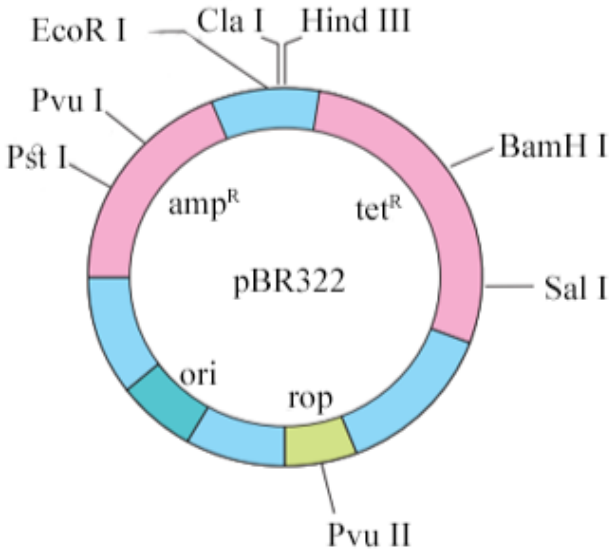
CBT OCTOBER 2023
CLASS – XII: BIOLOGY

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- Biotechnology : Principles and processes and Biotechnology and its applications

Q.1: A cloning vector is a small piece of DNA that can be stably maintained in an organism, and into which a foreign DNA fragment can be inserted for cloning purposes. A large number of cloning vectors are available, and choosing the vector may depend upon a number of factors, such as the size of the insert, copy number and cloning method.



1.What will be the effect if pBR322, a cloning vector does not carry 'ori site?

a) Sticky ends will not produce
b) Replication will not take place
c) Transformation will not take place
d) The cell will transform into a tumor cell

Answer. b) Replication will not take place
FEED BACK : Ori is a genetic sequence that acts as the initiation site for the replication of DNA. Any fragment of DNA, when linked to the ori region, can be initiated to replicate.

2. pBR322 is frequently used as a vector in biotechnology. It helps in cloning foreign genes of interest. Which of the following is the correct statement about this vector?

a) It has three antibiotic resistance genes
b) It contains the restriction site for Sal I within the tetracycline resistance gene
c) It occurs naturally in Escherichia coli
d) Both b and c

Answer. b) It contains the restriction site for Sal I within the tetracycline resistance gene

FEED BACK: It contains the restriction site for Sal I within the tetracycline resistance gene

In biotechnology, vectors are molecules which act as vehicles to carry genes of interest (GOI) into the host organism. The plasmid pBR322 is not a naturally occurring plasmid in E. coli. It is an artificial cloning vector constructed by Bolivar and Rodriguez.

3. In pBR322 cloning vector, function of rop-gene is:

a) It codes for protein involved in the replication of the plasmid
b) Helpful in transcription
c) Helpful in translation
d) All of the above

Answer. a) It codes for protein involved in the replication of the plasmid**.**

FEED BACK: It codes for protein involved in the replication of the plasmid The gene 'rop' present in pBR322 cloning vector codes for the proteins involved in the replication of the plasmid.

4.**Assertion**: Restriction endonucleases are also called 'molecular scissors'.

Reason: When fragments generated by restriction endonucleases are mixed, they join together due to their sticky ends.

(a)Both A and R are true and R is the correct explanation of A.
(b)Both A and R are true and R is not the correct explanation of A.
(c)A is true but R is false.
(d)A is false but R is true.

Answer. (b) Both A and R are true and R is not the correct explanation of A.

FEED BACK : Restriction endonuclease are molecular scissors, which cut a DNA molecule within certain specific site called restriction site. Common restriction endonucleases are Eco RI, Bam II, Hind III, etc.

Q2. Biotechnology has revolutionized various fields, offering significant benefits for human welfare. Its applications range from medical advancements to agricultural improvements and environmental protection. In medicine, biotechnology has led to the development of life-saving drugs, personalized medicine, and advanced diagnostic tools.

For instance, monoclonal antibodies and CRISPR-Cas9 gene editing are transforming the treatment of genetic disorders and cancers. CRISPR-Cas9 gene editing include the development of prime editing, which allows for precise DNA edits with fewer errors, and base editing, which enables direct conversion of DNA bases without causing double-strand breaks, enhancing the accuracy and scope of gene editing applications

In agriculture, genetically modified crops are enhancing food security by increasing yield, resistance to pests, and tolerance to adverse environmental conditions. According to recent data from the International Service for the Acquisition of Agri-biotech Applications (ISAAA), the global adoption of biotech crops reached 190.4 million hectares in 2022, with significant contributions from developing countries.

Moreover, biotechnology plays a crucial role in environmental sustainability through bioremediation, which uses organisms to clean up pollutants. The integration of biotechnology in various sectors underscores its potential to address global challenges and improve the quality of life.

1. **Given the recent advancements in CRISPR-Cas9 gene editing, which of the following best illustrates a potential ethical concern associated with its use?**
    - A) The high cost of the technology
    - B) The ability to correct genetic disorders
    - C) The possibility of creating 'designer babies'
    - D) The use of monoclonal antibodies in treatment

    Answer: C) The possibility of creating 'designer babies'

    Explanation: A significant ethical concern with CRISPR-Cas9 gene editing is the potential for its misuse in creating 'designer babies,' where genetic modifications could be made for non-medical reasons, leading to ethical and societal implications.
2. **What is a primary reason for the increased global adoption of genetically modified (GM) crops, as indicated by the ISAAA data?**

- A) Higher resistance to pests and diseases.
- B) Reduced need for agricultural workforce.
- C) Increased use of chemical pesticides.
- D) Decreased nutritional value of crops.

Answer: A) Higher resistance to pests and diseases.

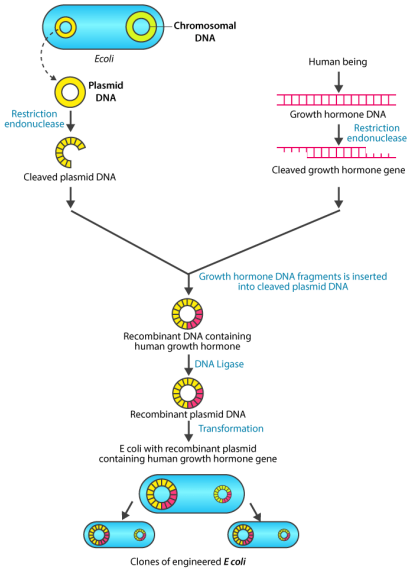
Explanation: One of the primary reasons for the increased adoption of GM crops is their enhanced resistance to pests and diseases, which leads to higher crop yields and reduced reliance on chemical pesticides.

3. **In the context of biotechnology's impact on human welfare, why is the development of advanced diagnostic tools considered a major breakthrough?**
   - A) It reduces the cost of medical treatments.
   - B) It allows for early detection and accurate diagnosis of diseases.
   - C) It eliminates the need for medical practitioners.
   - D) It increases the complexity of medical procedures.

   Answer: B) It allows for early detection and accurate diagnosis of diseases.

   Explanation: Advanced diagnostic tools developed through biotechnology enable early detection and accurate diagnosis of diseases, which is crucial for effective treatment and improved patient outcomes.

Q3. Recombinant DNA technology involves using enzymes and various laboratory techniques to manipulate and isolate DNA segments of interest. This method can be used to combine (or splice) DNA from different species or to create genes with new functions.



1.. The main challenging step in the production of human insulin by recombinant DNA technology was

A) splitting A and B-peptide chains.

B) Addition of C-peptide to proinsulin

C) Getting peptides assembled into mature form.

D) Removal of C-peptide from active insulin.

Answer: C) getting peptides assembled into mature form.

Explanation: The main challenge for the production of insulin using rDNA technique (Recombinant DNA technology) was getting the peptides assembled correctly into a mature form.

Eli Lilly. an American company in the year 1983, first prepared two DNA sequences corresponding to A and B chains of human insulin. It then introduced them into the plasmids of Escherichia coli to produce insulin chains. Both the chains A and B were produced separately, extracted and combined in vitro by creating disulphide bonds to form human insulin (humulin).

2. The bacterial cells can be lysed by using _____ enzyme.
a) protease
b) lysozyme
c) lipase
d) cellulase

Answer: b

Explanation: The enzyme used for breaking or lysis of bacterial cells is lysozyme. It helps in the breakdown of carbohydrates found in a bacterial cell. It is also found in tears.

3**. Assertion:** The global adoption of biotech crops reached 190.4 million hectares in 2022.
Reason: Monoclonal antibodies are transforming the treatment of genetic disorders and cancers.
Answer:

- A) Both Assertion and Reason are true, and Reason is the correct explanation of Assertion.
- B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
- C) Assertion is true, but Reason is false.
- D) Assertion is false, but Reason is true.

Correct Answer: B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
Explanation: Both the assertion and the reason are true statements. The global adoption of biotech crops did reach 190.4 million hectares in 2022, and monoclonal antibodies are indeed transforming the treatment of genetic disorders and cancers. However, the reason given (monoclonal antibodies) is not the correct explanation for the assertion about the global adoption of biotech crops. The increase in biotech crops is due to factors like improved yield, resistance to pests, and tolerance to environmental conditions.