

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

PAPER-III
(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. The phenomenon where two or more distinct phenotypes are produced by the same genotype
 - (a) Mutation
 - (b) Voltinism
 - (c) Polyphenism
 - (d) Polymorphism
2. Which part of the insect mouth mixes the food with digestive enzymes?
 - (a) Hypopharynx
 - (b) Labrum
 - (c) maxillae
 - (d) Palps
3. An organ or process of the anal region of an insect that serves in copulation, oviposition, or stinging is
 - (a) Apophysis
 - (b) Gonapophysis
 - (c) Conglobate gland
 - (d) Cerci
4. The most common insect orders that transmit human diseases are
 - (a) Odonata
 - (b) Hymenoptera
 - (c) Diptera
 - (d) Hemiptera
5. Immature stages in paurometabolous insects are called
 - (a) Larvae
 - (b) Nymph
 - (c) Naiad
 - (d) Maggots
6. The primary functioning organ of respiration in most insects is
 - (a) Aorta
 - (b) Gills
 - (c) Lungs
 - (d) Trachea
7. A type of reproduction where young ones are produced without the fusion of male and female gametes is called
 - (a) Parthenogenesis
 - (b) Viviparity
 - (c) Polyembryony
 - (d) Oviparity
8. The process in arthropods by which the epidermal cells are separated from the cuticle is termed as
 - (a) Hydrolysis
 - (b) Ecdysis
 - (c) Apolysis
 - (d) Catalysis

21. Male of the Housefly *Musca domestica* differs from the female in having
(a) wide space between the eyes (b) narrow space between the eyes
(c) equal space between the eyes (d) eyes underside of the head
22. Which chemical is not used as a liquid-killing agent for the systematic collection of insects?
(a) Ethyl Acetate (b) Ethanol
(c) Formaldehyde (d) Liquid Ammonia
23. Ticks and mites are collectively called as
(a) Arachnids (b) Crustaceans
(c) Insects (d) Worms
24. The most profound threat to biodiversity in terms of species affected is:
(a) Climate change (b) Diseases
(c) Habitat loss (d) Overexploitation
25. Which one is not an invasive insect species?
(a) Cutworm (b) Diamondback moth
(c) Fall armyworm (d) Potato tuber moth
26. Facts about the biodiversity hotspot is that
A. To qualify as a biodiversity hotspot a region must contain at least 1,500 species of vascular plants as endemics
B. It must have lost at least 70% of its primary vegetation
C. There are 34 biodiversity hotspots around the globe
(a) A and B are correct (b) A and C are correct
(c) B and C are correct (d) All are correct
27. The biodiversity hotspot in India which is one of the hottest hotspots in the world is
(a) Indo-Burma (b) Himalayan
(c) Sundaland (d) Western Ghats
28. Among the listed insects, the most active vectors of human disease is
(a) Ants (b) Beetles
(c) Mosquitoes (d) Moths
29. Which of the following is not a diversity index?
(a) Upright index (b) Shannon-Weiner index
(c) Gini-Simpson index (d) Simpson's index
30. Diversity which measures the change in diversity of species from one environment to another is
(a) Alpha (b) Beta
(c) Gamma (d) All
31. The term Biosphere is coined by
(a) AG Tansley (b) Eugene Odum
(c) Edward Suess (d) GE Hutchinson
32. The RFLP probes are frequently used in
(a) Fate mapping (b) Genome mapping
(c) Karyotyping (d) None of these

33. Between microsatellites and SNPs
- A. microsatellites are more informative than SNPs
 - B. SNPs are far more common than microsatellites
- (a) Only A is correct (b) Only B is correct
(c) A and B are correct (d) A and B are incorrect
34. A laboratory tool used to detect the expression of thousands of genes simultaneously
- (a) Microarray (b) RFLP
(c) RAPD (d) All of the above
35. DNA barcoding can help in
- A. Assessing the age of the organisms
 - B. Differentiate two cryptic species
 - C. Resolving illegal animal trade
- (a) A and B are correct (b) B and C are correct
(c) A and C are correct (d) All are correct
36. The infective stage of malarial parasite for humans is
- (a) Merozoites (b) Oocyst
(c) Sporozoites (d) Trophozoites
37. Maurer's cleft is related to the infection of
- (a) *Leishmania donovani* (b) *Plasmodium falciparum*
(c) *Trypanosoma cruzi* (d) *Wuchereria bancrofti*
38. Romaña's sign is the manifestation of the disease
- (a) Chagas disease (b) Filariasis
(c) Leishmaniasis (d) Malaria
39. The fifth *Plasmodium* species recognized by WHO in 2008 causing malaria in humans is
- (a) *Plasmodium vivax* (b) *Plasmodium malariae*
(c) *Plasmodium ovale* (d) *Plasmodium knowlesi*
40. The disease lymphatic filariasis is commonly known as
- (a) Acromegaly (b) Elephantiasis
(c) Leptospirosis (d) Sleeping sickness
41. The disease scrub typhus
- A. is caused by *Orientia tsutsugamushi*
 - B. *Orientia tsutsugamushi* is a gram-positive bacteria
 - C. It is transmitted through mites
- (a) A and B are correct (b) B and C are correct
(c) A and C are correct (d) All are correct
42. The most severe form of Leishmaniasis is
- (a) Cutaneous leishmaniasis (b) Visceral leishmaniasis
(c) Mucocutaneous leishmaniasis (d) None of these
43. The causal agent of Kyasanur Forest disease (KFD) is a virus belonging to
- (a) Flaviviridae (b) Hepeviridae
(c) Rudiviridae (d) Pneumoviridae

44. Egg parasitoid are
- (a) Braconids
 - (b) Ichneumonids
 - (c) Trichogrammatid
 - (d) Tachinid
45. The type of organism interaction where one species benefits but does not benefit nor harm the other is
- (a) Amensalism
 - (b) Commensalism
 - (c) Mutualism
 - (d) Parasitism
46. The process where the prey adapts well with the predator in a predator-prey relationship
- (a) Amensalism
 - (b) Co-evolution
 - (c) Competition
 - (d) Mutualism
47. The position of a species within an ecosystem comprising both the habitat requirements and the functional role of a species is
- (a) Carrying capacity
 - (b) Ecological habitat
 - (c) Ecological niche
 - (d) Ecological succession
48. A strongly interacting species that have a large impact on their ecosystems relative to their abundance is termed as
- (a) Umbrella species
 - (b) Keystone species
 - (c) Indicator species
 - (d) Flagship species
49. The decomposers help other organisms in an ecosystem
- (a) by breaking down dead organisms and add nutrients back to the soil
 - (b) by using the sunlight to make their own food that other organisms eat for energy
 - (c) by dispersing seeds for plant growth
 - (d) do not help other organisms in an ecosystem
50. A single nucleotide polymorphism (SNPs)
- A. is a genomic variant at a single base position in the DNA
 - B. are found in the DNA between genes
 - C. act as biological markers
- (a) A and B are correct
 - (b) B and C are correct
 - (c) A and C are correct
 - (d) All are correct

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

All questions carry equal marks of 10 each.

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

1. Discuss the modern approach to insect classification. Emphasize the role of wings in insects' classification (6+4=10)
2. Give an account of the female reproductive system of insects. Add a note on the hormonal regulation of reproduction in insects. (6+4=10)
3. Give an account of the mode of transmission and infection of Japanese encephalitis. Highlight the pathogenicity and control of the vector. (5+5=10)
4. Discuss the general life cycle and characteristics of mosquitoes. Explain the distinguishing features of *Aedes* and *Mansonia*. (4+6=10)
5. Give an account on the collection and preservation method of the soft bodied and hard bodied insects. (10)
6. Elaborate the impact of anthropogenic stressors on vector-borne diseases. (10)
7. Discuss the advantages and disadvantages of molecular techniques in insect taxonomy. (10)
8. Discuss the causative agent, vector and pathogenesis of plague. Add a note on its treatment and measures to control the infection. (7+3=10)
9. Discuss the dispersal and migration of insects and their importance in vector management (10)
10. Write short notes on any two (5+5=10)
 - (a) DNA barcoding
 - (b) Trypanosomiasis
 - (c) Zoonoses

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