

Total Pages—6

PG/IIIS/MCB/301.1 & 301.2/23

**M.Sc. 3rd Semester Examination, 2023**

**MICROBIOLOGY**

*(Cell Biology & Genetic Engineering)*

PAPER—MCB-301

*Full Marks : 50*

*Time : 2 hours*

*The figures in the right hand margin indicate marks*

*Candidates are required to give their answers in their own words as far as practicable*

**Unit : MCB-301.1 (Cell Biology)**

**GROUP – A**

Answer any two questions from the following :

2 × 2

1. Why during anaphase chromosome moves towards the pole ?

( Turn Over )

2. Distinguish between protooncogene and oncogene.
3. What is ligand-mediated ion channel ?
4. What is totipotency ?

**GROUP – B**

Answer any **two** questions from the following :

4 × 2

5. What are cell cycle check points ? Discuss, critically the molecular mechanism of check point regulations by cyclin dependent kinase. 1 + 3
6. State the applications of embryonic stem cells.
7. Briefly describe the structural features of G-Protein coupled receptor with a suitable diagram.

8. What do you mean by signal peptide ? Describe the role of ER and Golgi complex in secretory functions of cells. 1 + 3

**GROUP – C**

Answer any **one** question from the following :

- $8 \times 1$
9. What is gap junction ? Write in brief about cytoskeleton. What intracellular phenomenon is happened in the interphase of cell cycle ? 2 + 4 + 2
10. Describe how cancer cells overcome the effects of tumor suppressor genes during carcinogenesis. State the importance of anaphase promoting complex (APC) for the induction of anaphase. 3 + 5

**Unit : MCB-301.2 (Genetic Engineering)**

**GROUP – A**

Answer any **two** questions from the following :

2 × 2

11. Why type II restriction endorudease is preferred in molecular cloning ?
12. Write the principle of reverse-transcriptase PCR.
13. Name four different techniques for the analysis of protein-protein interaction.
14. Distinguish between gene expression analysis by northern blotting and cDNA microarray.

**GROUP – B**

Answer any **two** questions from the following :

4 × 2

15. (a) What is western blotting and which specific information about an antigen is obtained from western blotting ?  
  
(b) How alpha complementation is used for blue and white selection of recombinants from non-recombinants bacteria. 2 + 2

16. Write short notes on : 2 + 2

(i) Exon trapping

(ii) Herbicide resistant plant.

17. (a) Describe schematically the labelling of DNA by random priming.

(b) Which DNA sequence is used as probe in DNA fingerprinting ? 3 + 1

18. Write the principle of (i) amino acid sequence determination of a protein by mass spectrometry, and (ii) DNA-protein interaction by EMSA. 2 + 2

### GROUP – C

Answer any **one** question from the following :

8×1

19. (a) Write the principle and procedure of automated DNA sequencing.

(b) How automated DNA sequencing differ from Sanger's manual method of DNA sequencing. 5 + 3

20. (a) How genomic DNA library is differed from CDNA library ?

(b) Why cosmid is advantageous over PBR322 as cloning vector ? Mention three application of genetic engineering in production of therapeutics.

(c) What is shuttle vector ? 3 + 3 + 2

[ Internal Assessment — 10 Marks ]

---