

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

(Use Separate Answer Scripts for Objective & Descriptive)

Duration: 3 hrs.

Full Marks: 70

Time: 20 min.

(PART-A: Objective)

Marks:20

Choose the correct answer from the following:

1X20=20

- Which one of the following pairs are the primary lymphoid organs of immune system?
 - Bone marrow and spleen
 - Bone marrow and lymph nodes
 - Thymus and spleen
 - Thymus and bone marrow
- Which organ of the immune system is larger in infant and smaller in adult?
 - Bone marrow
 - Thymus
 - Spleen
 - Lymph nodes
- Which one of the following is the best anatomical barrier for microbes?
 - Muscles
 - Bones
 - Skin
 - Blood
- Which one of the following cell types fight for helminthic parasitic worms?
 - Neutrophil
 - Basophil
 - Eosinophil
 - Monocyte
- Which one of the following is an antigen presenting cell (APC)?
 - Eosinophil
 - Basophil
 - Dendritic cell
 - Neutrophil cell
- A homogeneous population of antibodies (i.e. monoclonal antibodies) can be raised by fusion of B lymphocytes with immortal cell cultures to produce
 - Lymphokines
 - Hybridomas
 - Dendritic cell
 - Clones
- Excess of antibody inhibits agglutination which is a phenomenon called
 - Prozone effect
 - Acoustic effect
 - Both (a) and (b)
 - None of the above
- The antibody which is most efficient in agglutination reaction is
 - IgG
 - IgM
 - IgE
 - IgD
- In Sandwich ELISA
 - Antibody is sandwiched between two antigen
 - Antigen is sandwiched between two antibodies
 - Antigen and antibody remains parallel
 - None of the above

10. The antigenic determinants on the basis of which immunoglobulin are grouped into different classes are located in
- | | |
|-----------------|---------------------|
| a. Light chains | b. Heavy chain |
| c. J chain | d. All of the above |
11. The plasma membrane of a B cell is indicated by
- | | |
|-------------------------|-------------------------|
| a. Green phospholipids | b. Yellow phospholipids |
| c. Orange phospholipids | d. None of the above |
12. Copyright covers -
- | | |
|----------------------|---------------------|
| a. Original Literary | b. Sound Recording |
| c. Photographs | d. All of the above |
13. The term *ethics* derives from the
- | | |
|-----------------|------------------|
| a. Greek word | b. Latin word |
| c. English word | d. None of these |
14. In which year, the Prevention of Cruelty to Animal Act was enacted?
- | | |
|---------|------------------|
| a. 1960 | b. 1972 |
| c. 1980 | d. None of these |
15. What is the full form of IAEC?
- | | |
|-------------------------------------------|------------------------------------------|
| a. Institutional Animals Ethics Committee | b. Institutional Animal Ethics Committee |
| c. Institutional Animal Ethical Committee | d. None of these |
16. What is called if you copy the text directly from the internet and use it in your dissertation?
- | | |
|------------------|------------------|
| a. Ethical issue | b. Plagiarism |
| c. Piracy | d. None of these |
17. Which of the following is incorrect regarding sequence homology?
- | |
|------------------------------------------------------------------------------------------------------------------------|
| a. It is an important concept in sequence analysis |
| b. When two sequences are descended from a common evolutionary origin, they are said to share homology |
| c. Two sequences can homologous relationship even if have do not have common origin |
| d. When two sequences are descended from a common evolutionary origin, they are said to have a homologous relationship |
18. Which of the Below-Given Names is an Example of a Homology and Similarity Tool?
- | | |
|-----------|-----------|
| a. BLAST | b. MEGA |
| c. Phylip | d. RasMol |
19. On the Following Scientists, Who Created the First Bioinformatics Database?
- | | |
|-------------------|--------------------|
| a. Dayhoff | b. Pearson |
| c. Richard Durbin | d. Michael J. Dunn |

20. Left-handed alpha-helix allowed region is present in which of the following quadrants of Ramachandran plot?

- a. First quadrant
- c. Third quadrant

- b. Second quadrant
- d. Fourth quadrant

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PART-B : Descriptive

Time : 2 hrs. 40 min.

Marks : 50

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

1. Elucidate in detail about the structure and function of an immunoglobulin molecule. 10
2. Discuss briefly about T cell receptor with special emphasis on TCR complex and the molecules involved therein 10
3. Elucidate in detail about ELISA technique adding a note on applications of ELISA 10
4. What do you mean by research? State the objectives of scientific research. Also write a note on the aspect that should not be covered during research. 2+4+4
=10

5. Distinguish between- 5+5=10
 - a. Qualitative research and Quantitative research
 - b. Conceptual research and Empirical research

6. What is BLAST and what are its different types? Discuss the application of BLAST in sequence homology search. 5+5=10
7. Define Antigen? Write the immunological properties of an antigen. Mention the factors influencing antigenicity. 10
8. Write short notes on- (*any two*) 5+5=10
 - a. Inflammatory barriers of immune system
 - b. Immunological memory
 - c. Major Histocompatibility Complex (MHC)

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