# M.Sc. 1st Semester Examination, 2019

## ZOOLOGY

PAPER – ZOO-103(Gr.-A + B)

*Full Marks* : 40

*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*

*Illustrate the answers wherever necessary*

**Write the answers to questions of each Group in separate books wherever necessary**

## GROUP – A

( *Immunology*)

1. Answer any *two* questions : 2 × 2

(*a*) What do you mean by Titer ? 2

(*b*) 'All immunogens are antigens but some antigens are not immunogen"—Explain. 2

(*c*) Write the functional significance of : $\frac{1}{2} \times 4$

(*i*) Psoriasin

(*ii*) HSC

(*iii*) MHC class.I

(*iv*) IgA

(*d*) What is the function of invarient chain during antigen processing and presentation ? 2

2. Answer any *two* questions : $4 \times 2$

(*a*) Describe how B-cell epitope are different from T-cell epitope ? 4

(*b*) Describe the formation of C5 convertase in classical complement pathway with proper diagram. 4

(*c*) Define Adjuvant with example. Mention its mode of action. 1 + 3

(*d*) (*i*) Write the name of two enzyme and substrate commonly used in ELISA.

(*ii*) State the advantages of ELISA over RIA. 1 + 3

3. Answer any *one* question : 8 × 1

(*a*) (*i*) Illustrate the cytosolic pathway of antigen presentation with special emphasis on stability of MHC as trimolecular complex.

(*ii*) Describe the structural complexity of MHC class II with suitable diagram. 4 + 4

(*b*) (*i*) Write the principle, protocol and application of Immuno histochemistry (IHC).

(*ii*) Write notes on ADCC. $2 + 3 + \frac{1}{2} + 2\frac{1}{2}$

## GROUP–B

## (*Methods in Biology*)

4. Answer any *two* questions : 2 × 2

(*a*) Describe briefly the essential features of a cloning vector with suitable diagram. 2

(*b*) Mention the use of following in SDS-PAGE : $\frac{1}{2} \times 4$

(*i*) SDS

(*ii*) Acrylamide

(*iii*) Ammonium per sulfate (APS)

(*iv*) TEMED

(*c*) What are the optimum physico-chemical parameters responsible for biodegradation ? 2

(*d*) Explain density gradient centrifugation. 2

5. Answer any *two* questions : $4 \times 2$

(*a*) What is Biotechnology ? State its prospects in Medical Sciences and Agriculture. $1 + 3$

(*b*) A linear DNA molecule is subjected to single and double digestions with restriction endonucleases, and the following results are obtained :

| Enzymes | Fragment size (in kb) |
|---|---|
| Eco RI | 2·9, 4·5, 7·4, 8·0 |
| Hind III | 3·9, 6·0, 12·9 |
| Eco RI and Hind III | 1·0, 2·0, 2·9, 3·5, 6·0, 7·4 |

Draw the restriction map defined by these data. 4

(*c*) (*i*) Discuss about the different types of rotor used in centrifugation technique.

(*ii*) What is cell fractionation ? 3 + 1

(*d*) Write the principle and application of ion-exchange chromatography. 4

**6.** Answer any *one* question : 8 × 1

(*a*) Write the principle, procedure and applications of Agarose Gel Electrophoresis. 2 + 4 + 2

(*b*) (*i*) Describe the structure of the PAC mammalian shuttle vector PJCPAC-Mam I with suitable diagram. Mention its components and function.

(*ii*) What do you mean by Phytoremediation ? 6 + 2