2008

MICROBIOLOGY

PAPER—III

Full Marks : 40

Time : 2 hours

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

Write the answers Questions of each Group in separate books

GROUP—A

Answer **Q. No. 3** and any *one* from the rest

1. (*a*) What do you understand by radioisotopes and stable isotopes ?

   (*b*) Write down the nuclear reactions for different radioactive emissions.

(*c*) C^{14} has a half-life of 5700 Yrs. Calculate the fraction of the C^{14} atoms that decays (*i*) per year and (*ii*) per minute. 2 + 4 + 4

2. (*a*) What do you mean by hydrogen ion activity? How it is related to hydrogen ion concentration?

(*b*) Explain why pH of a neutral solution is *f*.

(*c*) What are the pH and pOH of a 0·002 M solution of HNO_3? (2 + 2) + 3 + 3

3. Write short notes on (any *two*): 5 x 2

(*i*) Membrane fluidity

(*ii*) Entrophy

(*iii*) Non-covalent bonding

(*iv*) Artificial membrane.

(*v*) First law of thermodynamics.

GROUP—B

Answer **Q. No. 4** and any *one* from the rest

4. Write short notes on: (any *four*): 10

(*i*) Confocal microscope

(*ii*) ESR

(*iii*) Ion exchange chromatography

(*iv*) Agarose gel electrophoresis

(*v*) Circular dichorism (CD).

5. What is resolving power of a microscopic? What is the resolving power of light microscope?

(if $\sin 58^\circ = 0{\cdot}8$)

How SEM differs from TEM? Why sample preparation is a vital step for electron microscopy? $2 + 3 + 3 + 2$

6. Write down at least two major differences of gas chromatography (GC) with high performance liquid chromatograph (HPLC). What are different types of supports used in HPLC ? What is fluorescence ? How a spectrophotometer differs from a colorimeter ? Schematically draw different parts of a spectrophotometer.

2 + 2 + 2 + 2 + 2