

Register Number:

Date:02-03-2022

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| **ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27** |
| **M.Sc. MICROBIOLOGY – I SEMESTER** |
| **SEMESTER EXAMINATION: OCTOBER 2021** |
| (Examination conducted in January-March 2022) |
| **MB 7221 - Cell Biology** |
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| **Time- 2 1/2 hrs** |  | **Max Marks-70** |
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| **This paper contains two printed pages and four parts** |

**I. Answer any Five of the following 5 x 3 = 15**

1. What is the importance of a Mannose-6-phosphate tag on proteins?
2. List three important features of clathrin coats.
3. What are the components of two component systems? Where do you find it?
4. Give any two characters of a cell. Name one bioluminescent bacteria.
5. Draw a simple labelled diagram of bacterial Type I secretion system.
6. Write names of various bacterial structures involved in adhesion to host cells.
7. Mention the steps in biofilm formation.

**II. Answer any Five of the following 5 x 5 = 25**

1. Which organelle is involved in processing of VLCFAs? What happens in X-linked adrenoleukodystrophy?
2. Explain the structure and role of Golgi apparatus.
3. How do receptor tyrosine kinases work?
4. Write a brief note on the dynamic polymerization and depolymerization of microfilaments.
5. Give an account of quorum sensing in gram negative bacteria.
6. p53 is called the tumor suppressor gene. Justify.
7. Elucidate the JAK-STAT pathway.

**II. Answer any Two of the following 2 x 10 = 20**

1. Write a note on cellular interactions taking place between same and different types of cells.
2. Which phospholipid is involved in GPCR signaling? Explain the components and the pathway.
3. A. What are Cancer stem cells? Add a note on targeted cancer therapy based on CSCs. (7)

B. What is MreB? What will happen if MreB gene is deleted? (3)

**III. Answer the following 1 x 10 = 10**

1. Explain the expected outcomes of the following experiments/conditions-

i. MinE gene is knocked down in bacteria undergoing cell division.

ii. One copy of BRCA1 gene is mutated.

iii. cdc25 gene is overexpressed.

iv. cAMP phosphodiesterase gene is mutated in such a way that the protein’s affinity to cAMP is decreased.

v. Ryanodine receptors have been blocked in a heart muscle cell.