CBT FEBRUARY 2024
CLASS – XI: BIOLOGY

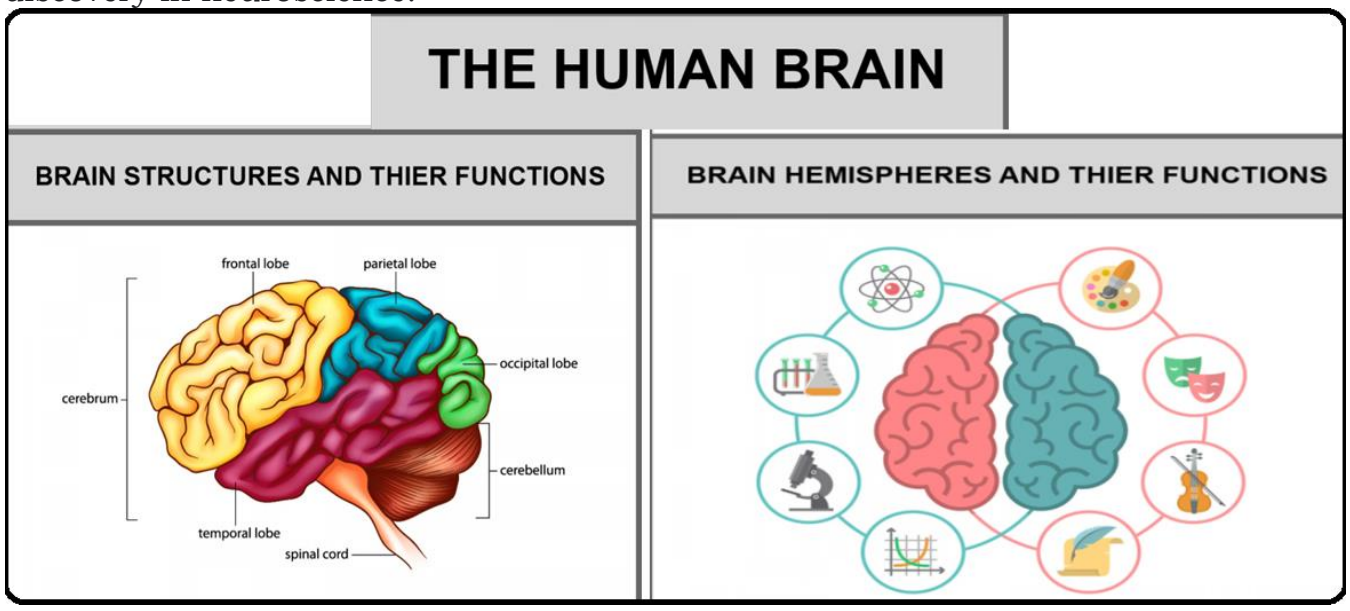
GENERAL INSTRUCTION :

SCORE AND REVIEW OF ALL THE QUESTIONS WILL BE PROVIDED IN THE EMAIL TO ALL THE STUDENTS ON NEXT DAY AND AFTER CLOSING OF QUIZ TIME.

IMPORTANT : ALL THE STUDENTS SHOULD FILL THE CORRECT SCHOOL NAME FROM DROP DOWN BUTTON

CHAPTERS COVERED:
Chapter-21: Neural Control and Coordination
Chapter-22: Chemical Coordination and Integration

Q.1: The brain, our body's central information processor, serves as the command and control system, overseeing a multitude of functions. It manages voluntary movements, bodily balance, and the functions of vital involuntary organs, while also regulating thermoregulation, hunger, thirst, and circadian rhythms. Notably, it plays a key role in processing vision, hearing, speech, memory, intelligence, emotions, and thoughts.
Encased in the protective skull, the brain is covered by cranial meninges – the dura mater, arachnoid, and pia mater. Divided into the forebrain, midbrain, and hindbrain, the forebrain encompasses the cerebrum, thalamus, and hypothalamus. The cerebrum, with left and right hemispheres, features a cerebral cortex responsible for motor and sensory functions, including complex tasks handled by association areas.
In recent developments, ongoing research has revealed intricate details about specific brain functions. Neuroscientific advances have deepened our understanding of neural processes, such as the role of neurotransmitters in cognition and emotions. Additionally, modern brain imaging techniques, like functional magnetic resonance imaging (fMRI), enable scientists to observe brain activity in real-time, enhancing our comprehension of cognitive functions.
The limbic lobe, a complex structure within the brain, includes inner cerebral hemisphere parts and associated structures like the amygdala and hippocampus. Together with the hypothalamus, it actively regulates sexual behaviour, emotional expressions, and motivation. This dynamic interplay of brain regions underscores the complexity of human behaviour and physiology, a subject of ongoing exploration and discovery in neuroscience.



1. How does the brain's regulation of circadian rhythms connect with other physiological functions?
   a. Circadian rhythms are independent of other functions.
   b. Circadian rhythms influence memory but not emotions.
   c. Circadian rhythms interact with functions like thermoregulation and hunger.
   d. Circadian rhythms solely impact involuntary organ functions.
Answer: c. Circadian rhythms interact with functions like thermoregulation and hunger.
Explanation: The text mentions that the brain regulates circadian rhythms along with functions like thermoregulation, hunger, and more.

2. Assertion : Cerebellum has very convoluted surface in order to provide the additional space for many more neurons.
Reason : The medulla oblongata control respiration, cardiovascular reflexes and gastric secretions.
   A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
   B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
   C. If assertion is true but reason is false.
   D. If both assertion and reason are false.
Answer: B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
Explanation: Cerebellum has very convoluted surface in order to provide the additional space for many more neurons. And the medulla oblongata control respiration, cardiovascular reflexes and gastric secretions. Both are correct but not connected.

3.The hypothalamus controls body temperature, eating, and drinking urges through:
   a. Direct motor commands to organs.
   b. Release of hypothalamic hormones.
   c. Isolation from other brain regions.
   d. Circadian rhythm synchronization.
Answer: b. Release of hypothalamic hormones.
Explanation: The hypothalamus controls body temperature, eating, and drinking urges through the release of hypothalamic hormones.

4. The protective layers of the brain (cranial meninges) contribute to:
   a. Visual processing.
   b. Emotional regulation.
   c. Safeguarding the brain.
   d. Thirst and hunger regulation.
Answer: c. Safeguarding the brain.
Explanation: The cranial meninges protect the brain, as mentioned in the text, contributing to the overall safeguarding of the central nervous system.

5. The interplay between forebrain, midbrain, and hindbrain is crucial for:
   a. Isolating sensory and motor functions.
   b. Simple involuntary movements.
   c. Executing complex tasks related to voluntary and involuntary movements.
   d. Emotional expression only.
Answer: c. Executing complex tasks related to voluntary and involuntary movements.
   - Explanation: The interplay between forebrain, midbrain, and hindbrain is crucial for executing complex tasks related to both voluntary and involuntary movements, as discussed in the text.

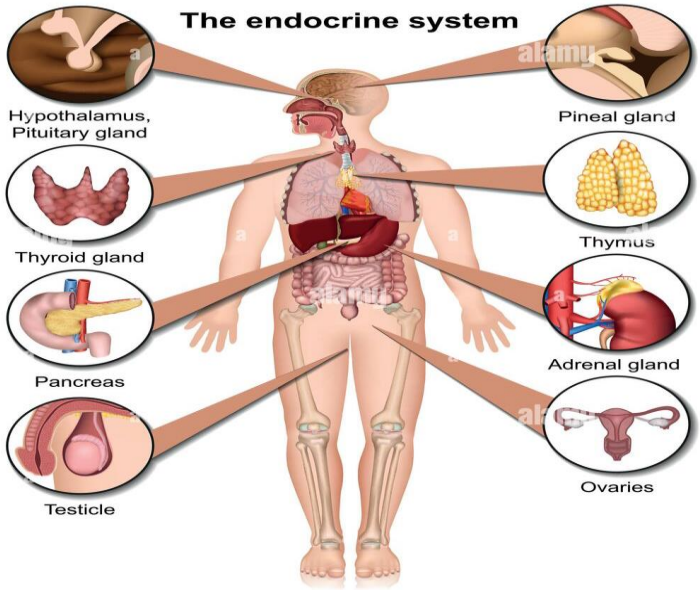
Q.2: Delving into the fascinating realm of endocrinology, the intricate dance of hormones orchestrates the symphony of physiological processes in the human body. Yet, when this harmony is disrupted, either by an excess (hypersecretion) or a deficiency (hyposecretion) of hormones, it can lead to a spectrum of disorders, each holding profound implications for health.

Hypersecretion, characterized by an overproduction of hormones, often arises from conditions such as tumors or malfunctioning endocrine glands. Take hyperthyroidism, for instance, a global concern linked not only to overactive thyroid glands but also, recent research suggests, to autoimmune factors, paving the way for targeted treatment strategies. Similarly, the hypersecretion of growth hormone results in acromegaly, a disorder not only affecting physical features but also influencing mental well-being.

Conversely, hyposecretion of hormones can be equally impactful. Hypothyroidism, a prevalent disorder stemming from an underactive thyroid gland, significantly influences energy metabolism. Recent studies spotlight the intricate interplay between genetics and hypothyroidism, unlocking potential personalized treatment avenues.

Expanding our exploration beyond the thyroid, various endocrine glands contribute to this delicate hormonal balance. Disorders like Cushing's syndrome, associated with hypersecretion of cortisol from the adrenal glands, exemplify the broader implications. Additionally, the pancreas, responsible for insulin secretion, plays a crucial role; disruptions can lead to diabetes, showcasing the far-reaching consequences of hormonal imbalances.

Understanding these hormonal intricacies is paramount for personalized healthcare. The intersection of genetics, autoimmune factors, and innovative treatments continues to unfold in the dynamic field of endocrinology. This knowledge empowers individuals to proactively manage their health, fostering a continuous journey of exploration into the captivating world of hormonal regulation.



1. What is hyperthyroidism, and what recent research aspect is highlighted in the text?
   a. Excess growth hormone production; personalized treatment avenues
   b. Overactive thyroid gland; autoimmune factors and targeted treatments
   c. Insufficient insulin secretion; genetic implications
   d. Underactive adrenal glands; cortisol imbalance

Answer: b. Overactive thyroid gland; autoimmune factors and targeted treatments.
Explanation: Hyperthyroidism involves excessive thyroid hormone production. Recent research highlights the connection between hyperthyroidism and autoimmune factors, emphasizing the potential for targeted treatments.

2. Cushing's syndrome, mentioned in the text, is linked to the hypersecretion of hormones from which endocrine gland?
a. Thyroid gland
b. Adrenal glands
c. Pancreas
d. Pituitary gland
Answer: b. Adrenal glands.
Explanation: Cushing's syndrome is associated with the hypersecretion of cortisol, a hormone produced by the adrenal glands. This disorder involves an overactive adrenal cortex.

3. What broader health implications are associated with disruptions in insulin secretion from the pancreas?
a. Acromegaly
b. Diabetes
c. Cushing's syndrome
d. Hyperthyroidism
Answer: b. Diabetes
Explanation: Disruptions in insulin secretion from the pancreas can lead to diabetes. This highlights the broader health implications of hormonal imbalances beyond the thyroid, as discussed in the text.

4. In the context of hormonal imbalances, why is understanding the interplay between genetics and disorders like hypothyroidism crucial?
a. To explore cortisol imbalance pathways
b. To unravel personalized treatment avenues
c. To identify autoimmune connections
d. To understand the broader implications beyond the thyroid
Answer: b. To unravel personalized treatment avenues.
Explanation: Understanding the interplay between genetics and disorders like hypothyroidism is crucial for unravelling personalized treatment avenues. This intersection informs tailored approaches for managing hormonal imbalances based on individual genetic factors.

5. Assertion: Adrenal medulla is called the gland for 'fight, fright and flight'.
Reason: The hormones adrenaline and noradrenaline help the body to combat against stress and emergency conditions.
A.If both Assertion and Reason are true and Reason is the correct explanation of Assertion
B. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
C.If Assertion is true but Reason is false.
D.If both Assertion and Reason are false.
Answer: A. If both Assertion and Reason are true and Reason is the correct explanation of Assertion
Explanation: Adrenaline or epinephrine dilates (widens) arterioles in the skeletal muscles and constricts (narrows) those in the skin and abdominal viscera. It increases the rate and force of heart beats and arterial blood pressure by enhancing the cardiac output. Adrenaline relaxes the smooth muscles of gastro-intestinal tract, and urinary bladder and bronchioles and contracts the sphincters of gastrointestinal tract and bladder. It increases blood sugar and blood lactic acid levels and also increases heat production, metabolic rate and body temperature. Noradrenaline or norepinephrine constricts arterioles in general or increases the total peripheral resistance against the flow of blood. The coordinated actions of both adrenaline and noradrenaline, thus help the body to react under stress conditions.