Expansion of agriculture, human settlements, roads, mining, and reservoirs has resulted in habitat

LOSS.

1. Local communities cut trees for fodder and fuel wood, affecting wildlife and their habitat.

2. Grazing by domestic cattle further impacts wildlife habitats.

3. Hunting, once a sport for the elite, has now turned into commercial poaching.

4. Forest fires also pose a threat to wildlife and their habitats.

Recognizing the importance of wildlife conservation for national and global heritage, as well as the promotion of ecotourism, the government has taken steps in this direction.

Wildlife Conservation in India

Efforts for wildlife conservation include:

1. Wildlife Protection Act, 1972: Provides legal protection to wildlife and establishes protected areas.

2. Project Tiger: Launched in 1973 to conserve the Bengal tiger.

3. Project Elephant: Launched in 1992 to protect elephants and their habitats.

4. Protected Areas: Includes national parks, wildlife sanctuaries, and conservation reserves.

Biosphere Reserves

Biosphere reserves are areas designated to promote the conservation of biodiversity, research, and sustainable development. India has several biosphere reserves, including:

1. Nilgiri Biosphere Reserve: Encompasses parts of Tamil Nadu, Kerala, and Karnataka.

2. Sundarbans Biosphere Reserve: Famous for its mangrove forests and Royal Bengal tigers.

3. Gulf of Mannar Biosphere Reserve: Known for its marine biodiversity.

4. Nanda Devi Biosphere Reserve: Located in the Himalayan region, it supports a wide range of flora and fauna.

MULTIPLE CHOICE QUESTIONS

Q 1: The Littoral and Swamp forests are found mainly in

a) West Bengal and Odisha b) Jammu and Kashmir

c) Assam d) Bihar and Sikkim

Ans: (a)

Q 2: Which one of the following does not belong to the biosphere reserves set up so far?

a) Great Nicobar b) Sunderbans

c) Nanda Devi d) Gulf of Kutch

Ans: (d)

Q 3: Which one of the following pairs is correctly matched?

a) Teak : Jammu and Kashmir b) Deodar : Madhya Pradesh

c) Sandalwood : Kerala d) Sundari : West Bengal

Ans: (d)

Q 4: Which one of the following pairs is not correctly matched?

a) Ebony : Tropical evergreen b) Shisham : Moist Deciduous

c) Walnut : Alpine d) Birch : Alpine

Ans: (c)

Q 5: The Nokrek Biosphere Research Reserves is located in

a) Arunachal Pradesh b) Assam c) Sikkim d) Meghalaya

Ans: (d)

Q 6: Which one of the following pairs is not correctly matched?

a) Simlipal : Odisha b) Dehong Debang : Assam

c) Nokrek : Meghalaya d) Kanchenjunga : Sikkim

Ans: (b)

Q 7: Which one of the following is included in the world list of Biosphere Reserves of UNESCO?

a) Kinnaur Region b) Spiti Valley

c) Nallamalai Hills d) Sunderbans

Ans: (d)

Q 8: Where is the Asiatic wild ass found?

a) Rann of Kutch b) Kaziranga c) Ranathambore d) Periyar

Ans: (a)

Qu 9: Which one of the following is also known as top slip?

a) Simlipal National Park b) Periyar Wildlife Sanctuary

c) Manjira Wildlife Sanctuary d) Indira Gandhi Wildlife Sanctuary and National Park

Answer: (d)

10. Choose the right answer from the four alternatives given below.

(i). Sandalwood is an example of:

(a) Evergreen forest (b) Deciduous forest

(c) Deltaic forest (d) Thorny forest.

Answer: (b) Deciduous forests

11). Which one of the following proportion of area of the country was targeted to be under forest in Forest Policy of India?

(a) 33 (b) 44 (c) 55 (d) 22.

Answer: (a) 33.

3 Marks Questions

(i). What is natural vegetation? Under what climatic conditions do tropical evergreen forests develop?

Answer: Natural vegetation refers to a plant community that has been left undisturbed over a long time, so as to allow its individual species to adjust themselves to climate and soil conditions as fully as possible.

India is a land of great variety of natural vegetation.

Tropical Evergreen forests are found in the western slope of the Western Ghats, hills of the north-eastern region and the Andaman and Nicobar Islands. They are found in warm and humid areas with an annual precipitation of over 200 cm and mean annual temperature above 22°C.

(ii). What do you understand by social forestry?

Answer: Social forestry means the management and protection of forests and afforestation on barren lands with the purpose of helping in the environmental, social and rural development.

The National Commission on Agriculture (1976) has classified social forestry into three categories. These are:

1. Urban forestry,

2. Rural forestry and

3. Farm forestry.

(iii). Define Biosphere reserves?

Answer: A Biosphere Reserve is a unique and representative ecosystem of terrestrial and coastal areas which are internationally recognised within the framework of UNESCO's Man and Biosphere (MAB)

Programme. The Biosphere Reserve aims at achieving the three objectives:

- Conservation of biodiversity and ecosystem
- Association of environment with development;
- Providing international network in research and monitoring.

3. Answer the following questions in not more than 150 words.

(i). What steps have been taken up to conserve forests?

Answer: Following steps have been taken up to conserve forests:

1. Social forestry: Social forestry means the management and protection of forest and afforestation on barren lands with the purpose of helping in the environmental, social and rural development. The National Commission on Agriculture (1976) has classified social forestry into three categories.
- Urban forestry
- Rural forestry

- Farm forestry

2. Community forestry

3. Farm forestry

LONG ANSWER QUESTIONS:

Q1.What objectives have been determined for the conservation of forests according to national forest policy?

Ans: Objectives of new forest policy are:

- Bringing 33% of the geographical areas under forest cover.
- Maintaining environmental stability and to restore forests where ecological balance was disturbed.
- Conserving the natural heritage of the country.
- Its biological diversity and gentle pool.
- Checks soil erosion extension of the deserts land and reduction of floods and droughts.
- Increasing the forest cover through social forestry and afforestation on degraded lands.
- Increasing the productivity of forest to make timber, fuel, fodder and food available to rural population dependent on forests and encourage the substitution of wood.
- Creating massive people's movement involving women to encourage planting of trees, stop felling of trees and thus, reduce pressure on the existing forest.

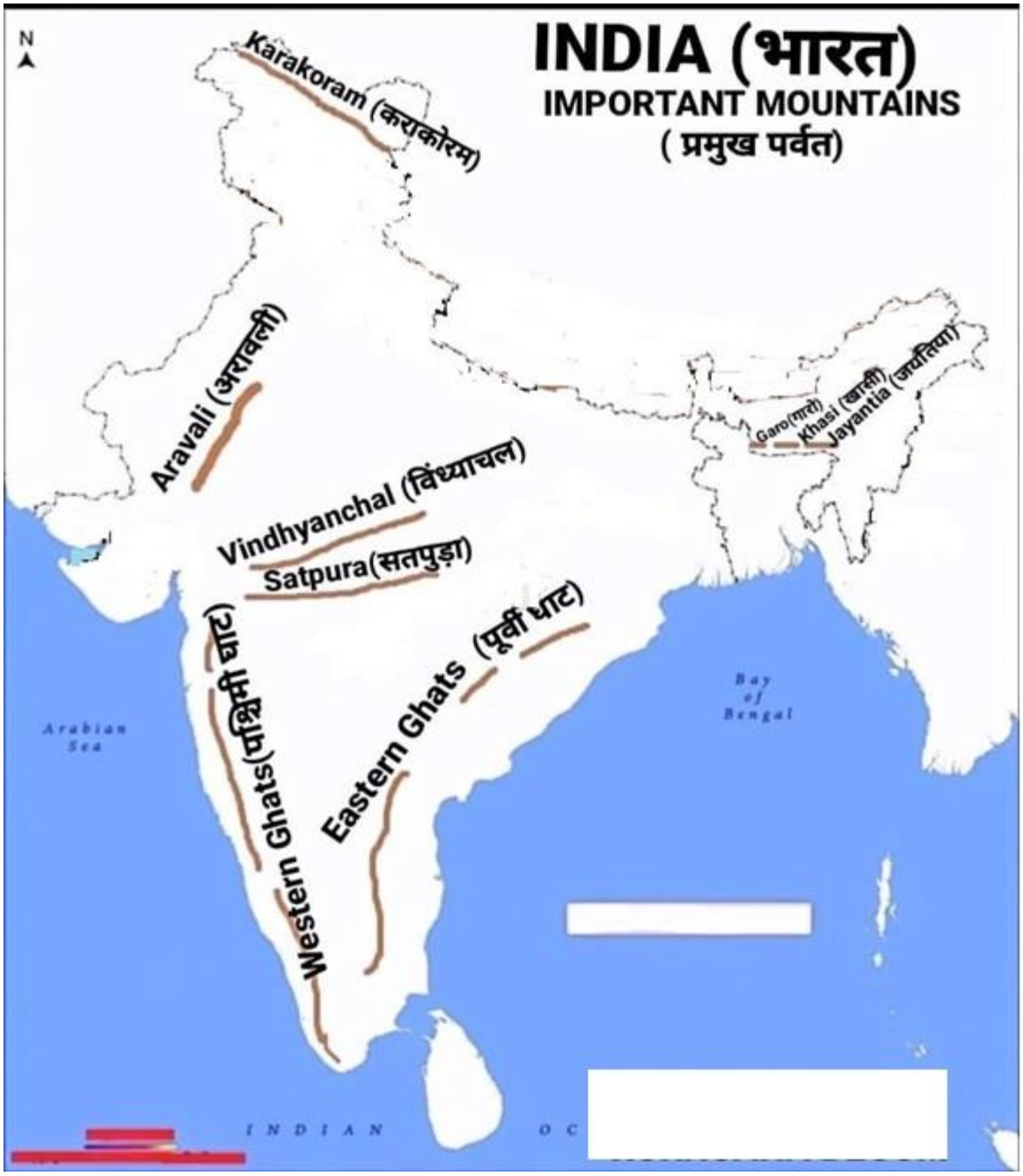
Q 2. Mention the reasons for the decline of wildlife in India?

Answer: Important reasons for the decline of Wildlife in India are-

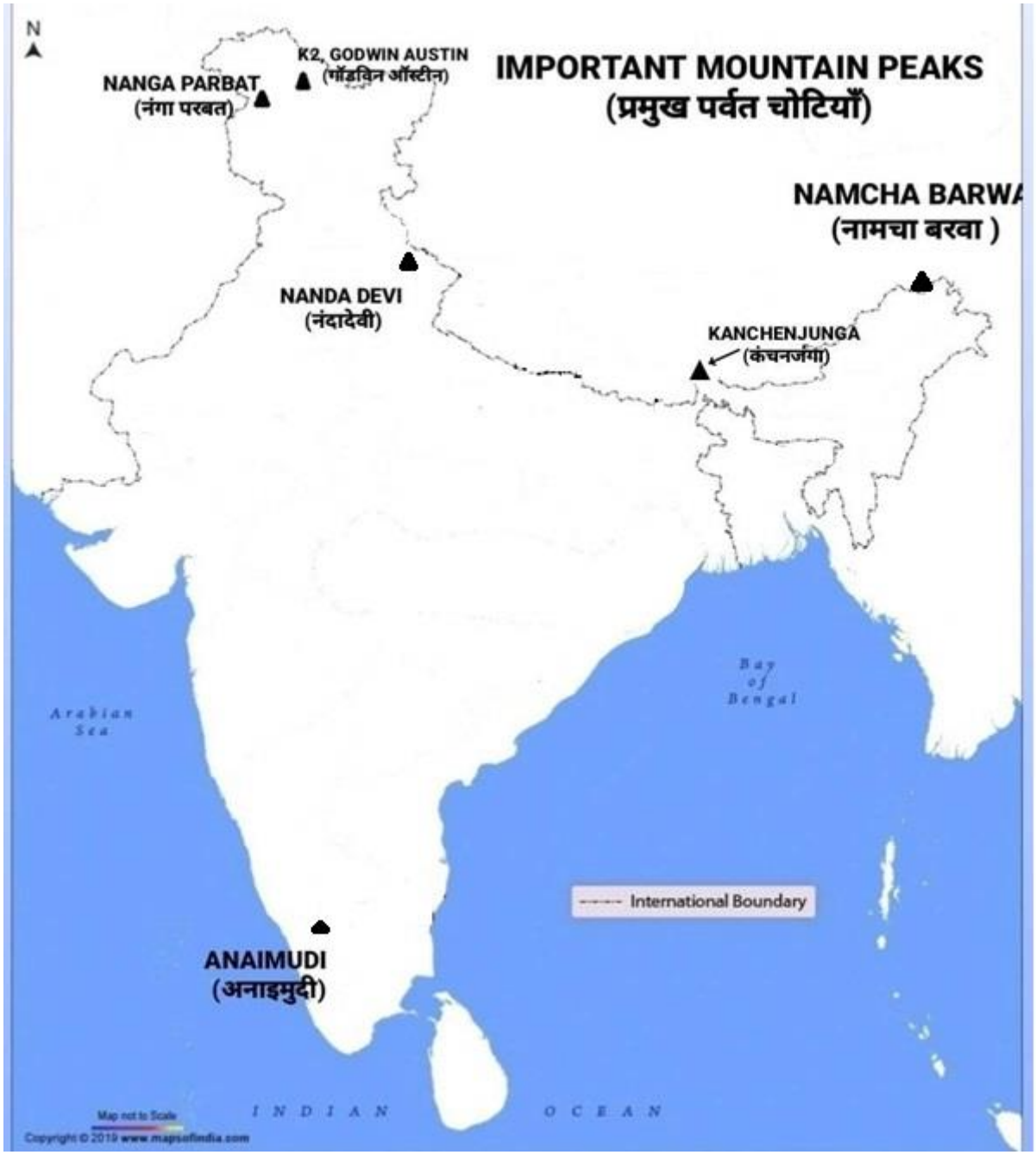
- Industrial and technological advancement brought about a rapid increase in the exploitation of forest resources.
- More and more lands were closed for agriculture, human settlement, roads, mining, resources, etc.
- Pressure on forests maintained due to looping for fodder and fuel, wood and removal of small timber by the local people.
- Grazing by domestic cattle caused an adverse effect on wildlife and its habitat.
- Hunting was taken up as a sport by the elite and hundreds of wild animals were killed in a single hunt.
- Now commercial poaching is rampant.
- Incidence of forest fire.

6. Natural Hazards and Disasters
(To be tested through internal assessments in the form of project and presentation)

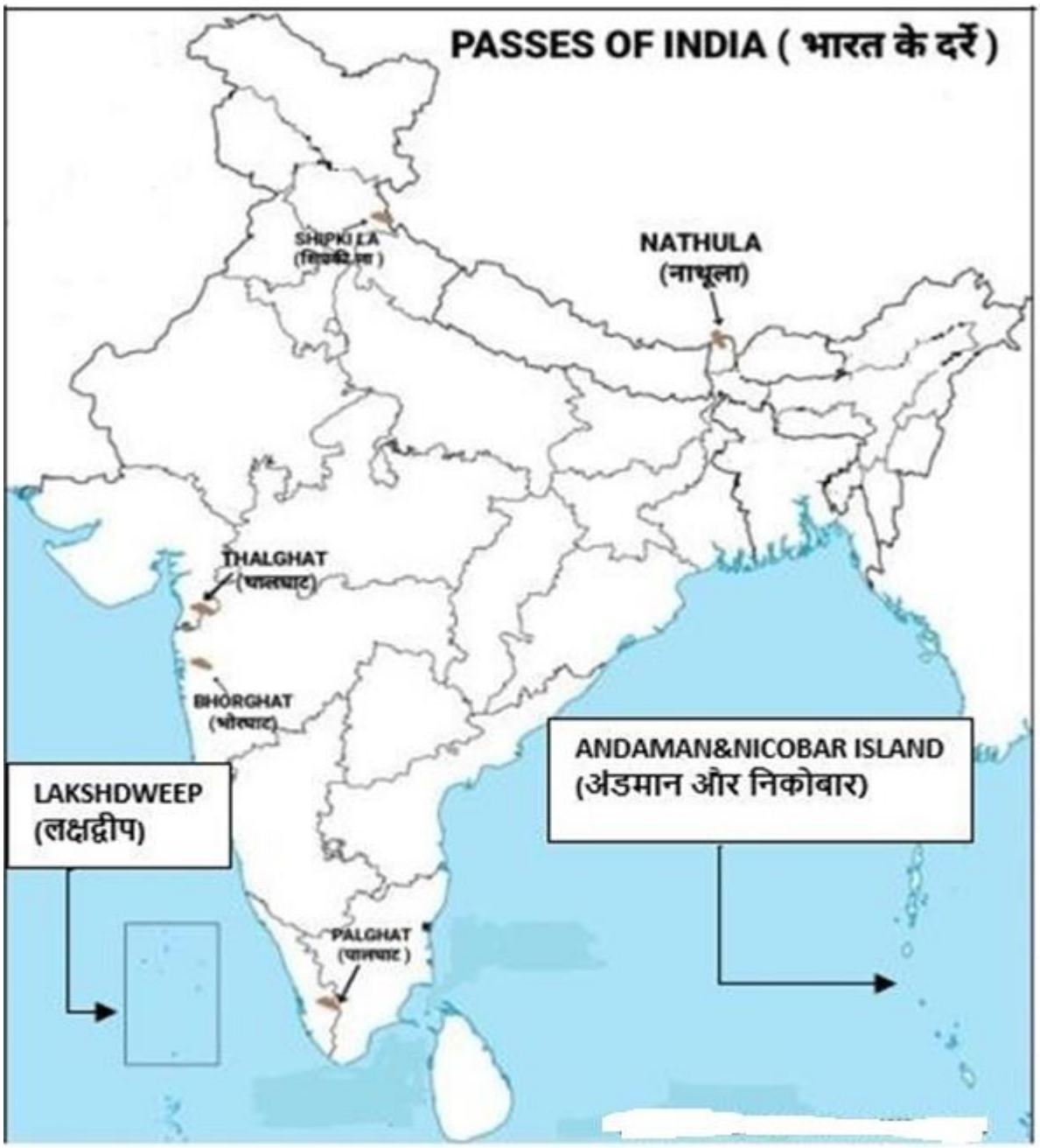
MAP



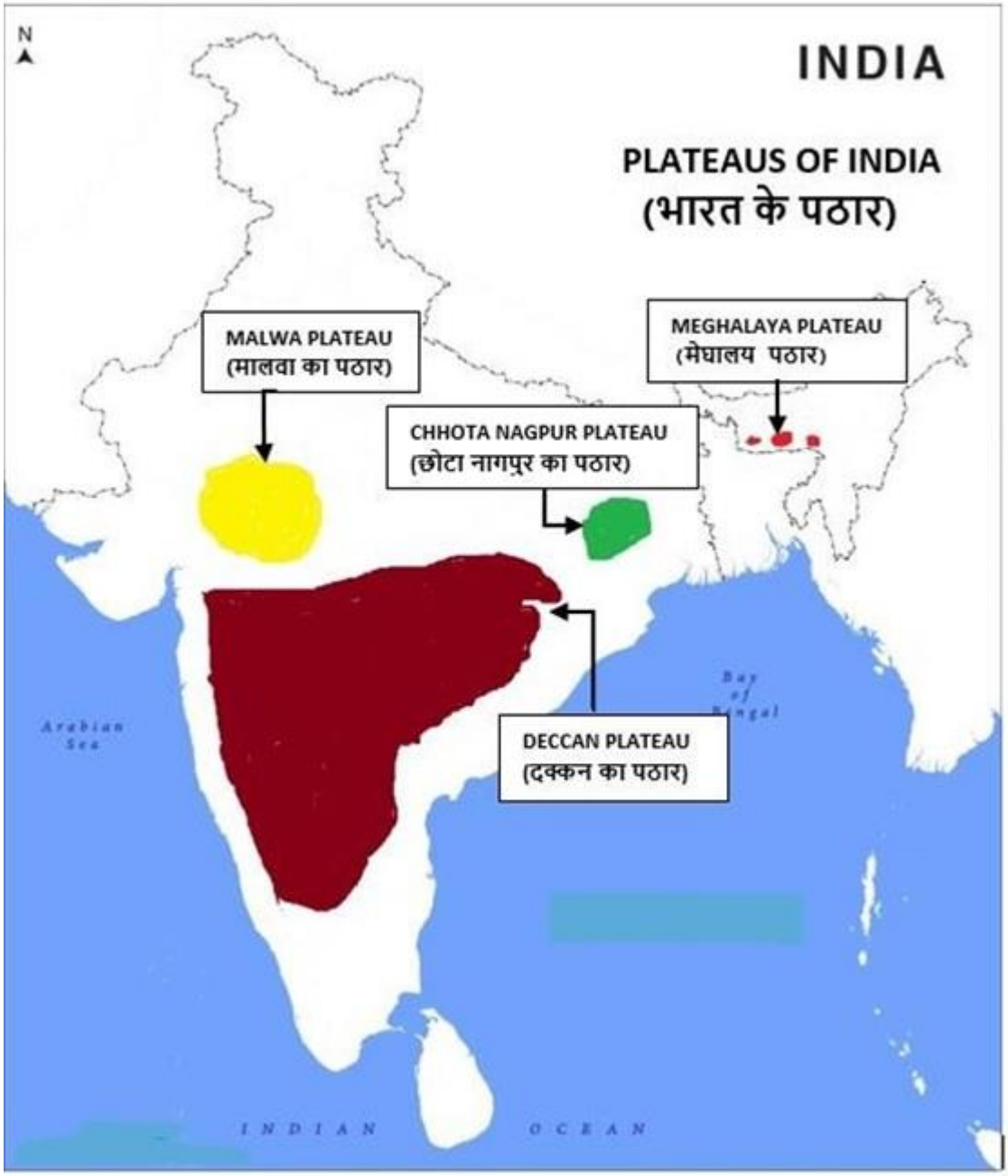
MOUNTAIN PEAKS



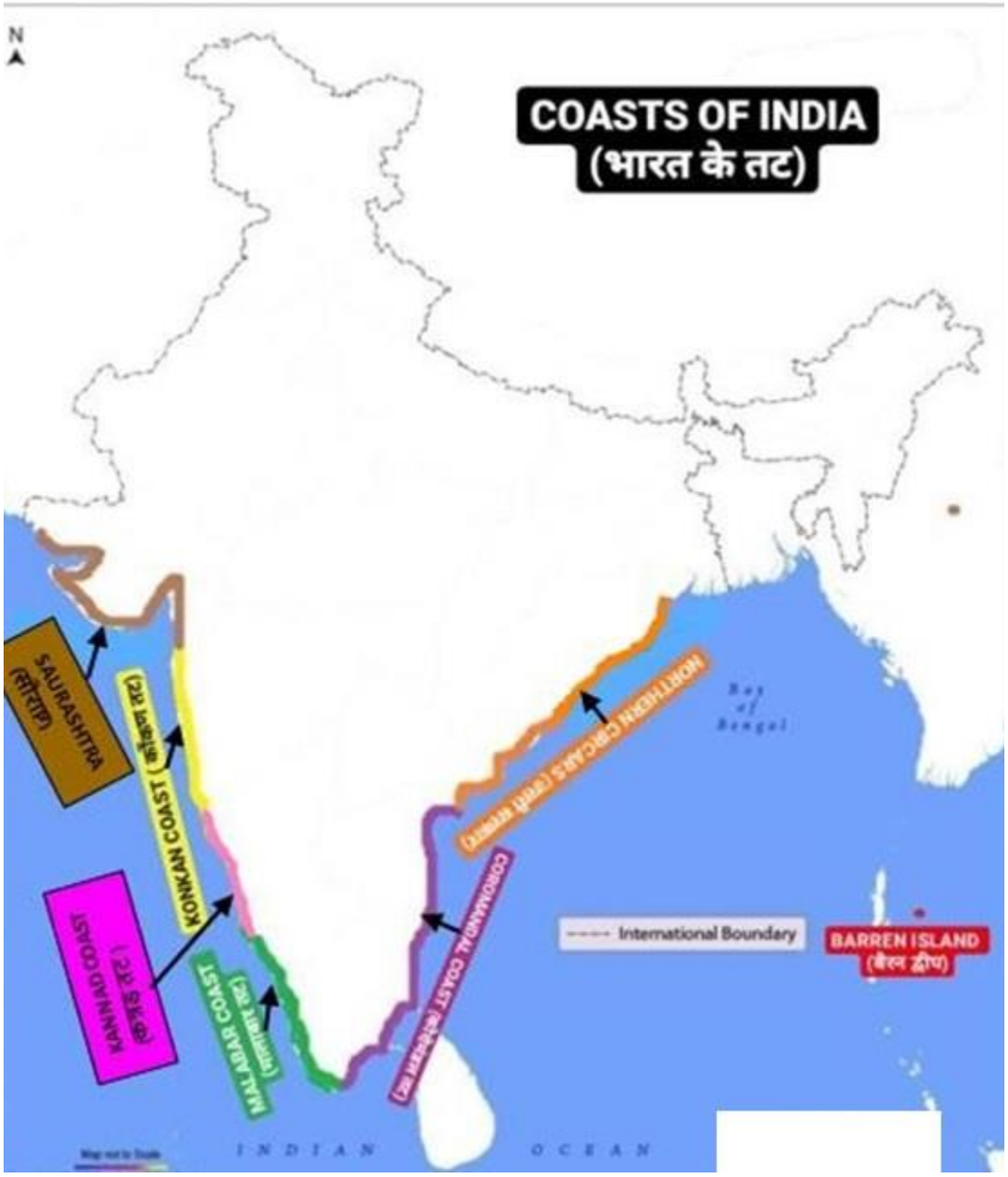
MOUNTAIN PASSES


PASSES OF INDIA (भारत के दर्रे)
SHIPKI LA
NATHULA
(नाथूला)
THALGHAT
(थालघाट)
BHORGHAT
(भोरघाट)
LAKSHDWEEP
(लक्षद्वीप)
ANDAMAN&NICOBAR ISLAND
(अंडमान और निकोबार)
PALGHAT
(पालघाट)

PLATEAUS

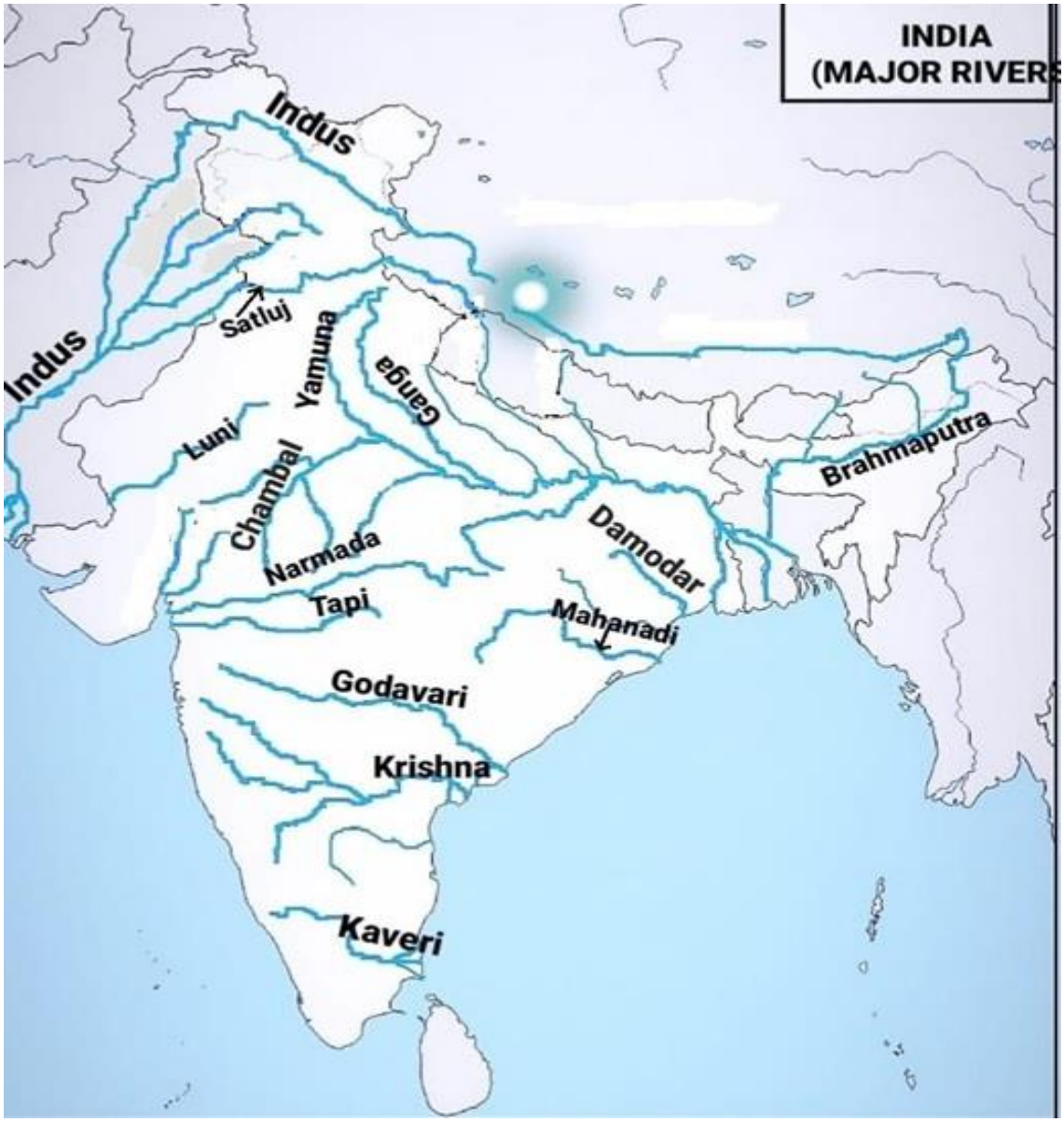


COASTAL PLAINS



DRAINAGE SYSTEM

RIVERS

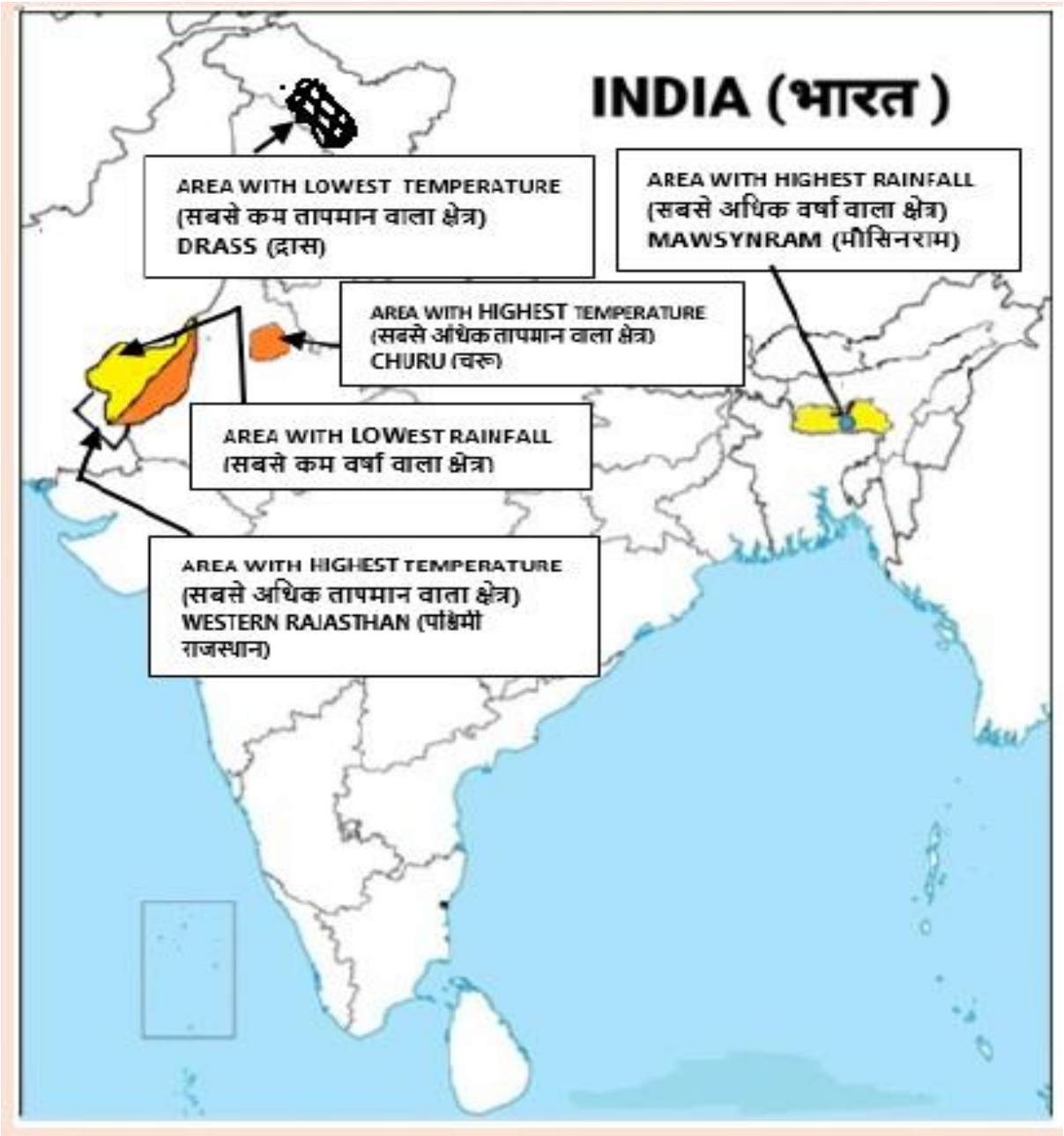

INDIA
(MAJOR RIVERS
Indus
Indus
Satluj
Yamuna
Ganga
Luni
Chambal
Narmada
Tapi
Damodar
Mahanadi
Brahmaputra
Godavari
Krishna
Kaveri

LAKES

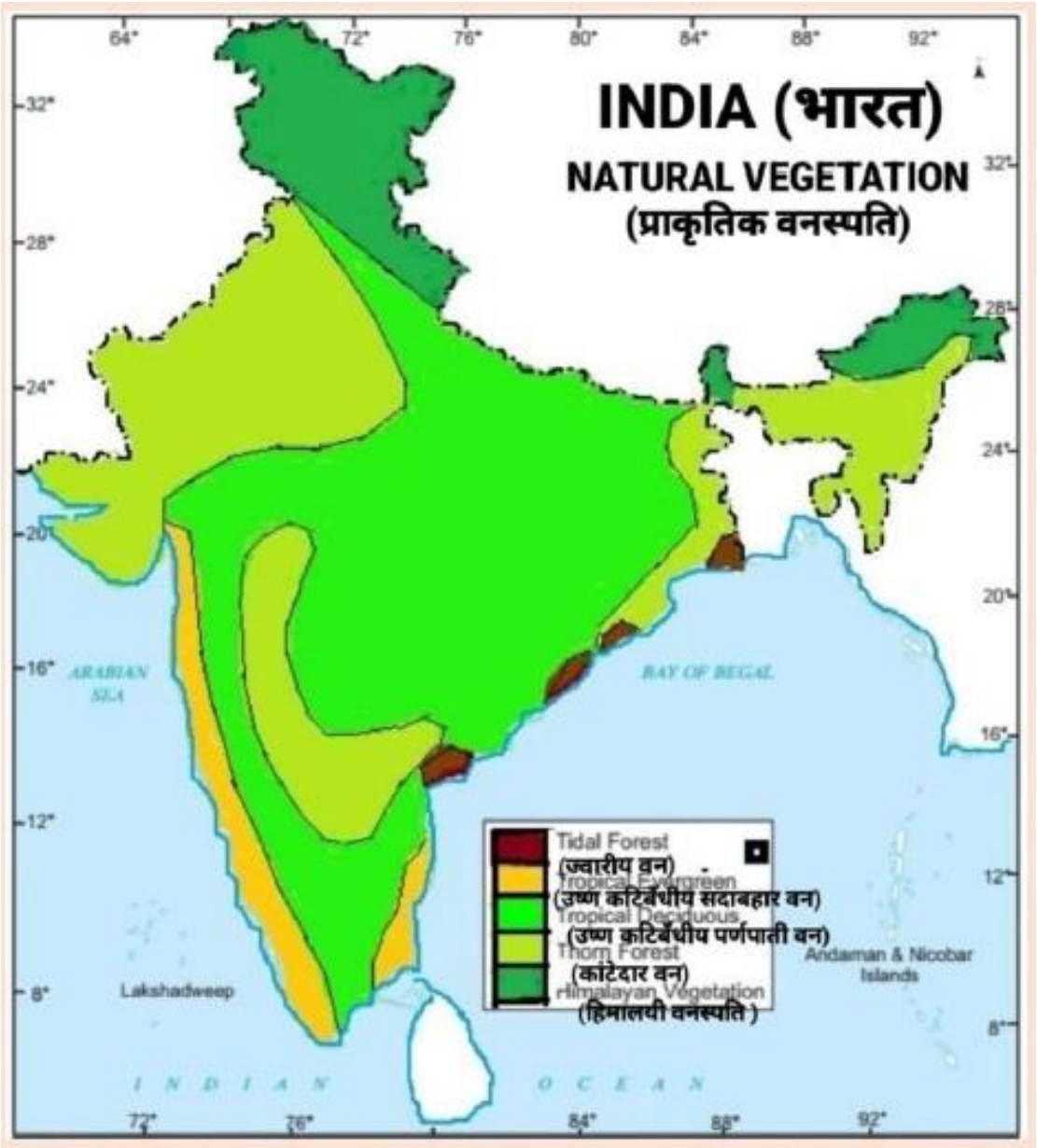
STRAITS, BAYS & GULFS

CLIMATE

AREAS WITH HIGHEST & LOWEST TEMPERATURE; AREAS WITH HIGHEST & LOWEST RAINFALL



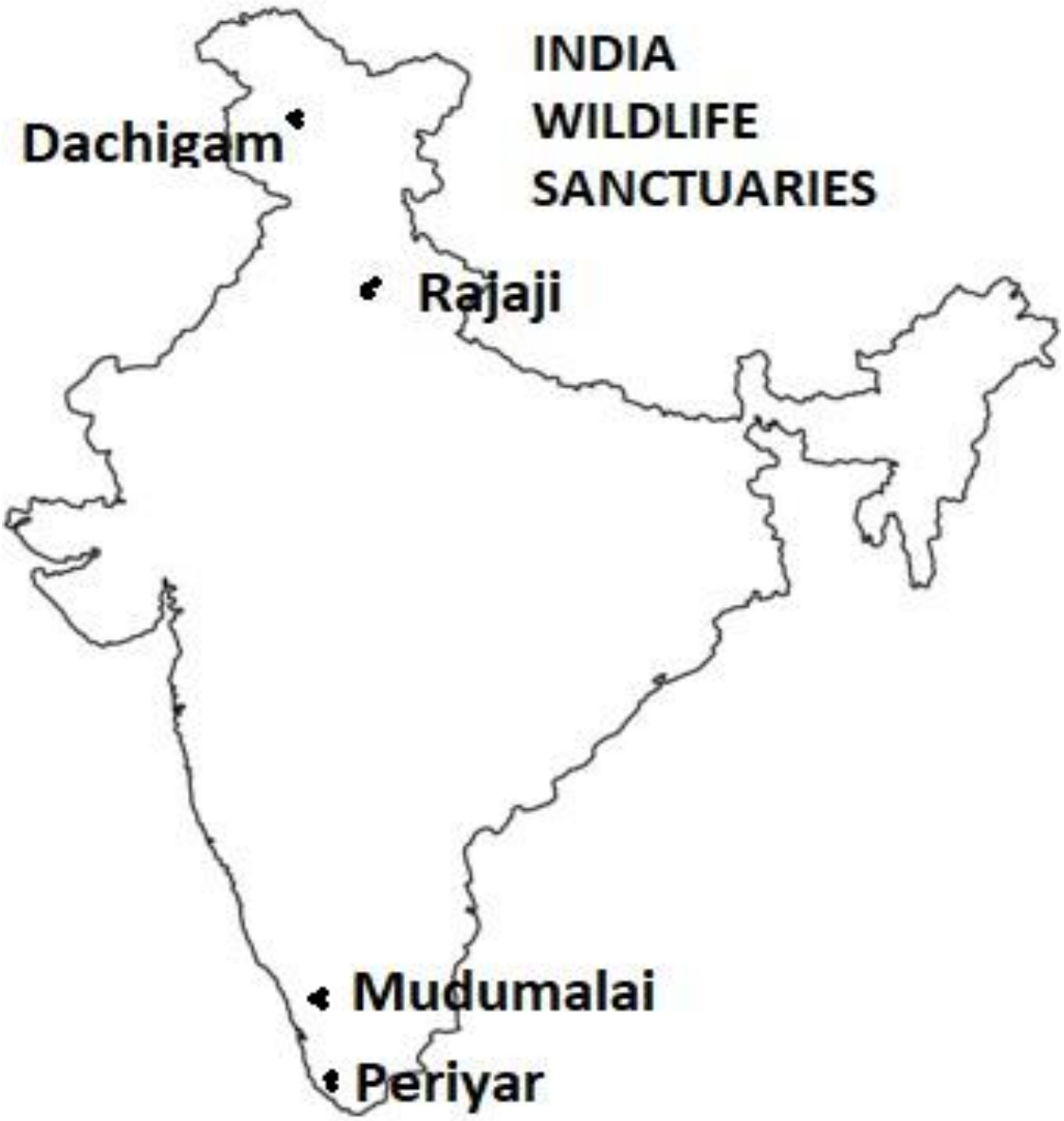
NATURAL VEGETATION



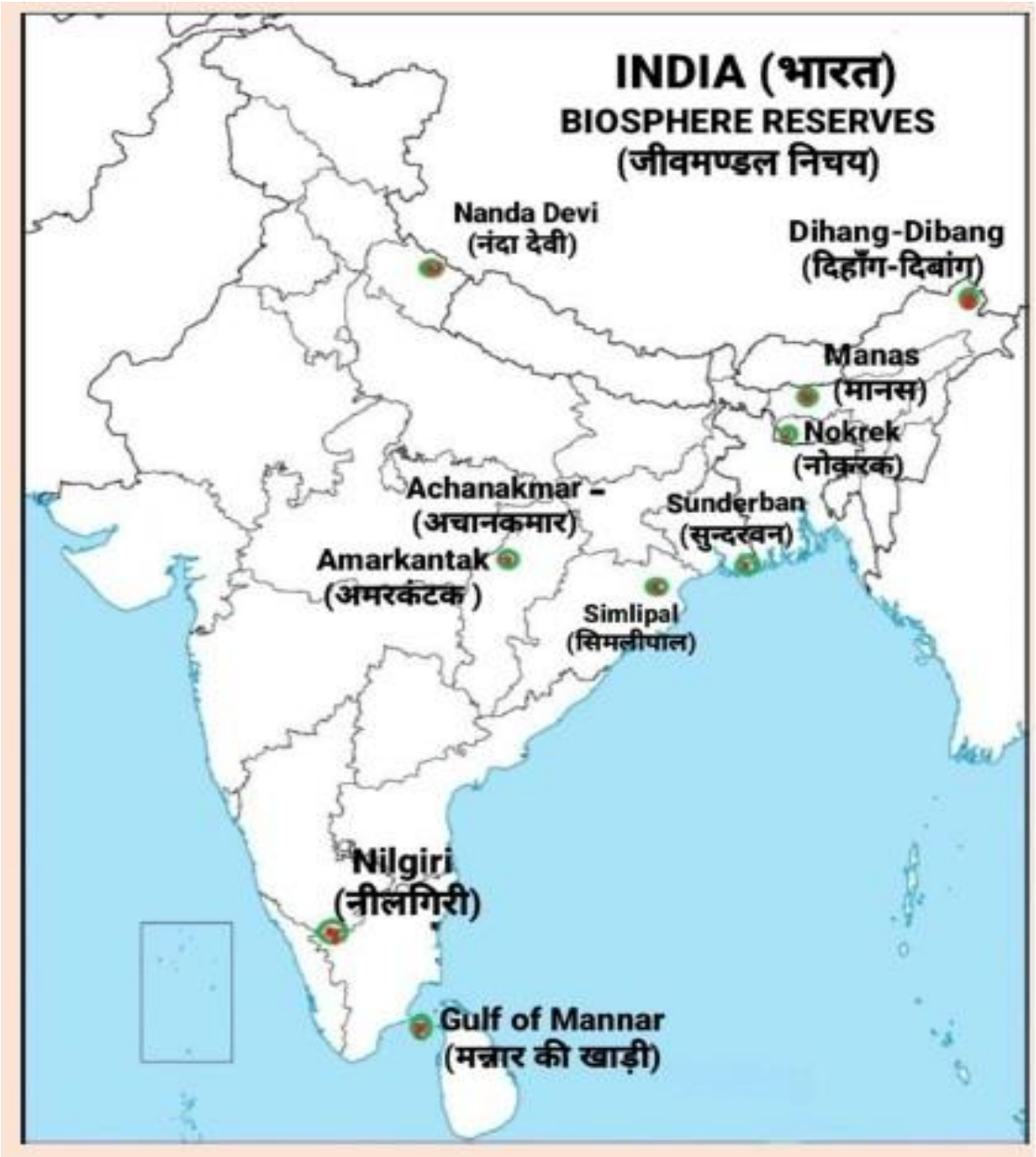
NATIONAL PARKS

BIRD SANCTUARY

WILDLIFE SANCTUARIES



BIOSPHERE RESERVES


INDIA (भारत)
BIOSPHERE RESERVES
(जीवमण्डल निचय)
Nanda Devi
(नंदा देवी)
Dihang-Dibang
(दिहाँग-दिबांग)
Manas
(मानस)
Nokrek
(नोकरक)
Achanakmar –
(अचानकमार)
Sunderban
(सुन्दरवन)
Amarkantak
(अमरकंटक)
Simlipal
(सिमलीपाल)
Nilgiri
(नीलगिरी)
Gulf of Mannar
(मन्नार की खाड़ी)

CLASS XI GEOGRAPHY

BLUE PRINT– SESSION ENDING EXAM 2024

Part A (Book I): Fundamentals of Physical Geography							
Form of Questions		MCQ + Case based MCQ	Source based Question	S.A.	L.A.	Map Based / Map Que.	
	Name of Chapters	No. of questions Unit-wise					
	MARKS	1	3	3	5	5	Total Marks
1	Geography as a Discipline	-	-	3(1)	-	-	3 (1)
2	The Origin and Evolution of the Earth	1	-	-	-	-	1 (1)
3	Interior of the earth	3 (SBQ)	-	-	-	-	3(3)
4	Distribution of Oceans and Continents	-	-	--	1	-	5(1)
5	Geomorphic processes	1	-	-	-	-	1(1)
6	Land forms and their evolution	-	-	-	1	-	5(1)
7	Composition and Structure of Atmosphere	-	(SBQ) 3(1)	-	-	-	3(1)
8	Solar Radiation, Heat balance and Temperature	-	-	3(1)	-	-	3(1)
9	Atmospheric Circulation and Weather Systems	1	-	-	-	-	1(1)
10	Water in the Atmosphere	1	-	-	-	-	1(1)

11	Water (Oceans)	1	-	-	-	-	1(1)
12	Movement of Ocean Water	-	-	3(1)	-	-	3(1)
	Map Work					1	5 (1)
(A)	Sub- total	8(8)	3(1)	9(3)	10(2)	5(1)	35 (15)
	Part B (Book II): India: Physical Environment						
1	India-Location	2	-	3(1)	-	-	5 (3)
2	Structure and Physiography	1	-	-	1	-	6 (2)
3	Drainage System	2	-	-	1	-	7(3)
4	Climate	3	-	-	1	-	8(4)
5	Natural Vegetation	1	(SBQ) 3(1)	-	-	-	4(2)
	Map work	--	--	-	-	1	5 (1)
(B)	Sub - Total	9(9)	3(1)	3(1)	15(3)	5(1)	35 (15)
	TOTAL of (A) & (B)	17 (17)	6(2)	12 (4)	25 (5)	10 (2)	70 (30)

Easy = 20 % **Average = 60 %** **Difficult = 20 %**

KENDRIYA VIDYALAYA SANGATHAN LUCKNOW REGION

केंद्रीय विद्यालय संगठन लखनऊ संभाग

SESSION ENDING EXAM

वार्षिक परीक्षा

CLASS- XI

कक्षा-११

SUBECT- GEOGRAPHY (029) THEORY

विषय-भूगोल (०२९) सैधान्तिक

SESSION-2023-2024

TIME: 03.00 hours **Maximum Marks: 70**

General Instructions:

01. There are 30 questions in all.
02. Question paper is divided into five sections A, B, C, D and E All questions are compulsory. Marks for each question are indicated against it.
03. In Section – A -Question number 01 to 17 are MCQ type questions carrying 01 mark each.
04. In Section B&C- Question number 18 to 23 are (SA) short answer questions, carrying 03 marks each. Answer to each of these questions should not exceed 80-100 words. Question no 18 and 19 are source-based questions
05. In Section D Question number 24 to 28 are long answer-based questions carrying 05 marks each. Answer to each of these questions should be between 120- 150 words.
06. In Section E -Questions number 29 and 30 are related to identification or locating and labeling of geographical features on maps carrying 5 marks each.
07. Outline maps of the World and India provided to you must be attached within your answer-book.
08. Use of templates or stencils for drawing outline maps is allowed.

सामान्य निर्देश :-

01. **प्रश्न पत्र में कुल ३० प्रश्न हैं ।**

02. **प्रश्न पत्र चार खण्डों खंड A, B, C, DऔरE में विभाजित है । सभी प्रश्न अनिवार्य हैं, प्रत्येक प्रश्न के अंक उनके सामने दिए गए हैं ।**

03. **खंड –अ (Section – A) प्रश्न संख्या 01 से 17 तक बहु-विकल्पीय प्रश्न(MCQ) हैं प्रत्येक प्रश्न १ अंक का है सही विकल्प चुन कर उत्तर दें ।**

04. **खंड – ब (Section B&C)- प्रश्न संख्या 18 से 23 तक लघु उत्तरीय प्रश्न (SA) हैं ,प्रत्यैक प्रश्न ३ अंक के है और उत्तर देने की अधिकतम शब्द सीमा 80-100 शब्द हैं ।**

05. **खंड -द (Section D)प्रश्न संख्या 24 से 28 तक सभी प्रश्न दीर्घ उत्तरीय प्रश्न हैं एवं प्रत्येक प्रश्न 05 अंक के हैं । इन प्रश्नों के उत्तर देने की अधिकतम शब्द सीमा 120 से 150 शब्दों के बीच है ।**

06. **खंड- इ – (Section E)-प्रश्न संख्या 29 एवं 30 मानचित्र पर आधारित प्रश्न हैं । प्रश्न सं 29 में विश्व के दिए गए रेखा मानचित्र में A, B, C , D,E,F,G द्वारा दर्शाए गए भौगोलिक लक्षणों को पहचानिए और दिए गए स्थान पर उनका नाम लिखिए । इसी तरह प्रश्न संख्या30 में भारत के दिए गए रेखा मानचित्र में दिए गए भौगोलिक लक्षणों को दर्शायें एवं नामांकित करें ।**

07 . मानचित्र को उत्तर पुस्तिका के साथ नत्थी करना न भूलें |

08. मानचित्र बनाने के लिए स्टैंसिल का प्रयोग किया जा सकता है |

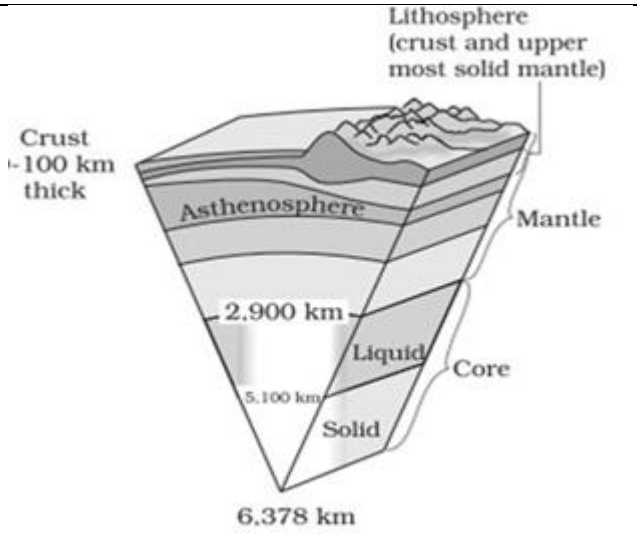
Q.NO.	**SECTION A** **There are 17 questions in this section. All are mandatory**	MARKS
1.	Life on the earth surface appears around how many years before the present time? a. 13.7 billion years ago b. 3.8 millions years ago c. 4.6 billions years ago d. 3.8 billions years ago पृथ्वी पर जीवन का विकास आज से लगभग कितने समय पूर्व हुआ था? क) 13.7 billion अरब वर्ष पूर्व ख) 3.8 लाख वर्ष पूर्व ग) 4.6 अरब वर्ष पूर्व घ)3.8 अरब वर्ष पूर्व	1
2.	Which of the following is an example of endogenic forces? **a)** Erosion b)Weathering **b)** Balance d) Volcanism निम्नलिखित में से कौन सा एंडोजेनिक बलों का एक उदाहरण है? क) कटाव ख) ज्वालामुखीता ग)अपक्षय घ)संतुलन	1
3.	What will be the direction of wind around a low pressure in Northern Hemisphere? उतरी गोलार्द्ध में निम्न वायुदाब के चारो तरफ पवन की दिशा क्या होगी? A) clockwise B) Perpendicular to isobars c) Anti-clock wise D) Parallel to isobars क) क्लॉकवाइज ख) समदाब रेखाओं के समकोण ग)एंटीक्लॉकवाइज घ) समदाब रेखाओं के समानांतर	1
4.	Which of the following areas receives convectional rainfall? निम्नलिखित में से किस क्षेत्र में संवहनीय वर्षा होती है?	1

	a)Monsoon Asia b)Middle latitude c)Mountain region d)Equatorial region क)मॉनसून एशिया ख)मध्य अक्षांश ग)पर्वतीय क्षेत्र घ) भूमध्यरेखीय क्षेत्र	
5.	Identify the element which is not a part of the hydrological cycle: उस तत्व को पहचानें जो जलचक्र का हिस्सा नहीं है: a) Evaporation b) Hydration c) Precipitation d) Condensation. क) वाष्पीकरण ख) जलयोजन ग) वर्षण घ) संक्षेपण।	1
6.	Which one of the following states not passes through Tropic of Cancer line? निम्नलिखित में से कौन सा राज्य कर्क रेखा से होकर नहीं गुजरता है? a) Rajasthan c) Tripura b) Haryana d) Jharkhand क) राजस्थान ग) त्रिपुरा ख) हरियाणा घ) झारखंड	1
7.	India's territorial limit is extended up to – भारत का सीमान्तर्गत क्षेत्र विस्तारित है- a)12 Nautical Mile b)20 Nautical Mile c)6100 km d)7517 km क) 12 समुद्री मील ख)20 समुद्री मील	1

	ग)6100किमी. घ)7517 किमी.	
8.	Question: Consider the following statements 1. Along with Northern plain, coastal plains also form one of the physiographic divisions of India 2. Islands of India does not form part of physiographic divisions of India **प्रश्न: निम्नलिखित कथनों पर विचार करें** 1. **उत्तरी मैदान के साथ-साथ तटीय मैदान भी भारत के भौगोलिक प्रभागों में से एक हैं** 2. **भारत के द्वीप भारत के भौगोलिक प्रभागों का हिस्सा नहीं हैं** Select the correct answer from the following codes **निम्नलिखित कूटों में से सही उत्तर का चयन करें** a) Only 1 b) Only 2 c) Both 1 and 2 d) Neither 1 nor 2 **क) केवल** 1 **ख) केवल** 2 **ग)** 1 **और** 2 **दोनों घ) न तो** 1 **और न ही** 2	1
9.	Assertion (A): Perennial rivers mostly originate from the Himalayas. Reason (R): The glaciers in the Himalayas feed the rivers. **कथन** (A) : **बारहमासी नदियाँ ज्यादातर हिमालय से निकलती हैं।** **कारण** (R) : **हिमालय के हिमनद नदियों का पोषण करते हैं।** Options: a) Only assertion is correct b) Only reason is correct c) Both assertion and reason are correct and reason is the correct explanation for assertion d) Both assertion and reason are correct but reason is not the correct explanation for assertion **विकल्प**:	1

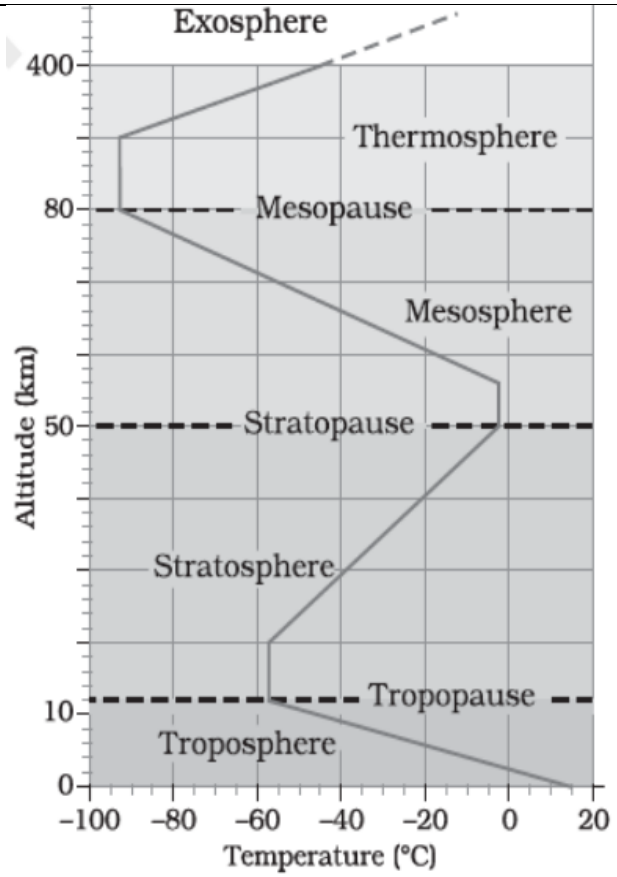
	क) केवल कथन सही है। ख) केवल कारण सही है। ग) कथन और कारण दोनों सही हैं और कारण कथन की सही व्याख्या है। घ) कथन और कारण दोनों सही हैं लेकिन कारण कथन का सही स्पष्टीकरण नहीं है।	
10.	Kayals are typically found along which coastal plain: कयाल किस तटीय मैदान में मुख्य रूप से मिलती है: a)Konkan Coast b)Malabar Coast c)Northern Circar d)Coromondal Coast 1) कोंकण तट ख) मालाबार तट ग) उत्तरी सिरकार घ) कोरोमंडल तट	1
11.	What causes rainfall on the coastal areas of Tamil Nadu in the beginning of winters? सर्दियों की शुरुआत में तमिलनाडु के तटीय क्षेत्रों में वर्षा का क्या कारण है? a) South-West monsoon b) Temperate cyclones c) North-Eastern monsoon d) Local air circulation क) दक्षिण-पश्चिम मानसून ख) शीतोष्ण चक्रवात ग) उत्तर-पूर्वी मानसून घ) स्थानीय वायु परिसंचरण	1
12.	Highest rainfall takes place in India at: भारत में सबसे अधिक वर्षा होती है: a) Mawsynram b) Eastern Coast c) Gaya d) Bhabhar क) मावसिनराम ख) पूर्वी तट ग) गया घ) भाभर	1

13.	The winds blow across the Asian continent at latitudes north of the Himalayas roughly parallel to the Tibetan highlands. These are known as what? **हिमालय के उत्तर में उच्च अक्षांशों पर एशियाई महाद्वीप में हवाओं का प्रवाह लगभग तिब्बती उच्चभूमि के समानांतर है, इन्हें किस नाम से जाना जाता है?** a) Monsoon bursting b) Western cyclones c) Jet streams d) Monsoon winds **क) मानसून का प्रस्फोट ख) पश्चिमी चक्रवात** **ग) जेट धाराएँ घ) मानसूनी हवाएँ**	1
14.	What are called the temperate forests in the Nilgiris, Anaimalai and Palani hills in southern India? **दक्षिणी भारत में नीलगिरि, अनाईमलाई और पलानी पहाड़ियों में समशीतोष्ण वनों को क्या कहा जाता है?** a) Prairies b) Downs c) Steppes d)Sholas **क) प्रेयरीज ख) चढ़ाव** **ग) स्टेप्स घ) शोला**	1
	Read the following case study and answer question no 15 to 17. Observe the given diagram(picture) and answer the following questions: **दिए गए आरेख (चित्र) को देखें और निम्नलिखित प्रश्नों के उत्तर दें:**	

	 **Figure 3.4 : The interior of the earth**	
15.	Which of the following is the densest and heavy part of Earth's interior? **निम्नलिखित में से कौन पृथ्वी के आंतरिक भाग का सबसे घना और भरी भाग है?** a) Core b) Oceanic crust c) Continental crust d) Mantle **क) क्रोड ख) समुद्री क्रस्ट ग) महाद्वीपीय परत घ) मैंटल**	1
16.	At which depth the core-mantle boundary is located? **क्रोड- मैंटल सीमा किस गहराई पर स्थित है?** a)100km b)2900km c)5100km d)6378km **क) 100 किमी ख) 2900 किमी ग) 5100 किमी घ) 6378 किमी**	1
17.	Which of the following layers is known as SIAL? **निम्नलिखित में से किस परत को सियाल के नाम से जाना जाता है?** a) Mantle b) crust c) Core d) None of these **क) मैंटल ख) क्रस्ट ग) क्रोड घ) इनमे से कोई नही।**	1
	For Visually impaired students, In lieu of Q. No.15,16,17	

	केवल दृष्टिबाधित विद्यार्थियों के लिए प्रश्न संख्या 15,16,17 के स्थान पर	
15	Which of the following is the densest and heavy part of Earth's interior? निम्नलिखित में से कौन पृथ्वी के आंतरिक भाग का सबसे घना और भरी भाग है? a) Core b) Oceanic crust c) Continental crust d) Mantle क) क्रोड ख) समुद्री क्रस्ट ग) महाद्वीपीय परत घ) मैंटल	
16	At which depth the core-mantle boundary is located? क्रोड- मैंटल सीमा किस गहराई पर स्थित है? a)100km b)2900km c)5100km d)6378km क) 100 किमी ख) 2900 किमी ग) 5100 किमी घ) 6378 किमी	
17	Which of the following layers is known as SIAL? निम्नलिखित में से किस परत को सियाल के नाम से जाना जाता है? a) Mantle b) Continental crust c) Oceanic crust d) Core क) मैंटल ख) महाद्वीपीय क्रस्ट ग) महासागरीय परत घ) क्रोड	
	SECTION- B **Question 18& 19 are Source based questions**	
18.	The mangrove tidal forests are found in the areas of coasts influenced by tides. Mud and silt get accumulated on such coasts. Dense mangroves are the common varieties with roots of the plants submerged under water. The deltas of the Ganga, the Mahanadi, the Krishna, the Godavari and the Kaveri are covered by such vegetation. In the Ganga-Brahmaputra delta, sundari trees are found, which provide durable hard timber. Palm, coconut, keora, agar, etc., also grow in some parts of the delta. Royal Bengal Tiger is the famous animal in these forests. Turtles, crocodiles,	3X1 =3

	gharials and snakes are also found in these forests. मैंग्रोव ज्वारीय वन ज्वार से प्रभावित तटों के क्षेत्रों में पाए जाते हैं। ऐसे तटों पर कीचड़ और गाद जमा हो जाती है। घने मैंग्रोव आम किस्म हैं जिनके पौधों की जड़ें पानी के नीचे डूबी होती हैं। गंगा, महानदी, कृष्णा, गोदावरी और कावेरी के डेल्टा ऐसी वनस्पति से आच्छादित हैं। गंगा-ब्रह्मपुत्र डेल्टा में सुंदरी के पेड़ पाए जाते हैं, जो टिकाऊ कठोर लकड़ी प्रदान करते हैं। डेल्टा के कुछ भागों में ताड़, नारियल, केवड़ा, अगर आदि भी उगते हैं। रॉयल बंगाल टाइगर इन जंगलों का प्रसिद्ध जानवर है। इन जंगलों में कछुए, मगरमच्छ, घड़ियाल और सांप भी पाए जाते हैं। 18.1 Which one species of plant is found in abundance in Mangrove tidal forest of India? 18.2 Write major species of fauna found in these forests. 18.3 In the deltaic regions of which rivers such vegetation is most common? 18.1 भारत के मैंग्रोव ज्वारीय वन में पौधे की कौन सी प्रजाति बहुतायत में पाई जाती है? 18.2 इन वनों में पाई जाने वाली प्रमुख जीव-जंतुओं की प्रजातियाँ लिखिए। 18.3 किन नदियों के डेल्टाई क्षेत्रों में ऐसी वनस्पतियाँ सर्वाधिक पाई जाती हैं?	
19.	Observe the given diagram(picture) and answer the following questions: दिए गए आरेख (चित्र) को देखें और निम्नलिखित प्रश्नों के उत्तर दें:	3



19.1 Stratopause separates which two layers of the atmosphere?

19.2 Which layer of atmosphere is vital for telecommunications?

19.3 All weather related phenomenon happen in which layer of the atmosphere?

19.1 स्ट्रैटोपॉज़ वायुमंडल की किन दो परतों को अलग करती है?

19.2 दूरसंचार के लिए वायुमंडल की कौन सी परत महत्वपूर्ण है?

19.3 मौसम संबंधी सभी घटनाएँ वायुमंडल की किस परत में घटित होती हैं?

For Visually Impaired Students In lieu of Q. No.19

दृष्टिबाधित छात्रों के लिए प्रश्न संख्या 19

19.1 Stratopause separates which two layers of the atmosphere?

19.2 Which layer of atmosphere is vital for telecommunications?

19.3 All weather related phenomenon happen in which layer of the

	atmosphere? 19.1 स्ट्रैटोपॉज़ वायुमंडल की किन दो परतों को अलग करती है? 19.2 दूरसंचार के लिए वायुमंडल की कौन सी परत महत्वपूर्ण है? 19.3 मौसम संबंधी सभी घटनाएँ वायुमंडल की किस परत में घटित होती हैं?	
	SECTION-C **Question numbers 20-23 are SA type questions.**	
20.	Differentiate between Systematic approach and Regional approach. On any three basis. व्यवस्थित दृष्टिकोण और क्षेत्रीय दृष्टिकोण के बीच अंतर बताएं। किन्हीं तीन आधारों पर।	3
21.	What are the different ways of heating and cooling of the atmosphere? Explain. वायुमंडल को गर्म करने और ठंडा करने के विभिन्न तरीके क्या हैं? समझाओ।	3
22.	What do you mean by tides? Differentiate neap and spring tides. ज्वार-भाटा से आप क्या समझते हैं? नीप और स्प्रिंग ज्वार में अंतर करें।	3
23.	What are the implications of India having a long coastline? भारत की लंबी तटरेखा होने के क्या निहितार्थ हैं?	3
	SECTION D **Question numbers 24 to 28 are Long Answer based questions**	
24.	Explain the concept of “Sea floor spreading”. "समुद्र तल प्रसार" की अवधारणा को समझाइए।	5
25.	Name the erosional and depositional features formed by the action of river and diagrammatically explain one land features of each. नदी के अपरदन तथा निक्षेपण द्वारा बनने वाले स्थलरूपों के नाम लिखिये तथा दोनों मे से एक-एक स्थलाकृति का सचित्र वर्णन करो।	5
26.	Write major physical divisions of India and give a detailed description of Northern mountains.	5

	भारत के प्रमुख भौतिक प्रभागों को लिखिए तथा उत्तरी पर्वतों का विस्तृत विवरण दीजिए। OR Differentiate Eastern and Western coastal plains on any five bases. पूर्वी और पश्चिमी तटीय मैदानों को किन्हीं पाँच आधारों पर विभेदित कीजिए।	
27.	Write different types of drainage patterns and distinguish eastward and westward flowing peninsular rivers of India. विभिन्न प्रकार के जल निकासी पैटर्न लिखें और भारत की पूर्व और पश्चिम की ओर बहने वाली प्रायद्वीपीय नदियों में अंतर करें।	5
28.	Name the seasons of India? Describe the South West Monsoon season of India? भारत की विभिन्न ऋतुओं के नाम बताए। दक्षिण पश्चिम मानसून ऋतु का वर्णन करें।	2+3 =5
	SECTION E **Question numbers 29 & 30 are Map based questions** **खंड ई** **प्रश्न संख्या 29 एवं 30 मानचित्र आधारित प्रश्न हैं**	
29.	On the given map of the world, the following seven features are shown. Identify any five of these features and write their correct names on the lines marked near each feature. विश्व के दिए गए मानचित्र पर निम्नलिखित सात लक्षण दर्शाए गए हैं। इनमें से किन्हीं पाँच लक्षणों को पहचानिए तथा प्रत्येक विशेषता के निकट अंकित रेखाओं पर उनके सही नाम लिखिए। A. A Cold Current. ठंडी धारा। B. A Ocean. महासागर। C. A warm current. गर्म धारा। D. An Ecological hotspots	1*5 =5

पारिस्थितिक हॉट-स्पॉट

E. A continental plate

महाद्वीपीय प्लेट

F. An earthquake zone.

भूकंप क्षेत्र।

G. A continental

महाद्वीप

The following questions are for visually impaired candidates only in lieu of Q No. 29. Attempt any five

निम्नलिखित प्रश्न संख्या 29 के स्थान पर दृष्ट बाधित छात्रों के लिए (इनमे से कोई पांच प्रश्न हल कीजिये)

A. रिंग आफ फायर कहाँ स्थित है?

Where is located Ring of Fire?

B. सहारा मरुस्थल का क्षेत्र नाम बताए

Name the area of Sahara desert.

C. नजका प्लेट के क्षेत्र का उल्लेख कीजिए

Mention the area of Nazka plate.

D. मध्य अटलांटिक कटक कहाँ स्थित है?

Where is located Mid Atlantic ridge?

E. वान झील कहाँ स्थित है?

Where is located Van lake?

F. पृथ्वी पर सबसे बड़ी महासागरीय प्लेट कौन सी है ?

Which is largest oceanic plate?

G. लेब्रोडोर महासागरीय जल धारा कहाँ पर चलती है?

	Where is blow Labrador Oceanic Current?	

30.	On the political outline map of India, locate and label ANY FIVE following items with appropriate symbols. दिए गए भारत के राजनीतिक रेखा मानचित्र पर निम्नलिखित भौगोलिक लक्षणों में से किन्हीं पाँच को उपयुक्त चिन्हों से अंकित कीजिए और उनके नाम लिखिए। A. River Ganga गंगा नदी B. Tropic of cancer कर्क रेखा C.A place in India of lowest temperature भारत में सबसे कम तापमान वाला स्थान D. Simlipal National Park सिमलीपाल राष्ट्रीय पार्क E. IST of India. भारत का आई.एस.टी. F. Nathula Pass नाथूला दर्रा G. Satpura Range सतपुड़ा रेंज The following questions are for visually impaired candidates only in lieu of Q No. 30. Attemt any five निम्नलिखित प्रश्न संख्या 30 के स्थान पर दृष्ट बाधित छात्रों के लिए (इनमे से कोई पांच प्रश्न हल कीजिये) (A) श्रीलंका और भारत को कौन सी जल संधि अलग करता हैं? Which is separated strait from India and Shrilanka? (B) भारत का सबसे दक्षिणतम बिंदु बताइए	1*5 =5

Name the southernmost point of mainland of India.

(C) काबेरी नदी का उदगम स्थान कहाँ स्थित?

What is origin place of Kaveri river?

(D) उत्तरीय सरकार तटीय मैदान कहाँ स्थित हैं?

Where is located Northern Circar.

(E) अरब सागर में स्थित द्वीप समूह का नाम बताए

Write the name of islands in Arabian sea.

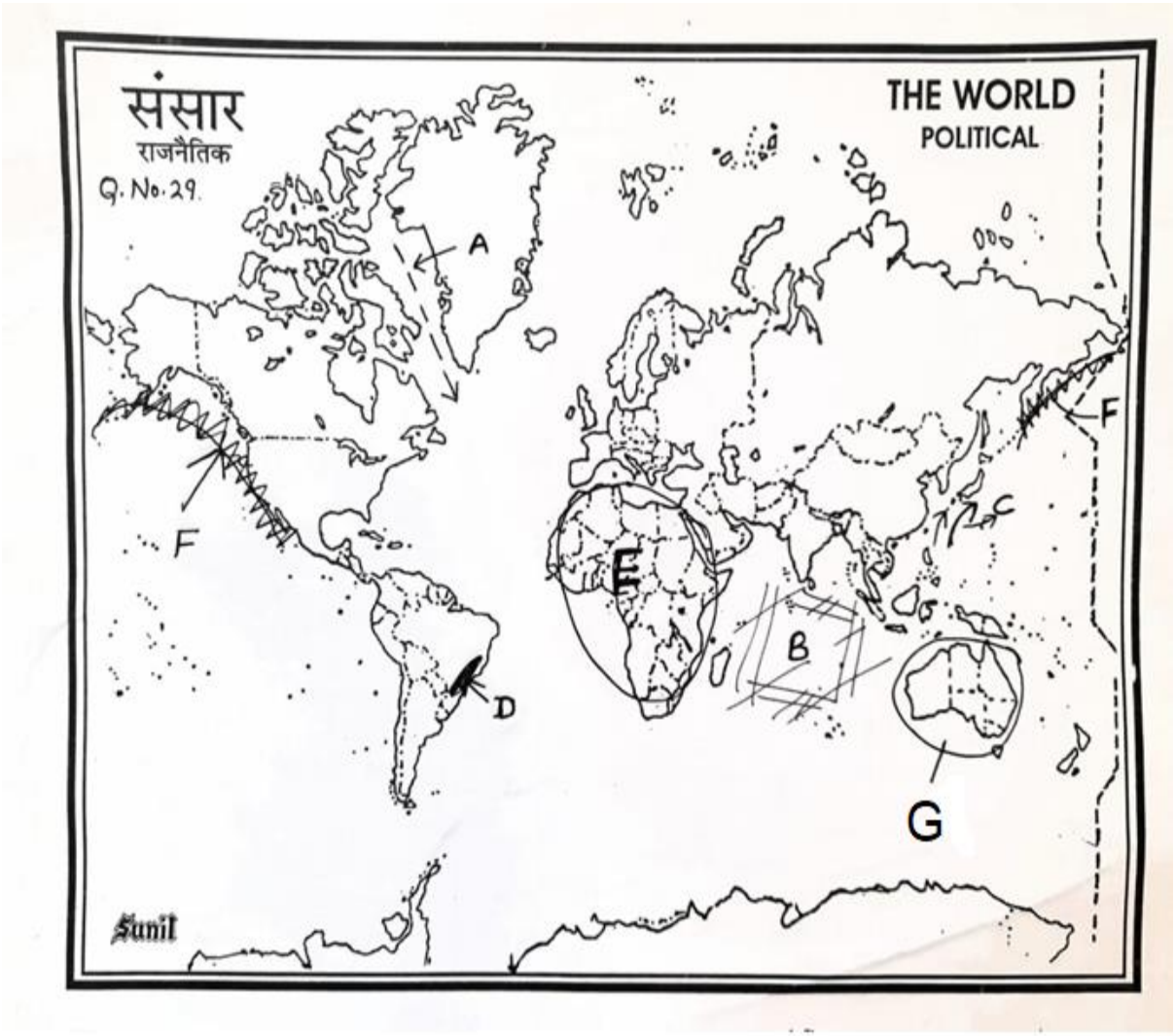
(F) आंध्रप्रदेश का एक प्रसिद्ध झील नाम लिखिए

Name the famous lake of Andhra pradesh

(G) दक्षिण भारत की सबसे ऊँची चोटी कौन सी है?

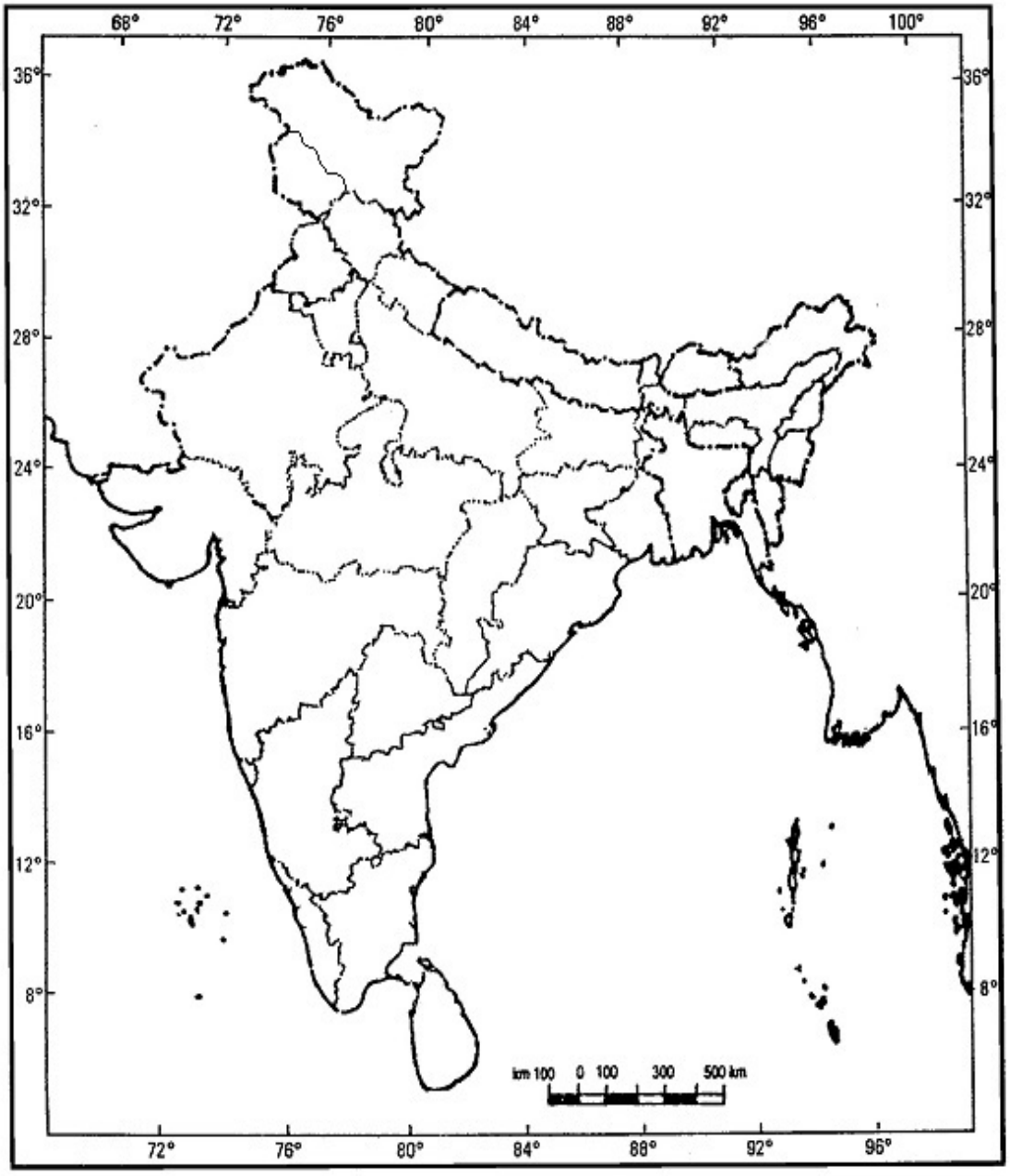
Which is highest peak of southern India?

Q.29



भारत का रेखा-मानचित्र (राजनीतिक)

Outline Map of India (Political)



KENDRIYA VIDYALAYA SANGATHAN LUCKNOW REGION

Session Ending Exam (2023-24)

CLASS XI **GEOGRAPHY (029)**
Time: 3Hrs. **Max. Marks 70**

MARKING SCHEME

Q.N.	Answers	Marks
1	c. 4.6 billions years ago	1
2	d) Volcanism	1
3	c) Anti-clock wise	1
4	d)Equatorial region	1
5	b) Hydration	1
6	b) Haryana	1
7	a)12 Nautical Mile	1
8	a) Only 1	1
9	c) Both assertion and reason are correct and reason is the correct explanation for assertion	1
10	b)Malabar Coast	1
11	c) North-Eastern monsoon	1
12	a) Mawsynram	1
13	c) Jet streams	1
14	d)Sholas	1
15	a) Core	1
16	ख) 2900 किमी	1
17	b) crust	1
18	18.1 Sundari tree 18.2 Tiger, crocodile, ghariyal etc. 18.3 The deltas of the Ganga, the Mahanadi, the Krishna, the Godavari and the Kaveri.	1+1+1
19	19.1 Stratosphere and mesosphere 19.2 Ionosphere 19.3 Troposphere	1+1+1
20	In systematic approach,we select one geographical factor and study its distribution for the whole world or a part thereof. Relief, drainage, climate, vegetation, soil, mineral wealth, agriculture, industry, transport, trade and commerce and population are some of the important geographical elements Systematic Approach- The study of specific natural or human phenomenon that gives rise to certain spatial patterns and structures on the earth surface is called systematic study. Generally, systematic geography is divided into four main branches Regional approach- the world is divided into different regions and geographical phenomena are studied taking each region as a unit. The phenomena of the region is studied holistically. It was introduced by a German Geographer, Karl Ritter.	3
21	**1.condction** **3. convection** **2. advection**	3

<table>
<tr><td>22</td><td>Tides are the rise and fall of sea levels caused by the combined effects of the gravitational forces exerted by the Moon.
Spring Tides
1.A tide in which the difference between high and low tide is the greatest is called a spring tide.
2.Spring tides occur when the moon is either new or full, and the sun, the moon, and the Earth are aligned. When this is the case, their collective gravitational pull on the Earth's water is strengthened.
Neap Tides
1.A tide in which the difference between high and low tide is the least is called a neap tide.
2. Neap tides occur twice a month when the sun and moon are at right angles to the Earth. When this is the case, their total gravitational pull on the Earth's water is weakened because it comes from two different directions.</td><td>3</td></tr>
<tr><td>23</td><td>
1.marine resorses.
2. international trade.
3. Tourism.
4. EEZ etc.</td><td>3</td></tr>
<tr><td>24</td><td>studies of rocks from oceanic regions revealed the following facts : (i) It was realised that all along the midoceanic ridges, volcanic eruptions are common and they bring huge amounts of lava to the surface in this area. (ii) The rocks equidistant on either sides of the crest of mid-oceanic ridges show remarkable similarities in terms of period of formation, chemical compositions and magnetic properties. Rocks closer to the mid-oceanic ridges have normal polarity and are the youngest. The age of the rocks increases as one moves away from the crest. (iii) The ocean crust rocks are much younger than the continental rocks. The age of rocks in the oceanic crust is nowhere more than 200 million years old. Some of the continental rock formations are as old as 3,200 million years. (iv) The sediments on the ocean floor are unexpectedly very thin. Scientists were expecting, if the ocean floors were as old as the continent, to have a complete sequence of sediments for a period of much longer duration. However, nowhere was the sediment column found to be older than 200 million years. (v) The deep trenches have deep-seated earthquake occurrences while in the midoceanic ridge areas, the quake foci have shallow depths.</td><td>5</td></tr>
<tr><td>25</td><td>Erosional Landforms-V-shape valley, gorge, canyon, pot holes, plunge pools, river terraces etc.

Depositional Landforms- Alluvial Fan, Deltas, Flood plains, Natural Levees, point bar, braided channel etc.

(Explain any one of each with digram)</td><td>5</td></tr>
<tr><td>26</td><td>India can be divided into the following physiographic divisions: (i) The Northern and Northeastern Mountains (ii) The Northern Plain (iii) The Peninsular Plateau (iv) The Indian Desert (v) The Coastal Plains (vi) The Islands.
1. The Himalayan Mountains The Himalayan mountains extend from the Indus to the Brahmaputra. They have three parallel ranges: Himadri, Himachal and Shiwaliks. A number of valleys lie between these ranges.

2. North eastern hills

Or

<table>
<tr><td>Eastern Coastal Plains</td><td>Western Coastal Plains</td></tr>
<tr><td>Eastern Coastal Plain is divided into 2 stretches North and South. The part which is in the South is known as Coromandel Coast and the Northern Stretch of Eastern Coastal Plains is known as Northern Circar.</td><td>Western Coastal Plains are divided into 3 different se southern part is known as Malabar Coast, the Central Western Coast is known as the Karavali or Kanara. T Part of the Western Coast is known as Konkan.</td></tr>
<tr><td>Eastern Coastal Plain is in between the Bay of Bengal in the East and the Eastern Ghats to its West.</td><td>Western Coastal Plain is between the Arabian Sea an Western Ghats.</td></tr>
<tr><td>Wide Deltas are formed by large rivers on the Eastern Coastal Plains</td><td>No Deltas are formed in Western Coastal plains, by s</td></tr>
<tr><td>Eastern Coastal Plain is fertile due to alluvial soil</td><td>Except for the Southern Part i.e. Malabar Coast, the V</td></tr>
</table>
</td><td>5</td></tr>
</table>

		Coastal Plain is infertile for agricultural purposes.		
	Eastern Coastal Plain is broader	Western Coastal Plains are very narrow		
	Eastern Coastal plain is a level surface	Western Coastal plain is intersected by mountain ridges.		

.

27

5

Dendritic drainage patterns · Trellis drainage pattern · Rectangular drainage pattern · Parallel drainage pattern · Radial drainage pattern.

East flowing peninsular rivers	West flowing peninsular rivers
(i)The rivers flowing eastward on the peninsular plateau are generally large.	(i)The rivers flowing westward on the peninsular plateau are generally small but rivers Narmada and Tapi are exceptions to this.
(ii)These rivers form huge deltas near their mouth.	(ii)These rivers do not form deltas.
(iii)These rivers do not flow through trough.	(iii)West flowing rivers like Narmada and Tapi flow through troughs which have been formed due to faulting.
(iv)These rivers fall into Bay of Bengal.	(iv)These rivers fall into Arabian sea.
(v)The Mahanadi, Godavari, Krishna and Kaveri are east flowing rivers.	(v)The Narmada and Tapi are west flowing rivers.

28

5

The meteorologists recognise the following four seasons :

(i) the cold weather season

(ii) the hot weather season

(iii) the southwest monsoon season

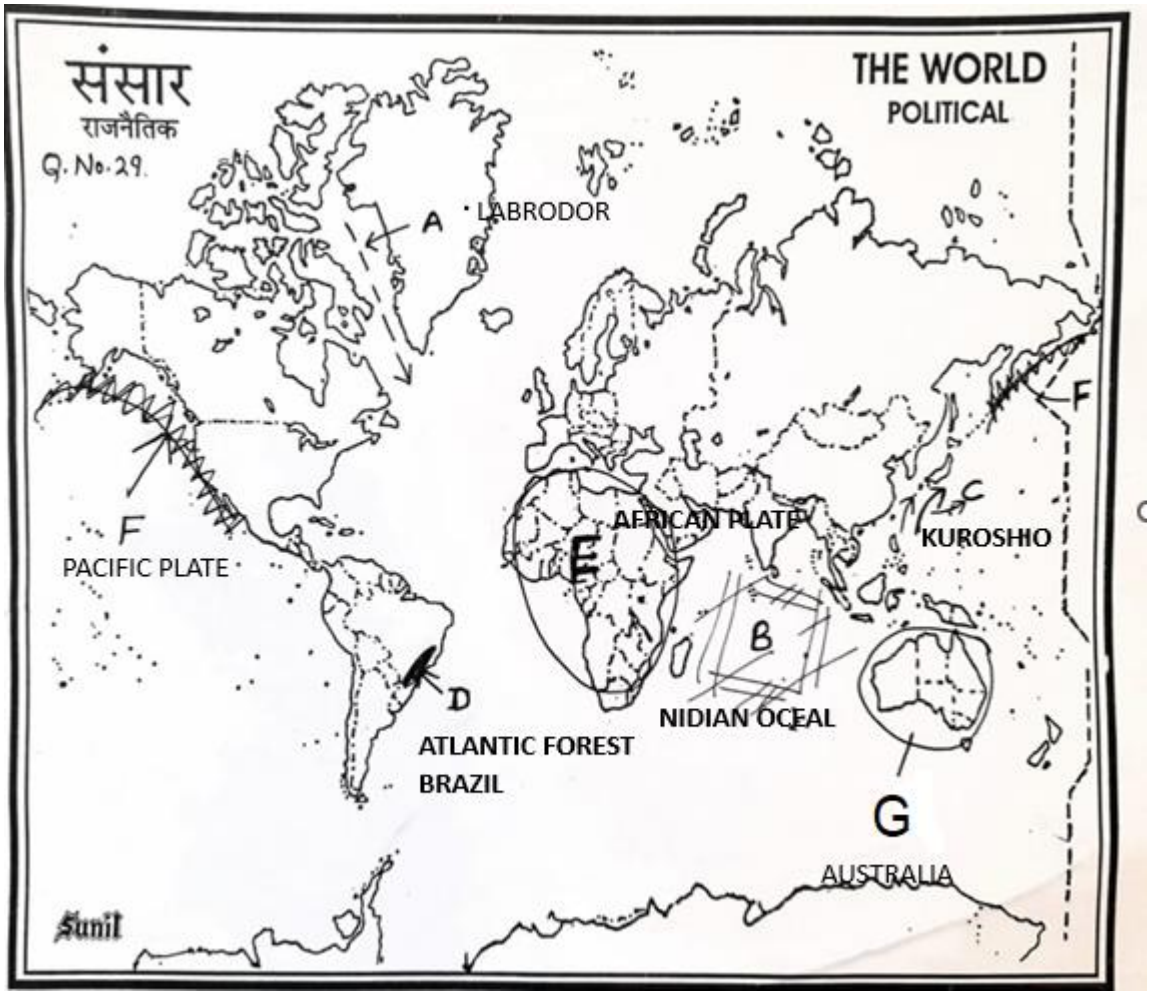
(iv) the retreating monsoon season.

The Southwest Monsoon Season

As a result of rapid increase of temperature in May over the northwestern plains, the low pressure conditions over there get further intensified. By early June, they are powerful enough to attract the trade winds of Southern Hemisphere coming from the Indian Ocean. These southeast trade winds cross the equator and enter the Bay of Bengal and the Arabian Sea, only to be caught up in the air circulation over India. Passing over the equatorial warm currents, they bring with them moisture in abundance. After crossing the equator, they follow a southwesterly direction. That is why they are known as southwest monsoons.

The rain in the southwest monsoon season begins rather abruptly. One result of the first rain is that it brings down the temperature substantially. This sudden onset of the moisture-laden winds associated with violent thunder and lightening, is often termed as the “break” or “burst” of the monsoons. The monsoon may burst in the first week of June in the coastal areas of Kerala, Karnataka, Goa and Maharashtra while in the interior parts of the country, it may be delayed to the first week of July. The day temperature registers a decline of 5°C to 8°C between mid-June and mid-July.

As these winds approach the land, their southwesterly direction is modified by the relief and thermal low pressure over the northwest India. The monsoon approaches the landmass in two branches:

	(i) The Arabian Sea branch (ii) The Bay of Bengal branch	
29	A. - Labrador cold current B.- Indian Ocean C. -Kuroshio Warm current D.- Atlantic Forest Brazil E. - African Plate F.- Pacific Plate G Australia  The following questions are for visually impaired candidates only in lieu of Q No. 29. Attempt any five A. Pacific Ocean B. North Africa C. Pacific Ocean D.The Atlantic Ocean E. Turkey F. The Pacific Plate G. North Atlantic Ocean	5
30.	A. River Ganga---- गंगा नदी B. Tropic of cancer --- कर्क रेखा C.A place in India of lowest temperature- भारत में सबसे कम तापमान वाला स्थान D.Simlipal National Park-----	5

सिमलीपाल राष्ट्रीय पार्क

E.IST of India.

भारत का आई.एस.टी.

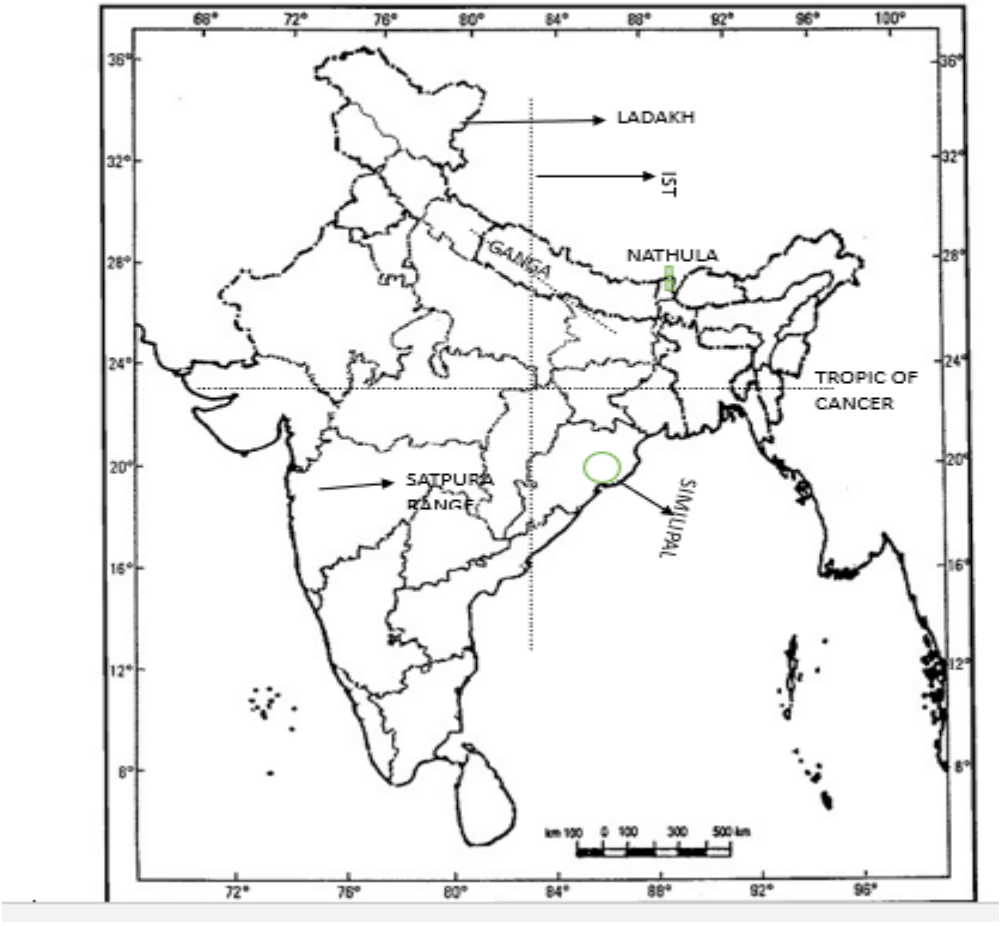
F. Nathula Pass -

नाथूला दर्रा

G. Satpura Range---

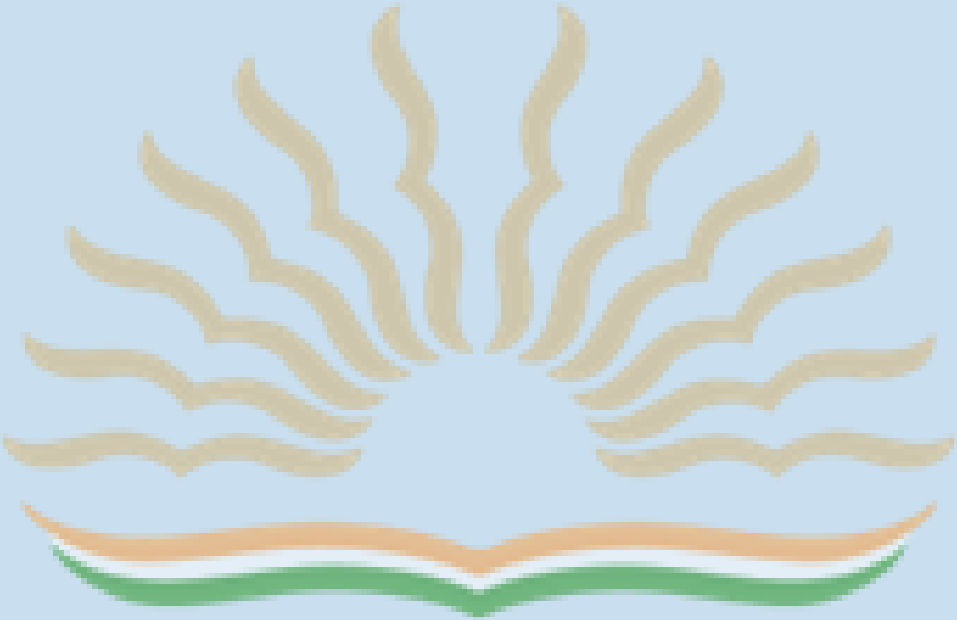
सतपुड़ा रेंज

भारत का रेखा-मानचित्र (राजनीतिक)
Outline Map of India (Political)



The following questions are for visually impaired candidates only in lieu of Q No. 30. Attemt any five

A. Palk Strait
B. Kanyakumari
C. Brahmagiri Range
D. Chennai
E. The Lakshadweep Islands
F. Kolleru
G. Anamudi



केन्द्रीय विद्यालय संगठन

Kendriya Vidyalaya Sangathan