Total No. of printed pages = 5

63/2 (SEM-2) BIT 203

2022

BIOTECHNOLOGY

Theory Paper)

Paper Code : BIT 203

(Genetic Engineering)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct option from the choices given : 1×8=8

(i) Taq polymerase is used in PCR because of its

(a) low thermal stability

(b) high fidelity

(c) high speed

(d) high thermal stability

[Turn over

(ii) Introduction of recombinant DNA into bacterial cell by using current is called

(a) transformation (b) electroporation

(c) conjugation (d) transduction

(iii) The uptake of plasmid DNA into bacterial cells is facilitated by the presence of

(a) Calcium chloride

(b) Magnesium chloride

(c) Potassium chloride

(d) Sodium chloride

(iv) A new nucleotide can be added in to a DNA strand at

(a) 3′-OH group (b) 5′-OH group

(c) 3′-PO_4 group (d) 5′-PO_4 group

(v) Southern blotting is

(a) Attachment of probes to DNA fragments.

(b) Transfer of DNA fragments from electrophoretic gel to a nitrocellulose sheet

(c) Comparison of DNA fragments to two sources

(d) Transfer of DNA fragments to electrophoretic gel from cellulose membrane.

(vi) Plasmids are used as cloning vectors for which of the following reasons ?

(a) Can be multiplied in culture

(b) Self-replication in bacterial cells

(c) Can be multiplied in laboratories with the help of enzymes.

(d) Replicate freely outside bacterial cells.

(vii) If the plasmid and the foreign DNA are cut by the same restriction endonuclease recombinant DNA can be formed by joining both by

(a) Polymerase III (b) Eco RI

(c) Ligase (d) Taq Polymerase

(viii) Antibiotics are used in genetic engineering. They are useful

(a) to keep culture free of microbial infections

(b) to select healthy vectors

(c) to identify replication start sites

(d) as selectable markers.

2. Answer any *six* of the following questions : 2×6=12

(i) What is ribozyme ? Give examples.

(ii) Define insertional inactivation.

(iii) How does alkaline phosphate act as an end-modification enzyme ?

(iv) What are binary T_i vectors ?

(v) Define phage display.

(vi) What are restriction endonucleases ? What are its types ?

(vii) What are DNA chips ?

3. Write short notes on any *four* : 5×4=20

(a) Direct and Indirect DNA labelling

(b) Genetically Modified Organisms

(c) Klenow Enzyme

(d) GST-Tag

(e) Advantages and disadvantages of Southern Blotting.

4. Answer any *two* from the following : 8×2=16

(a) Explain the technique of Yeast – two-hybrid system.

(b) Describe in brief Maxam and Gilbert's chemical degradation method of DNA sequencing.

(c) What are artificial chromosomes ? Describe the components of P1 Artificial Chromosome, with reference to the reporter genes and their method of selection.

5. Answer any *two* from the following : 12×2=24

(a) What are cloning vectors ? Outline the steps involved in DNA cloning procedure. Describe how screening of recombinants is done and mention the necessity of screening. Describe the process of blue-white screening in brief.

(b) Write a descriptive note on the principles and applications of Antisense-RNA. Describe in brief the hok / sok system of *E. Coli* R_1 plasmid.

(c) What is expression cloning ? What are expression vectors ? Explain the structural components and functioning of PET expression system.