

Microbiology (P.G.)

[CBCS]

M.Sc. Third Semester End Examination-2024

(Regular & Supplementary Paper)

PAPER-MCB-301

[Cell Biology and Genetic Engineering]

Full Marks: 40

Time: 02 Hrs.

The figures in the right hand margin indicate marks.

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

Illustrate the answers wherever necessary.

Group A (MCB-301.1)

[Cell Biology]

(Marks 20)

1. Answer any two questions of the following: 2x2= 4

- a) What is Totipotency? 2
- b) What is quorum quenching? 2
- c) Describe the role of Cyclin E in cell cycle progression. 2
- d) Why FBS is used in cell culture media? 2

2. Answer any two questions of the following: 2x4= 8

- a) What is biofilm? Briefly discuss quorum sensing mechanism.

1+3

(2)

- b) Write a short note on somatic hybridization. 4
- c) Write a comparative account of various cell adhesion molecules.
- d) Describe the role of RB gene in cancer progression. 4

3. Answer any one question of the following: 1x8=8

- a) What is DMEM? What are the factors affecting in animal cell culture? What are pluripotent cells? 2+4+2
- b) What are the genes involved in cancer development? Write down the role of P53 in cancer development. Describe two most important check-points in cell cycle. 2+3+3

**Group B (MCB-301.2)
[Genetic Engineering]
(Marks 20)**

1. Answer any two questions of the following: 2x2= 4

- a) What are caspases? 2
- b) Write down the difference between cloning vector and expression vector. 2
- c) Define SNP chips. 2
- d) Write the principle of real time PCR using SYBR green dye. 2

(3)

2. Answer any two questions of the following: 2x4= 8

- a) i) Write the steps involved in Southern blotting analysis.
ii) What probe is used in DNA finger printing and RFLP analysis? 2+2
- b) i) What type of modified dNTPs are used during chemical synthesis of oligonucleotide and Illumina method of DNA sequencing?
ii) Write the enzyme and ddNTPs used during Sanger's automated method of DNA sequencing. 2+2
- c) i) What is the differences between gene expression analysis by northern blotting and cDNA microarray?
ii) Write schematically gene expression analysis by cDNA microarray. 2+2
- d) Write a brief note on G-protein coupled receptors. 4

3. Answer any one question of the following: 1x8=8

- a) i) Mention the steps involved in the screening of genomic DNA library using labelled DNA as probe.
ii) Write schematically the production recombinant insulin in *E.coli*. 4+4
- b) Describe (i) the sequencing of protein by mass spectrometry, and
(ii) Generation of Bt cotton plant. 4+4