B.Sc.-M.Sc. INTEGRATED PROGRAMME (BIOTECHNOLOGY)
SEMESTER IV, ONLINE EXAMINATION, MAY 2021
PAPER CODE – BBT-CC12

PAPER TITLE: RECOMBINANT DNA TECHNOLOGY

Time : Three Hours *Maximum Marks : 75*

Attempt all questions. All parts of a question must be attempted in continuation. Start answer of a fresh question on a new page. Cite examples and draw labeled diagrams wherever necessary

Question No. 1:

A) Choose the correct answers of the following : **[5 x 1 = 5]**

1. Which of the following is required for repairing the phosphodiester backbone of DNA during molecular cloning?
   a. cDNA
   b. reverse transcriptase
   c. restriction enzymes
   d. DNA ligase

2. All of the following are processes used to introduce DNA molecules into bacterial cells except:
   a. transformation
   b. transduction
   c. transcription
   d. conjugation

3. The enzyme that uses RNA as a template to produce a DNA copy is called:
   a. a restriction enzyme
   b. DNA ligase
   c. reverse transcriptase
   d. DNA polymerase

4. In blue-white screening, what do blue colonies represent?
   a. cells that have not taken up the plasmid vector
   b. cells with recombinant plasmids containing a new insert
   c. cells containing empty plasmid vectors
   d. cells with a non-functional lacZ gene

5. The Ti plasmid is used for introducing genes into:
   a. animal cells
   b. plant cells
   c. bacteriophages
   d. *E.coli*

B) State whether the following are True or False : **[5 x 1 = 5]**

a) Circular DNA molecules are generally more stable inside cells than linear molecules (TRUE/FALSE)
b) The number of DNA molecules produced during PCR increases exponentially (TRUE/FALSE)
c) Protoplast fusion is enhanced by the presence of polyethylene glycol (TRUE/FALSE)
d) Large DNA molecules such as chromosomes are easier to work with than small molecules (TRUE/FALSE)
e) Sticky end fragments generated by EcoRI will ligate to any other sticky-end sequence (TRUE/FALSE)

C) Fill in the Blanks : **[5 x 1 = 5]**

a) The process of introducing DNA molecules into eukaryotic cells is called _____.
b) The PCR step during which the double-stranded template molecule becomes single-stranded is called _____.
c) The unpaired nucleotides produced by the action of restriction enzymes are referred to as_____.
d) Method of introducing recombinant DNA into host cell using fine needle is called_____.
e) Enzyme used in linking the DNA segments together is called _____.

Question No. 2:

Attempt any THREE of the following: **[3 x 5 = 15]**

A. Describe the process of Gene cloning. State the advantages and limitations.
B. Describe important constituents of a plasmid based vector and desired properties for efficient cloning.
C. What are Linkers and Adaptors and explain their role in gene cloning.
D. Describe the process of PCR.
E. What is Yeast Artificial Chromosome (YAC)? Draw the organised structure and cloning strategy involved.

Question No. 3:

Attempt any THREE of the following: **[3 x 5 = 15]**

A. What is the role of various DNA modifying enzymes in rDNA technology?
B. What are Restriction Endonucleases and explain their utility in gene cloning?
C. What is Genomic library and cDNA library? State the differences.
D. Explain the process for production of transgenic animals.
E. How vaccine development has been revolutionised by rDNA technology?

Question No. 4:

Attempt any ONE of the following: **[1 x 15 = 15]**

A. Explain the process of *in vitro* mutagenesis. What are various approaches to attain desired mutations?

B. What is protein engineering? Give some suitable examples to justify this approach.

Question No. 5:

Attempt any ONE of the following: **[1 x 15 = 15]**

A. Describe the role of Ti plasmid in gene transfer in plants. What are various strategies adopted for successful gene transfer using features of this plasmid.

B. How are insecticide and herbicide resistant plants produced? Explain the cloning strategy involved.

It should be noted that 60 minutes extra time will be provided to scan your answer sheets, build a PDF and upload it to biotechnologyexam2020@gmail.com.

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