Seat No. : _____

SI-129

September-2020

B.Sc., Sem.-VI

CC-307 : Microbiology
(Genetic Engineering)
(New)

Time : 2 Hours] **[Max. Marks : 50**

Instructions : (1) Students should write the answers from whichever the question paper applicable to them; either **"NEW COURSE"** or **"OLD COURSE"** and it must be mentioned at the beginning of the answer paper.
(2) Answer any **three (3)** questions **out of Q. 1 to Q. 8 (eight)** questions. **Question No. 9 is compulsory.**
(3) Draw figures wherever necessary.

Section-I

1. Explain the role of restriction endonuclease and cloning vectors in rDNA technology. **14**

2. (A) Explain the outline of rDNA construction. **7**
   (B) Describe desirable characteristics of a good host cell for gene cloning. **7**

3. What are blotting techniques ? Explain in detail Southern blotting technique and give is significance. **14**

4. (A) Explain with labelled diagram the process of PCR. **7**
   (B) Describe how did Sanger determine the gene sequence using chain termination technique. **7**

5. How desired DNA fragment is obtained using genomic and cDNA library ? **14**

6. (A) Explain two methods of transferring rDNA into host cell. **7**
   (B) Describe colony hybridization technique for selection of recombinant clone. **7**

7. Enlist medical applications of rDNA technology. Explain in detail the preparation of hepatitis-B recombinant vaccine. **14**

8. (A) Write short note on 'metagenomics'. **7**

   (B) How the transgenic plants have revolutionized the modern agricultural practices ? Explain giving few examples. **7**

Section-II

9. Give short and specific answers in **1-2** lines only : (Any **Eight**) **8**

   (1) Arrange the steps of rDNA technology in the correct order :
      (i) Transformation,
      (ii) Isolation of DNA,
      (iii) Ligation,
      (iv) Restriction enzyme digestion.

   (2) Who discovered restriction enzymes ?

   (3) What is *Ti* plasmid ?

   (4) Give two examples of reporter genes.

   (5) How many DNA duplex are obtained from one DNA duplex after 4 cycles of PCR ?

   (6) Name a technique where a slide attached with a high-density assemblage of immobilized DNA oligomers representing the entire genome of the species under study.

   (7) Who discovered site directed mutagenesis ?

   (8) Draw the structure of dideoxynucleotide triphosphate.

   (9) What is the use of X-gal dye ?

   (10) What is protoplast fusion ?

   (11) Who first chemically synthesized the oligonucleotide *in vitro* ?

   (12) Name two important enzymes used for the construction of genomic library.

   (13) Give environmental applications of rDNA technology.

   (14) Name the host in which recombinant insulin gene was first expressed.

   (15) Name two recombinant proteins (other than insulin).

   (16) Give an example of GM food.

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(3) Draw figures wherever necessary.

Section-I

1. Explain the role of different enzymes in rDNA technology. **14**

2. (A) Write note on PCR technique and its significance. **7**

   (B) Name and briefly describe the laboratory technique used to amplify of a particular region of DNA. **7**

3. Describe methods of obtaining desired gene for the rDNA technology. **14**

4. (A) Enlist different methods for transferring rDNA in host and explain the physical methods in detail. **7**

   (B) Explain Southern blotting technique and how does it differ from Western blotting technique ? **7**

5. Biotechnology is multi-disciplinary science. – Justify. **14**

6. (A) Describe molecular hybridization and its application. **7**

(B) Explain principle and application of paper chromatographic technique. **7**

7. Describe giving examples various areas in which biotechnology has promoted human life. **14**

8. (A) Write short note on 'bioremediation'. **7**

(B) Discuss ethical issues of biotechnology. **7**

Section-II

9. Give short and specific answers in **1-2** lines only : (Any **Eight**) **8**

(1) Why do bacteria have restriction endonucleases ?

(2) Which enzyme is often described as 'molecular glue' or 'molecular stitchers' ?

(3) Name the Nobel Laurate who discovered DNA Polymerase.

(4) Give two examples of 'molecular vehicles' used in rDNA technology.

(5) What is the utility of X-gal dye ?

(6) Gene gun is used for what purpose ?

(7) What are marker genes ?

(8) How cells are made competent to receive rDNA in transformation technique ?

(9) What is spectroscopy ?

(10) What is callus ?

(11) What are cell lines ?

(12) Which plant hormone is responsible for proliferation shoot in plant culture medium ?

(13) Give one example of PGPR.

(14) Give an example of genetically modified plant.

(15) Which microbial product are used in MEOR ?

(16) Give one analytical application of enzyme.