2010

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) What is quorum sensing ? Describe how it occurs and briefly discuss its importance to microorganisms. 2+2+1

(b) What is the generation on doubling time? How can they be determined. State the importance of Helmstetter-Cumming technique. Why bacteria reach stationary phase during growth in liquid media? 1+1+1+2

2. (a) How many chemoreceptors have been noticed in *E. Coli* and name the substances that are sensed by the receptors. Give a brief note on molecular mechanism of chemotaxis in *E. Coli.*

(b) State the components present in the cell wall of bacterial endospore. What might account for its heat resistance? 1+1+5+(2+1)

3. (i) Mention the location, chemical structure and function of the following in the bacterial cell : $1\frac{1}{2} \times 4$

(a) Teichoic acid ;
(b) Pseudopeptidoglycan ;
(c) Dipicolinic acid ;
(d) PHB.

(ii) Write notes on (any *two*) : 2×2

(a) Bacterial genome ;
(b) Phycobilisome ;
(c) L-form.

Group—B

[Marks : 20]

Answer any *two* questions.

4. (a) How many genera are recognized in prochlorophytes ? Briefly describe their characteristics.

(b) What is cyanophycin ? How cyanobacteria obtained ATP from it in nitrogen deficient condition ?

(c) Briefly mention the molecular mechanism of Acid fast stain. (1+3)+(1+2)+3

5. (i) What do you mean by mole % G+C ? State its importance in bacterial classification. Briefly mention one method which is used to determine GC content of the bacteria. What is Tm ? Mention its significance.

(ii) What is meant by % S ? State its importance.

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

6. (i) Describe each of the following agents in terms of its chemical nature, mechanism of action, mode of application and effectiveness of (any *three*) :

$2\frac{1}{2} \times 3$

(a) Phenolics ;

(b) Chlorine ;

(c) Aldehydes ;

(d) Heavy metals.

(ii) What is the importance of 16 S rRNA gene in bacterial taxonomy ? $2\frac{1}{2}$