

**MIZORAM PUBLIC SERVICE COMMISSION**  
**TECHNICAL COMPETITIVE EXAMINATIONS FOR ENTOMOLOGIST**  
**UNDER HEALTH & FAMILY WELFARE DEPARTMENT,**  
**GOVERNMENT OF MIZORAM, FEBRUARY-2024**

**PAPER-IV**  
**(TECHNICAL PAPER)**

Time Allowed : 3 hours

FM : 200

**SECTION - A (Multiple Choice questions) (100 Marks)**

*All questions carry equal mark of 2 each. Attempt all questions.*

*This Section should be answered only on the OMR Response Sheet provided.*

1. Pheromones used as chemical communication in insects are secreted through which type of glands:  
(a) Endocrine glands (b) Exocrine glands  
(c) Paracrine glands (d) All the above
2. The infective stage of *Entamoeba histolytica* is  
(a) Cyst (b) Trophozoite  
(c) Cyst and trophozoite (d) None of the above
3. *Wuchereria bancrofti* is transmitted by mosquitos belonging to the genus  
(a) Anopheles (b) Culex  
(c) Aedes (d) All of the above
4. *Cysticercus* larvae is a type of larvae found in which class of phylum platyhelminthes  
(a) Tubellaria (b) Trematoda  
(c) Cestoda (d) All of the above
5. Which of the statement about *Leishmania donovani* is true  
(a) It is transmitted by multiple sandfly species (b) There is multiple form of leishmaniasis  
(c) No effective vaccine is available (d) All of the above
6. In India DDT was introduced in the year \_\_\_\_\_ and banned in the year \_\_\_\_\_  
(a) 1947 and 1971 (b) 1948 and 1972  
(c) 1949 and 1973 (d) 1950 and 1974
7. The insecticide hydrogen cyanide used as fumigant is  
(a) Physical poison (b) Respiratory poison  
(c) Nerve poison (d) Protoplasmic poison
8. The insecticides parathion, chlorpyrifos, diazinon, dichlorvos, malathion belongs to the insecticide family of  
(a) Organochlorines (b) Carbamates  
(c) Organophosphates (d) All of the above

9. Insect growth regulators (IGRs) mimics the function of the
  - (a) Fibroblast Growth Factors
  - (b) Juvenile hormone
  - (c) Ecdysone
  - (d) Pheromones
10. Carbamate acaricide inhibits the function of
  - (a) Acetyl choline
  - (b) Acetyl choline esterase
  - (c) Dopamine
  - (d) Histamine
11. The recommended and accepted methods for testing insecticide resistance
  - (a) CDC Bottle bioassay
  - (b) WHO test tube assay
  - (c) Gene analysis
  - (d) All of the above
12. Insecticide resistance due to Glutathione S transferase (GST) activity is due to
  - (a) Decrease level of the enzyme activity
  - (b) Increased level of the enzyme activity
  - (c) Damaged GST gene
  - (d) None of the above
13. Which of the following statement about Cytochrome P450 is false
  - (a) The main function of Cytochrome P450 is detoxification
  - (b) Cytochrome P450 are monooxygenase
  - (c) Cytochrome P450 mutation induce insecticide resistance
  - (d) Cytochrome P450 is involved in multiple insecticide resistance.
14. The first known insecticide resistance studies were done in
  - (a) 1914
  - (b) 1915
  - (c) 1916
  - (d) 1917
15. The causes of insecticide resistance are
  - (a) Behaviour resistance
  - (b) Penetration resistance
  - (c) Metabolic resistance
  - (d) All of the above
16. National Malaria Control programme (NMCP) and National Vector Borne Disease Control Programme (NVBDCP) in India was launched in
  - (a) 1951 & 2000
  - (b) 1952 & 2002
  - (c) 1953 & 2004
  - (d) 1954 & 2006
17. The organ invariably involved in leptospirosis is?
  - (a) Eye
  - (b) Kidney
  - (c) Liver
  - (d) Pancreas
18. Chikungunya is an infection caused by the Chikungunya virus (CHIKV) is
  - (a) Single strand DNA virus
  - (b) Single strand RNA virus
  - (c) Double strand DNA virus
  - (d) Double strand RNA virus
19. Which of the following statement about Japanese encephalitis is true.
  - (a) The disease is caused by flavivirus
  - (b) There is no specific treatment
  - (c) The disease is transmitted by culex sp. Mosquito
  - (d) All the above
20. National Strategic Plan (NSP) for Elimination of Malaria was launched in India to set a goal to eradicate malaria from India by the year
  - (a) 2025
  - (b) 2026
  - (c) 2027
  - (d) 2028

21. Diagnosis of *Japanese encephalitis* is done by detecting the virus from  
(a) Cerebrospinal fluid (b) Blood serum  
(c) Bone marrow (d) Saliva
22. Lyme disease is a tick born disease  
(a) True (b) False
23. Q fever is an acute or chronic disease caused *Coxiella burnetii* is  
(a) Viral in origin (b) Bacterial in origin  
(c) Fungal in origin (d) None of the above
24. Plaque is caused by the bacteria *Y. pestis* which is transmitted by  
(a) Ticks (b) Mites  
(c) Lice (d) Flea
25. \_\_\_\_\_ is the vector mites of scrub typhus  
(a) *Leptotrombidium deliense* (b) *Leptotrombidium tsusugamushi*  
(c) *Leptotrombidium akashi* (d) *Leptotrombidium karp*
26. Modern approach disruption of dengue transmission by *aedes* sp includes the use of  
(a) *Beauveria* (b) *Wolbachia*  
(c) *Metarhizium* (d) All of the above
27. *Cul ex* sp. Life cycle from egg to adult takes 7-20 days.  
(a) True (b) False
28. The dominant anopheles sp. transmitting malaria in India is  
(a) *Anopheles culicifacies* (b) *Anopheles stephensi*  
(c) *Anopheles minimus* (d) *Anopheles bamaii*
29. The vector transmitting *Japanese encephalitis*  
(a) *Culex* sp. (b) *Anopheles* sp.  
(c) *Mansonia* sp. (d) All of the above.
30. Oviparity reproduction in insects refers to?  
(a) Laying of nymphal stages instead of eggs  
(b) Laying of immature larvae instead of eggs  
(c) Laying of fertile eggs which hatch and reach the adulthood  
(d) Laying of mature larvae instead of eggs
31. The most significant receptors in host selection among mosquito  
(a) Visual sensor (b) Olfactory sensors  
(c) Acoustic sensors (d) Chemosensory
32. Which of these groups of arthropods transmit *Babesia*?  
(a) Ticks (b) Mosquitoes  
(c) Mites (d) Bed bugs
33. Bubonic plague often termed Black death is spread by  
(a) Mites (b) Ticks  
(c) Fleas (d) Bugs
34. What is the name of the hypervariable region of immunoglobulin, which is responsible for its diversity?  
(a) CDR (b) Hinge region  
(c) Epitope (d) Agreptope

35. The immunoglobulin produced early in the primary response to infection?  
(a) IgE (b) IgA  
(c) IgG (d) IgM
36. Which of cells produce antibodies?  
(a) Plasma cells (b) macrophage.  
(c) B-- cells. (d) T-- cells
37. Antigen presenting cells are  
(a) Macrophages, (b) B cells  
(c) Dendritic cells, (d) All of the above
38. Which of the following acts as a coreceptor for B-cell activation?  
(a) CD28 (b) Interleukins  
(c) Immunoglobulins (d) CD19
39. Which of the following polypeptide is important for the expression of MHC I on the cell membrane?  
(a) Interferons (b)  $\beta$  2-microglobin  
(c) Lymphokines (d) Interleukins
40. Which of the following statement about Interferons is true  
(a) Are divided into 5 main families. (b) Are found only in mammalian species.  
(c) Are specific for individual viruses. (d) Induce enzyme synthesis in the target cell.
41. B -Cells are activated by  
(a) Antibody. (b) Interferon  
(c) Antigen (d) Memory cells.
42. Monoclonal antibodies recognize a single:  
(a) Antigen (b) Bacterium  
(c) Epitope (d) B cells
43. The immediate hypersensitivity reactions that are responsible for the symptoms of hay fever, asthma, hives, and anaphylactic shock is mediated by.  
(a) IGA (b) IgE  
(c) IgG (d) IgM
44. Many virus infections result in immune pathology, this is caused by which of the following?  
(a) A cytokine storms (b) Antibody mediated reactions  
(c) A response of killer T cells (CD-8) (d) A decline in function of the immune system
45. Type 2 hypersensitivity involves  
(a) IgD and IgE (b) IgG and IgE  
(c) IgG and IgM (d) IgE & IgM
46. Interferons are very special defence mechanisms which operate by:  
(a) Binding to viruses (b) Binding to neighbouring cells  
(c) Producing a long-lasting state of resistance (d) Inhibiting virus induced enzymes
47. The genetic material of AIDS virus is \_\_\_\_\_  
(a) single-stranded RNA (b) single-stranded DNA  
(c) double-stranded RNA (d) double-stranded DNA

48. The various complement components interact, in a highly regulated cascade, to carry out a number of basic functions including:
- (a) Lysis of cells,
  - (b) Lysis bacteria,
  - (c) Lysis viruses
  - (d) All of the above
49. Complement activation by the classical pathway commonly begins with the formation of soluble antigen-antibody complexes (immune complexes) by Immunoglobulins
- (a) IgM & IgG
  - (b) IGA & IgG
  - (c) IgE & IgA
  - (d) IgE & IgM
50. The immunoglobulins activated during type 1 hypersensitive reactions is
- (a) IgM
  - (b) IgG
  - (c) IgA
  - (d) IgE

**SECTION - B (Short answer type question) (100 Marks)**

*Marks for each question is indicated against it.*

*This Section should be answered only on the Answer Sheet provided.*

1. Write short note on **any two**. (2×5=10)
- (a) Concept of parasite and parasitism
  - (b) Life cycle of *Leishmania donovani*
  - (c) Modern approaches mosquito vector control.

**OR**

What is malaria. Explain the life cycle of *Plasmodium falciparum* and add a note on its treatment. (10)

2. Explain the classification of insecticides based on the chemical nature. (10)

**OR**

Write short notes on **any two**. (2×5=10)

- (a) Bio larvicides
- (b) Biomagnification
- (c) Pyrethroids.

3. Explain the mechanisms and importance of monitoring vector insecticide resistance. (10)

**OR**

Write short notes on any two:

- (a) Mechanism associated with pyrethroid resistance.
- (b) Xenobiotics
- (c) Synergistic enzyme inhibition

4. What are the different types of Rickettsial disease in human? Explain the clinical manifestation and treatment of scrub typhus in human? (10)

**OR**

Explain the chemoprophylaxis and treatment of **any two**. (2×5=10)

- (a) Dengue
- (b) Leishmaniasis
- (c) Kyasanur Forest disease (KFD)

5. Explain the symptoms of malaria. What are the methods employed in India to treat acute and severe malaria? (10)

**OR**

Write a note on **any two**. (2×5=10)

- (a) Filariasis
- (b) Murine typhus
- (c) Salmonellosis

6. Explain the importance of Mosquitoes as a vector of parasite of protozoan origin. (10)

**OR**

Explain the mechanism of prevention of mosquito bites as a measure to disease control.

7. Write a note on **any one (1)** of the following: (1×4=4)

- (a) Fleas and disease transmitted by them
- (b) Tick and mites- role as a vectors of disease
- (c) Life cycle of *Phlebotomus sergentomyia* (Sand flies)

8. Compare and contrast humoral and cell mediated immunity. (10)

**OR**

Write the mechanism of antigen antibody interactions.

9. Write short notes on **any two**. (2×5=10)

- (a) Epitopes
- (b) Hypersensitivity
- (c) Influence of T cell subset balance on disease outcome in tuberculosis

**OR**

Compare and contrast the structure, expression and functions of MHC class I and class II molecules. (10)

10. Explain the influence of T cell and NK cells on disease outcome in general and specifically in AIDS. (10)

11. Write short notes on **any one**. (6)

- (a) Types of hypersensitive reactions
- (b) Functions Interferons.

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