

PG 3rd Semester Examination, 2024

MICROBIOLOGY

PAPER – MCB-301.1 & 301.2

Full Marks : 50

Time : 2 hours

Answer all questions

The figures in the right hand margin indicate marks

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

PAPER : MCB-301.1

(Cell Biology)

GROUP – A

Answer any two questions from the following :

2 × 2

(Turn Over)

(2)

1. What are the basic differences between eukaryotic and prokaryotic cell membrane.
2. State the importance of integrins.
3. Write the role of condensin and cohesin during cell division.
4. State the features of cancer cells.

GROUP – B

Answer any two questions from the following :

5. Write the kinetics of facilitated diffusion. State the importance of voltage gated calcium channel. 4×2
6. Describe how ATR and ATM arrest the cell cycle during DNA lesion. 4
7. Describe the role of hypoxia inducible factor 1α (HIF- 1α) in the progression of cancer. 4

(3)

8. Describe the quorum sensing mechanism in *Vibrio harveyi*. 4

GROUP – C

Answer any **one** question from the following : 8×1

9. (a) Describe the mechanism of activation of nicotinic acetylcholine receptors. $3 + 3 + 2$
- (b) Discuss the functions of focal adhesion molecule.
- (c) State the importance of tight junction.
10. (a) Describe the mechanism of intrinsic pathway of apoptosis. $4 + 2 + 2$
- (b) Write the functions of kinesin and dynein in the intracellular trafficking.
- (c) State the clinical applications of stem cell culture.

PAPER : MCB-301.2

(*Genetic Engineering*)

GROUP – A

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

2 × 2

11. Define restriction endonuclease. How bacteria protect their DNA from the action of their own restriction endonuclease ? 1 + 1
12. How will you confirm PCR amplicon of desired DNA ? What is the role of Mg^{++} in PCR ? 1 + 1
13. Name two techniques for uniform labelling of DNA. Which enzyme is used to remove RNA from DNA-RNA hybrid ? 1 + 1
14. Write the principle of pyrosequencing of DNA. 2

(5)

GROUP – B

Answer any **two** questions from the following :
4 × 2

15. (a) Write the principle of yeast two hybrid system for the analysis of protein-protein interaction.

(b) Mention two techniques for the analysis of DNA-protein interaction. 3 + 1

16. Describe how amino acid sequence of a protein is determined by Edman degradation method. 4

17. Write the steps involved in the preparation of genomic DNA library. What is packaging extract and how it is prepared? 2 + 2

18. Describe the principle of Real Time PCR using SYBR green. Mention two applications of Real Time PCR. 3 + 1

GROUP – C

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

8 × 1

19. How is cDNA library screened using antibody to obtain desired clone ? Distinguish between cloning vector and expression vector. How self-ligation of plasmid vector (cut with a single restriction enzyme) is prevented during cloning ?

4 + 2 + 2

20. Describe schematically (a) production of recombinant insulin in *E.coli*, and (b) generation of Bt cotton plant.

4 + 4

[Internal Assessment – 10 Marks]