

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2023
(Second Semester)

Branch - MICROBIOLOGY

CELL BIOLOGY AND MICROBIAL GENETICS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 The meiotic stage during which crossing over occurs is
(i) prophase I (ii) interphase
(iii) anaphase I (iv) metaphase II
- 2 Properties of chemical and electrical synapses make them suitable for different functions. Which of the following properties are *true* for cells with chemical synapses, but *not* true for cells with electrical synapses?
(P) Can stimulate an action potential in postsynaptic cells.
(Q) Can amplify signals
(R) Can integrate excitatory or inhibitory signals from multiple sources
(S) Do not require membrane fusion events for synaptic transmission to occur
(T) Often utilise ligand gated ion channels
(i) P,Q and R (ii) Q,R and T
(iii) Q,S and T (iv) P,Q,R,S and T
- 3 In Griffith experiment, because living type R bacteria alone could not proliferate and kill the mouse, the interpretation of the data is that something from the dead type S bacteria was transforming the type R bacteria into type S. Griffith called this process _____.
(i) transduction (ii) conjugation
(iii) transformation (iv) Hfr formation
- 4 A temperature-sensitive mutation makes the product protein nonfunctional at one temperature, but normal in activity at another temperature. This kind of mutation is an example of a
(i) nonsensitive mutation (ii) frameshift mutation
(iii) missense mutation (iv) conditional mutation
- 5 When a population of bacteria capable of conjugation transfers a specific chromosomal gene (say a gene coding for galactose metabolism) at a very high frequency, but no other genes, regardless of how long the bacteria are allowed to mate, these bacteria are said to be
(i) F⁺ (ii) F⁻
(iii) Hfr (iv) F'

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a What is the significance of meiosis?
OR
- b What is the main function of cell membrane?

Cont...

- 7 a What are the types of cell junctions?
OR
b Define cell signaling. Why is it important?
- 8 a Plasmids are not inevitable for a bacterium. Why?
OR
b Discuss the transforming principle of Griffith.
- 9 a Explain the mechanism of SOS repair.
OR
b Mutational hotspots reflect intrinsic properties of the mutation process. Explain.
- 10 a Discuss generalized transduction.
OR
b Explain the mechanism of conjugation.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Explain the structure and functions of endoplasmic reticulum.
OR
b Discuss the key role of ribosomes.
- 12 a Discuss the types of cell junctions.
OR
b Discuss some cell signaling molecules.
- 13 a Write an essay on transposons.
OR
b Discuss the various applications of plasmids.
- 14 a By highlighting an example, explain the mechanism of silent mutation.
OR
b Explain the mechanism of transversion mutation.
- 15 a Discuss the role of rec A protein in genetic recombination.
OR
b What are F prime (F') strains? How are they formed?

Z-Z-Z

END