

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 its 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**

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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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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 Laureate 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.