

2012

M.Sc.

1st Semester Examination

MICROBIOLOGY

PAPER—I (MCB-101)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Answer any two questions from each group.

Group—A

[Marks : 20]

Answer any two questions.

1. (a) Write the chemical structure of Peptidoglycan.
- (b) Briefly describe the molecular mechanism of chemotaxis in *E. Coli*.
- (c) Mention the molecular structure and function of gas vesicle.

(Turn Over)

(d) State the types of porins and their functions.

1+3+3+3

2. (a) If a bacterial culture starts with 1000 cells that has a generation time of 20 minute, how many cells will be in the culture after 24h?

The bacterial culture is grown using glucose as the sole source of carbon and energy. The cell yield value is determined by dry weight analysis to be 0.4. What percentage of the substrate carbon will be found as cell man and as CO₂?

(b) Define synchronous culture and write the role of Helmstetter cumming technique to make a culture synchronous.

2+(3+3)+2

3. Answer any four of the following :

2½ × 4

- (a) Quorum sensing in Gram negative bacteria.
- (b) Define with example the term Antisepsis and Disinfection.
- (c) Pasteurization types.
- (d) Microbial culture preservation Methods.
- (e) Action of gluteraldehyde on bacterial cell.

Group—B

[Marks : 20]

Answer any *two* questions.

4. (a) What is culture independent method ?
- (b) Why r-RNA analysis is used as useful marker to find out evolutionary relatedness among the two groups of organism ?
- (c) What is metagenome ?
- (d) What is phylochip? How it helps to assess the presence of certain group of bacteria in a particular habitat ?
- (e) State the significance of type strain.

2+2+1+(1+2)+2

5. Write notes on the following :

 $2\frac{1}{2} \times 4$

- (a) DGGE;
- (b) Cell wall of endospore;
- (c) Non nitrogenous organic reserve material;
- (d) Structure and functions of Cyanophycin.

6. (a) Describe with diagram the ultrastructure of bacterial flagella. Mention one molecule in flagella.
- (b) Indicate the composition of outer membrane of gram negative bacteria and its pathological significance.
- (c) Write down the steps of synthesis of cell wall in Bacteria, with special reference to membrane associated part.
- (d) How Psychrophilic bacteria adapt themselves in their habitat ?

(3+1)+2+2+2
