PG/IIIS/MCB-301/18

M.Sc. 3rd Semester Examination, 2018

MICROBIOLOGY

PAPER – MCB-301

Full Marks : 40

Time : 2 hours

Answer any two questions from each Group

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

[*Marks* : 20]

1. (*a*) What is teichoic acid and point out its role in bacterial cell wall. $1\frac{1}{2}$

   (*b*) What is plasmolysis ? State the differences between bacterial protoplast and sphaeroplast. $1+1\frac{1}{2}$

(*c*) What factors make bacterial endospore a resistant structure ? $1\frac{1}{2}$

(*d*) State the difference between membrane carriers and channels. 2

(*e*) What is meant by the Amphiphilic nature of membrane lipids ? How many hydrocarbon tail(s) is/are present in the membrane lipids. $2+\frac{1}{2}$

2. (*a*) What is saltatory conduction ? Describe the role of Ca^{2+} in nerve impulse transmission.

(*b*) What are caspases ? Illustrate how Bax protein is involved in inducing apoptosis.

(*c*) Describe the role of P^{53} in cancer progression. 10

3. Write short notes (Attempt any *four*) : $2\frac{1}{2}\times 4$

(*i*) Tight junction

(*ii*) Synaptonemal complex

(*iii*) Proto-oncogenes

(*iv*) Stem cell therapy

(*v*) G-proteins

(*vi*) Cellular senescence.

GROUP – B

[*Marks* : 20]

4. State the principle of pyrosequencing. What is q-PCR ? State its applications. Differentiate between Southern and Western blotting. 3+2+2+3

5. What is chromosome walking ? How do you isolate a gene of interest coding for known specific protein ? Why selection of suitable cloning vector is essential in genomic library preparation ? Write the name of two vector used in gene therapy. State the differences between λ-phage and cosmid vector. 2+3+2+1+2

6. Write short notes (any *four*) : $2\frac{1}{2}\times 4$

   (*i*) Gene knockout technique

   (*ii*) Application of genetic engineering in forensic science

(*iii*) YAC and its importance

(*iv*) RFLP analysis

(*v*) Blue-white selection

(*vi*) Restriction-modification system.
