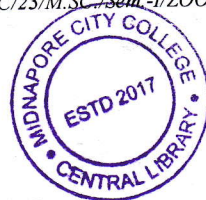


**PG CBCS**  
**M.Sc. Semester-I Examination, 2023**  
**ZOOLOGY**  
**PAPER: ZOO 103**



**(IMMUNOLOGY AND METHODS IN BIOLOGY)**

**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.

**Write the answer for each unit in separate sheet**

**UNIT: ZOO 103.1**

**IMMUNOLOGY**

**GROUP-A**

**1. Answer any TWO from the following questions:**

**2×2=4**

- a) What are primary and secondary lymphoid organs? Give example.
- b) What do you mean by Affinity and Avidity?
- c) Write the function of helper T-cell and cytotoxic T-cell.
- d) What do you mean by anaphylatoxin?

**GROUP-B**

**2. Answer any TWO from the following questions:**

**2×4=8**

- a) What is Adjuvant? Give example. State its mode of action. 1+3
- b) Name two reporter enzymes and their respective chromogenic substrate frequently used in immunohistochemistry (IHC). Illustrate the direct and indirect IHC method with suitable diagram. 1+3
- c) What are Antigen presenting cells (APC's)? Give example. Discuss endogenous pathway of antigen processing and presentation with proper illustration. 1+3
- d) Briefly describe Sandwich ELISA along with its applications.

**GROUP-C**

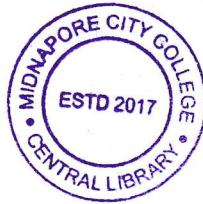
**3. Answer any ONE from the following questions:**

**1×8=8**

- a) Describe the structure and functions of immunoglobulin (Ig) molecule.
- b) Distinguish between MHC Class I and MHC Class II.
- c) Write short notes on (any two)
  - i. ADCC
  - ii. Classical pathway of complement
  - iii. RIA
  - iv. Thymic selection of T-cell

**(P.T.O.)**

(2)



**UNIT: ZOO 103.2**  
**METHODS IN BIOLOGY**

**GROUP-A**

4. Answer any **TWO** from the following questions: 2×2=4

- a) What are the characteristic features of a typical BAC vector?
- b) What is isoelectric focusing?
- c) What are biofertilizers?
- d) Write the principle and application of Agarose Gel Electrophoresis.

**GROUP-B**

5. Answer any **TWO** from the following questions: 2×4=8

- a) What is the principle of ultra-centrifugation process? What is density gradient ultra-centrifugation? 2+2
- b) Give detailed account on different phytoremediation processes. Name some of the enzymes responsible for bioremediation. 3+1
- c) How do bacteria protect their genomic DNA from their own restriction enzymes?
- d) How do you design a primer for PCR? What are the advantages of using Taq DNA polymerase? 3+1

**GROUP-C**

6. Answer any **ONE** from the following questions: 1×8=8

- a) What are the ideal physio-chemical parameters for bio-degradation process? Write note of superbug. 5+3
- b) Briefly describe the Liquid chromatography-mass spectroscopy (LC-MS). What is the purpose of FISH technique? 6+2

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