

M.Sc. ZOOLOGY
FOURTH SEMESTER
IMMUNOLOGY, BIOINFORMATICS & RESEARCH METHODOLOGY
MSZ-401

(Use separate answer scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

(PART-A : Objective)

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1x20=20

1. Which of the following cell/cells express MHC II on the surface?
 - a. B-lymphocyte
 - b. Macrophages
 - c. Dendritic cells
 - d. All of the above

2. Which of the following is not true about macrophages?
 - a. Macrophages have longer life span than neutrophils.
 - b. Macrophages at inflammatory sites are responsible for phagocytosis of cellular debris and help in keeping the tissue clean.
 - c. Macrophages contain many lysosomes and have cytoplasmic extensions called pseudopodia.
 - d. Macrophages appear at the site of inflammation earlier than neutrophil.

3. Which of the following statement is correct?
 - a. T-lymphocytes are conditioned by the bone marrow.
 - b. B-lymphocytes are conditioned by thymus.
 - c. B-cells produce plasma and memory cells.
 - d. T-cell do not produce cytokines.

4. Which of the following is not true for a good literature review?
 - a. It uses rigorous and consistent methods.
 - b. It is constructed in an arbitrary way.
 - c. It is a synthesis of available research.
 - d. It has clarity and conciseness.

5. Which of the following is not a primary database?
 - a. EMBL
 - b. DDBJ
 - c. OWL
 - d. Swiss-Prot

6. UGMA stands for:
 - a. Unweighted pair group method with average.
 - b. Unweighted pair group matrix with arithmetic mean.
 - c. Unweighted paradigm method with arithmetic mean.
 - d. Unweighted pair group method with arithmetic mean.

7. The surface of a large antigen on which the antibody will bind is:
 - a. Active site
 - b. Antigenic site
 - c. Epitope
 - d. Hapten

8. The antigenic determinants on the basis of which immunoglobulin are grouped into different classes are located in:
 - a. Light chains
 - b. Heavy chains
 - c. J-chains
 - d. All of the above

9. Which of the following is not a conceptual literature?
 a. Scientific literature b. Scholarly works
 c. Review of the literature article d. Theoretical literature
10. Which is not a bioethical committee?
 a. PETA b. IAEC
 c. CPCSEA d. IUCN
11. Intellectual Property Rights refers to:
 a. Creation of human mind b. Rearing of animal
 c. Buying a plot of land d. Reading a book
12. India's first genetically engineered vaccine is:
 a. Tetanus b. Hepatitis B vaccine
 c. Measles d. Tuberculosis
13. Memory B cells and T cells that are produced against a specific pathogen lived for:
 a. The period of infection b. 3-4 weeks
 c. Whole life d. None of the above
14. For performing ELISA virus and bacterial samples are diluted with:
 a. Phosphate buffered saline b. Carbonate-Bicarbonate buffer
 c. Hydrofluoric acid d. Sodium citrate buffer
15. In Sandwich ELISA:
 a. Antibody is sandwiched between two antigens.
 b. Antigen is sandwiched between two antibodies.
 c. Antigen and antibody remains parallel.
 d. None of the above.
16. Indirect ELISA is routinely used for detecting:
 a. Secondary antibody b. FIV disease
 c. HIV Infection d. Fluorescent antibodies
17. The research which is related to some abstract ideas or theory called:
 a. Descriptive research b. Applied Research
 c. Conceptual research d. Empirical research
18. The variables which can be expressed in integer values are called:
 a. Continuous variable b. Non-continuous variable
 c. Digital variable d. Non-digital Digital variable
19. True with monoclonal antibodies is:
 a. They are more sensitive than conventional antisera.
 b. They are formed of a single class of immunoglobulin with single antigenic determinant sites.
 c. They are produced by myeloma -T cell hybridoma.
 d. They are produced by a single clone of T lymphocytes.
20. The incorrect statement about Fab segment of Immunoglobulin is that:
 a. Fab determines the biological properties of immunoglobulin.
 b. It is an insoluble fragment.
 c. Two chains of Fab are held together by disulphide linkage.
 d. Two Fabs in antibody.

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Discuss briefly about T cell receptor with special emphasis on TCR complex and the molecules involved therein. 10
2. What is vaccination? Write the principles of vaccination. Differentiate between active and passive immunization or vaccination. 2+4+4=10
3. a) Define phylogenetic analysis. How is it useful in biological science? 10
 b) Provide an account of various softwares used for tree construction.
- Or
- a) Give detailed account of protein sequence database. 10
 b) State the significance of database file format.
4. Differentiate between primary and secondary source of information in reviewing literature. What are the importance and limitation of the use of secondary data in research? Write a brief sequential step of searching the literatures for a research topic. 2+3+5=10
5. What is Major Histocompatibility Complex (MHC)? What are the differences between MHC class I and MHC class II? 10
6. Describe the important concepts relating to Research Design. 10
7. What are monoclonal and polyclonal antibodies? Discuss briefly about the production of monoclonal antibodies with suitable sketches and add a note on their application. 2+8=10
8. Elucidate in detail about the different classes and sub-classes of antibodies citing suitable examples. 10
- Or
- What are the main objectives of writing a literature review? Describe briefly on the main requisites for writing a good literature review. Write a brief note on the steps to write an effective literature review. 10

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