 PG/IS/ZOO/103.1 & 103.2/23

M.Sc. 1st Semester Examination, 2023

ZOOLOGY

PAPER – ZOO-103

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

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

PAPER – ZOO-103.1

(*Immunology*)

[Marks : 20]

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

   (*a*) What are NK cells ? Mention its function.

   (*b*) Write the function of Helper T cell and cytotoxic T-cell.

(*c*) What do you mean by MHC restriction ?

(*d*) What do you mean by titer ?

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

(*a*) Differentiate direct & indirect ELISA. Mention the advantages of ELISA over RIA.

(*b*) State the salient features of peptides accepted by the MHC cleft.

(*c*) What do you mean by antigen processing and presentation ? Describe in brief the cytosolic pathway of antigen processing and presentation with proper illustration.

(*d*) (*i*) Write properties of T-cell epitope.

(*ii*) Describe the structure of any one primary lymphoid organ you have studied. $1\frac{1}{2} + 2\frac{1}{2}$

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

(*a*) Write the principle, procedure and applications of Southern Blotting Hybridization. $2 + 4 + 2$

(*b*) Write note on (any *two*) : $4 + 4$

(*i*) Cytokines

(*ii*) Phagocytosis

(*iii*) IgA and IgE

(*iv*) Kinetics of antibody response.

PAPER – ZOO-103.2

(*Methods in Biology*)

[Marks : 20]

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

(*a*) How plasmid vector pBR 322 differs from pUC 18 ?

(*b*) Why Type II restriction endonuclease is used in molecular cloning experiment ?

(*c*) Classify chromatography on the basis of pattern of stationary phase.

(*d*) Define recombinant DNA. Mention the role of Mg++ in PCR.

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

(*a*) Describe the principle of Flow cytometry and its use in the analysis of different phases of cell cycle. 4

(*b*) Describe the role of SDS and APS in SDS-PAGE. How reducing gel differs from non-reducing gel ? What is isoelectric pH ?

(*c*) What is Phytoremediation ? Describe different types of phytoremediation process. What is superbug ? $2\frac{1}{2}+1\frac{1}{2}$

(*d*) Write notes on (any *two*) : 2×2

(*i*) Cosmid

(*ii*) YAC

(*iii*) HPLC

(*iv*) Affinity chromatography.

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

(*a*) Describe the principle and procedure of the detection of viral RNA by real time PCR and write the steps involved in performing 'Fluorescence in Situ Hybridization' (FISH). $4 + 4$

(*b*) (*i*) Write schematically the production of recombinant insulin in *E.Coli*.

(*ii*) Write the principle of ion exchange chromatography.

(*iii*) What is isoschizomers and isocaudomers ? $3 + 3 + 2$

[Internal Assessment — 10 Marks]