2011

M.Sc.

3rd Semester Examination

ZOOLOGY

PAPER—ZOO-301

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.

Illustrate the answers wherever necessary.

Group—A

(Microbiology)

1. Answer any *two* of the following : 2×2

(a) What are coliforms ? Cite example.

(b) Schematically represent the 5-kingdom system with unique features of each kingdom.

(c) What is the difference between 'total count' and 'Viable count' in a normal bacterial growth curve ?

(d) Compare the properties of solid and liquid culture media.

2. Answer any *two* of the following : 4×2

(a) Classify bacteria on the basis of oxygen requirement and show the growth patterns of each type of colony in liquid culture. 4

(b) Distinguish between 'Enriched media' and 'Indicator media'.

How can bacteria be differentiated on the basis of biochemical tests ? 2+2

(c) Draw and label the structure of a gram-positive and gram-negative cell wall of bacteria. 2+2

(d) State the difference between Endotoxin and Exotoxin. Why is a spore highly resistant in nature ? 2+2

3. Answer any *one* of the following : 8×1

(a) (i) Mention the uniqueness of Bergey's Manual.

(ii) Distinguish between Archaebacteria and Eubacteria.

(iii) State Koch's Postulates.

(iv) Define Mesosome and mention its functions. 2×4

(b) (i) Briefly state the role of Bacteria in soil environment.

(ii) Write a short note on Growth factors.

(iii) What do you mean by 'S–R variation' ?

(iv) Name a virus infecting only vertebrates. State the economic importance of algae. 2×4

Group—B

(Bio-Instrumentation)

4. Answer any *two* questions of the following : 2×2

(a) Define R_f - value with an suitable examples. 2

(b) 'Twin tip is not advisable for AFM'—why ? 2

(c) Why we use OsO4 in electron microscopical sample preparation ? 2

(d) State the functional units related to spectrophotometers. 2

5. Answer any *two* questions of the following : 4×2

(a) 'Step gradients are also recommended when ion-exchange chromatography is being used' — Explain. 4

(b) Why —'xyz-piezoelectric scanner' is needed in Atomic Force Microscope (AFM) ? State the important biological applications of AFMs. 2+2

(c) Distinguish between (any two) : 2×2

(i) SEM and TEM.

(ii) NMR and ESR

(iii) Gel filtration and Gel electro phoresis.

(d) Describe briefly the ultrasound method for cell fractionation. Write note on : Paper electophoresis. 2+2

6. Answer any *one* from the following : 8×1

(a) (i) How you do prepare an affinity matrix in a biochemical Laboratory?

(ii) Discuss briefly the steps of SDS–PAGE. 4+4

(b) Answer any *four* questions of the following : 2×4

(i) Vascular perfusion fixation is essential for EM-sample preparation — why?

(ii) Significance of usage of TLC in present day scientific research.

(iii) Soft X-ray Vs Hard X-ray.

(iv) Note on : Electromagnetic Lenses in electron microscope.

(v) What is PMR?

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