MIZORAM PUBLIC SERVICE COMMISSION

AGRICULTURE & ALLIED SERVICES (COMBINED TECHNICAL) EXAMINATION, 2024 FOR RECRUITMENT OF FISHERIES EXTENSION OFFICER UNDER FISHERIES DEPARTMENT, GOVERNMENT OF MIZORAM, DECEMBER-2024

FISHERIES PAPER-III

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. Which food additive acts as a preservative by preventing microbial growth?

(a) Emulsifier (b) Antimicrobial additive

(c) Colour additive (d) Sweetener

2. What does the Biological Value (BV) measure in proteins?

(a) Taste (b) Energy content

(c) Digestibility (d) Nutritional efficiency

3. Fish muscle proteins change chemically during-

(a) Contraction (b) Digestion

(c) Fermentation (d) Oxidation

4. Which vitamin is helps in controlling clotting of blood?

(a) Vitamin C (b) Vitamin D

(c) Vitamin B6 (d) Vitamin K

5. Which type of vaccine contains live but weakened microorganisms?

(a) DNA vaccine (b) Inactivated vaccine

(c) Attenuated vaccine (d) Subunit vaccine

6. ELISA is used to detect:

(a) DNA sequences (b) Pathogens

(c) Antibodies or antigens (d) Hormones

7. Which chemical treatment is used to kill or inhibit pathogens on surfaces?

(a) Vaccine (b) Antibiotic

(c) Antiseptic (d) Immunostimulant

8. A substance that enhances the immune response to a vaccine is called-
   (a) Immunostimulant (b) Vaccine vector
   (c) Adjuvant (d) Antibiotic
9. Which fish disease is zoonotic, meaning it can be transmitted to humans?
   (a) Bacterial gill disease (b) Ichthyophthiriasis
   (c) Mycobacteriosis (d) Saprolegniasis
10. The process of pathogen identification using antibodies is known as-
   (a) Immunoassay (b) Antibiogram
   (c) Gram staining (d) Polymerase chain reaction
11. Which microorganism causes botulism in food?
   (a) E. coli (b) Vibrio cholerae
   (c) Clostridium botulinum (d) Listeria monocytogenes
12. Which toxin is commonly associated with puffer fish?
   (a) Mycotoxin (b) Scombroid toxin
   (c) Tetrodotoxin (d) Ciguatera toxin
13. Which preservation method uses high temperature to kill bacteria?
   (a) Freezing (b) Fermentation
   (c) Pasteurization (d) Dehydration
14. Salmonella is primarily transmitted through-
   (a) Water (b) Soil
   (c) Contaminated food (d) Airborne particles
15. Scombroid poisoning is commonly associated with-
   (a) Tuna (b) Pufferfish
   (c) Mussels (d) Shrimps
16. The causative organism of dropsy in fish is-
   (a) Pseudomonas putida (b) Aeromonas hydrophilla
   (c) E. tarda (d) Aeromonas veronii
17. Which organism is known for producing shellfish toxins?
   (a) Diatoms (b) Dinoflagellates
   (c) Green algae (d) Rotifers
18. An intrinsic factor affecting microbial growth in fish is-
   (a) Humidity (b) pH level
   (c) Temperature (d) Oxygen availability
19. A common foodborne pathogen in raw seafood is-
   (a) Salmonella (b) Vibrio vulnificus
   (c) Listeria monocytogenes (d) Staphylococcus aureus

20. What is the primary purpose of fish salting?

(a) Flavour enhancement (b) Microbial growth inhibition

(c) Colour preservation (d) Protein enrichment

21. The carcinogenic compound in wood smoke during fish smoking is-

(a) Benzopyrene (b) Sodium benzoate

(c) Ascorbic acid (d) Glycerol

22. Water activity (aw) in fish processing affects-

(a) Protein synthesis (b) Microbial growth

(c) Mineral absorption (d) Fat oxidation

23. What is the main ingredient in marinades that helps preserve fish?

(a) Salt (b) Acid

(c) Sugar (d) Spices

24. A common traditional fish processing method in Southeast Asia is-

(a) Freezing (b) Fermentation

(c) Curing (d) Steaming

25. A major benefit of fish smoking is-

(a) Increased sweetness (b) Extended shelf life

(c) Enhanced fat content (d) Improved colour

26. The Maximum Sustainable Yield (MSY) is-

(a) Highest catch without affecting future stocks (b) Smallest catch for economic gain

(c) Catch limit only for small fish (d) Catch limit for endangered species

27. The concept of unit stock in fisheries refers to-

(a) Mixed populations (b) A single, self-reproducing population

(c) Migratory populations (d) Endangered populations

28. Trawl selection in fisheries involves choosing:

(a) Net materials (b) Fish types

(c) Catch locations (d) Fish sizes

29. Which metric is commonly used to measure fish catch efficiency?

(a) CPUE (Catch per Unit Effort) (b) Growth rate

(c) Mortality rate (d) Biomass production

30. The von Bertalanffy growth model is used to study:

(a) Age structure (b) Fish migration patterns

(c) Fish size over time (d) Fish population density

31. Recruitment overfishing occurs when:

(a) Juvenile fish are excessively caught (b) Only large fish are caught

(c) Fish growth increases (d) Fish migration stops

32. Porphyra is what type of seaweed?

(a) Green (b) Red

(c) Brown (d) Yellow

33. Which bacterial species is responsible for bioluminescence in fish?

(a) Vibrio fischeri (b) Pseudomonas aeruginosa

(c) Escherichia coli (d) Listeria monocytogenes

34. Antibiotic resistance in aquaculture is primarily caused by-

(a) Misuse of antibiotics (b) High salinity

(c) Low oxygen (d) Poor feed quality

35. Which method reduces seepage in aquaculture ponds?

(a) Sand lining (b) Soil compaction

(c) Water aeration (d) Drainage

36. Nitrogen balance in fish measures:

(a) Oxygen use (b) Nutrient absorption

(c) Protein metabolism (d) Water quality

37. The most abundant muscle protein in fish is-

(a) Actin (b) Myosin

(c) Collagen (d) Tropomyosin

38. The dominant immune response in fish against bacteria is-

(a) Humoral immunity (b) Cellular immunity

(c) Innate immunity (d) Adaptive immunity

39. Marine toxins are often caused by-

(a) Pathogenic viruses (b) Algal blooms

(c) Polluted water (d) Antibiotics

40. Which parasite causes white spot disease in fish?

(a) Argulus (b) Ichthyophthirius

(c) Vibrio (d) Tricodina

41. Which hormone controls molting in crustaceans?

(a) Ecdysone (b) Cortisol

(c) Insulin (d) Prolactin

42. Which microorganism is a common foodborne pathogen?

(a) Salmonella (b) Bacillus subtilis

(c) Streptococcus (d) Escherichia coli

43. Ciguatera poisoning is caused by consuming:

(a) Reef fish (b) Freshwater fish

(c) Farmed fish (d) Frozen fish

44. Which compound is used as an immunostimulant in fish?

(a) Beta-glucan (b) Vitamin C

(c) Sodium chloride (d) Lactic acid

45. Zoonotic diseases are those that-

(a) Affect only aquatic animals (b) Can be transmitted to humans

(c) Are caused by viruses (d) Are restricted to fish farms

46. Which organism is a common ectoparasite of fish?

(a) Argulus (b) Tricodina

(c) Vibrio (d) Aeromonas

47. Quarantine in aquaculture is used to-

(a) Increase production (b) Prevent disease spread

(c) Enhance growth rates (d) Monitor water quality

48. The C:N ratio in bio floc is?

(a) 10:1 to 20:1 (b) 1:10 to 1: 20

(c) 10:1 to 1:20 (d) 1:10 to 20:1

49. Which is a common spoilage bacterium in fresh fish?

(a) Pseudomonas (b) Listeria

(c) Clostridium (d) Salmonella

50. The primary factor influencing microbial growth in fish is-

(a) Protein content (b) Water activity

(c) Lipid composition (d) Amino acid profile

SECTION - B *(Conventional Type) (100 Marks)*

*This Section should be answered only on the **Answer Sheet** provided.*
Marks for each question is indicated against it.
Attempt all questions.

1. Discuss the role of microorganisms in the spoilage of fish and fishery products. Explain the factors (intrinsic and extrinsic) affecting microbial growth in fish, and describe methods of controlling microbial activity through preservation techniques. **(5+10=15)**

2. Discuss the importance of water activity in relation to microbial growth and shelf life, citing examples of traditional and modern processing methods, emphasizing value-added products like surimi and fish sausages. **(5+5=10)**

3. Discuss the general characteristics for some important bacterial, viral, fungal, and parasitic diseases in fishes. Write some preventive measures to control Epizootic Ulcerative Disease in fishes. **(5+5=10)**

4. Explain the significance of quarantine, biosecurity, SPF, SPR and health certification in fish health management. **(10)**

5. Explain in details the occurrence, growth, and prevention of foodborne pathogens like Vibrio cholerae, Salmonella, and *Clostridium botulinum* in fish products. Discuss biological hazards such as marine toxins (e.g., saxitoxin and tetrodotoxin) and their implications for food safety and public health. **(5+5=10)**

6. Explain the innate and adaptive immune systems in fish. Analyze the role of immunostimulants, vaccines, and bioremediation in disease management in aquaculture. **(3+9=12)**

7. Explain the concept of population dynamics, including key parameters such as age structure, mortality rates, and growth rates. **(5)**

8. Discuss the importance of Maximum Sustainable Yield (MSY) and Catch Per Unit Effort (CPUE) in maintaining sustainable fisheries. **(6)**

9. Explain the metabolic processes of fish muscle during contraction and relaxation. Discuss the chemical changes that occur in fish muscle proteins during processing. Describe how biochemical reactions influence the taste, flavor, and texture of fish products. **(5+5+5=15)**

10. Briefly explain the health risks posed by foodborne pathogens such as Vibrio, Salmonella, and Clostridium botulinum. **(7)**

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