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M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2025.

Fourth Semester

Microbiology – Core

FOOD AND ENVIRONMENTAL MICROBIOLOGY

(For those who joined in July 2023 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following is a common source of gamma radiation used in food preservation?
  - (a) Cesium-37
  - (b) Uranium-235
  - (c) X-ray machines
  - (d) Alpha particles

2. What is the term used for the amount of radiation required to reduce the number of microorganisms in food by 90%
- (a) D-value                      (b) R-value  
(c) L-value                      (d) T-value
3. Which organization regulates the use of radiation for food preservation?
- (a) World Health Organization (WHO)  
(b) U.S. Food and Drug Administration (FDA)  
(c) United Nations Environmental Programme (UNEP)  
(d) European Food Safety Authority (EFSA)
4. Which helminth infection is commonly linked to the consumption of raw or undercooked fish?
- (a) Taeniasolium  
(b) Fasciola hepatica  
(c) Diphyllbothriumlatum  
(d) Ascarislumbricoides

5. The life cycle of Fasciola hepatica (liver fluke) typically involves which of the following?
- (a) Consumption of contaminated water or undercooked fish  
(b) Ingestion of undercooked pork  
(c) Consuming undercooked beef  
(d) Ingestion of vegetables contaminated with fluke eggs
6. According to the FSSAI (2014) guidelines, what is the maximum shelf life allowed for packaged food items?
- (a) 6 months  
(b) 1 year  
(c) 2 years  
(d) It depends on the food item
7. Which of the following is NOT a part of the FSSAI's responsibility?
- (a) Regulating the import of food products  
(b) Developing and enforcing food safety standards  
(c) Providing nutritional guidelines and information to consumers  
(d) Setting food prices across India

8. The Earth's solid outer layer, which includes the crust and upper mantle, is called the
- (a) Atmosphere                      (b) Biosphere  
(c) Lithosphere                      (d) Hydrosphere
9. The biosphere can be defined as the region of Earth where
- (a) Only humans live  
(b) Life exists, including all living organisms  
(c) Only aquatic life exists  
(d) Rocks and minerals are found
10. Which of the following metals commonly found in e-waste is highly toxic and can cause health problems when not disposed of properly?
- (a) Gold  
(b) Copper  
(c) Lead  
(d) Aluminum

11. Which of the following is a benefit of e-waste recycling?
- (a) Reduction in the amount of e-waste sent to landfills  
(b) Recovery of valuable metals like gold, silver, and copper  
(c) Prevention of harmful chemicals from leaching into the environment  
(d) All of the above
12. The breakdown of cellulose is important for which of the following processes?
- (a) Nitrogen fixation  
(b) Carbon cycling in ecosystems  
(c) Oxygen production  
(d) Photosynthesis
13. In the process of cellulose degradation, the enzyme cellulase acts on the polymer by breaking the bond between
- (a) Glucose molecules in cellulose chains  
(b) Amino acids in protein chains  
(c) Fatty acids in lipid molecules  
(d) Nucleotides in DNA molecules

14. Which of the following is NOT a synthetic polymer?

- (a) Polyethylene                      (b) Nylon  
(c) Teflon                                (d) Cotton

15. DDT is classified as a type of

- (a) Organophosphate  
(b) Carbamate  
(c) Chlorinated hydrocarbon  
(d) Neonicotinoid

PART B — (5 × 4 = 20 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

16. (a) Discuss the advantages and disadvantages of using chemical preservatives in food. Provide examples of commonly used chemicals and their functions.

Or

(b) What are the common causes of spoilage in milk products, and how can they be prevented?

17. (a) Describe the symptoms of foodborne illnesses caused by Salmonella and explain how contamination typically occurs.

Or

(b) How does Aflatoxin contamination occur in food, and what health risks does it pose to humans, especially when consumed over a long period?

18. (a) Explain the role of biotic components in the environment, and provide examples of how they affect the ecosystem.

Or

(b) Discuss the significance of space microbiology in the context of future human colonization of Mars and other celestial bodies.

19. (a) How can solid wastes be utilized as animal feed? Discuss the types of wastes that are commonly used and the benefits of this practice.

Or

(b) Explain the importance of recycling e-waste. What are the key benefits of proper e-waste management for the environment and economy?

20. (a) Discuss the role of microorganisms in the biodeterioration of textiles and leather. Which types of microorganisms are primarily involved in this process?

Or

- (b) How do pollution control bodies in India regulate water pollution, and what steps do they take to ensure the proper treatment of industrial effluents?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

21. (a) Discuss the role of micro organisms in food fermentation. How do they contribute to the production of fermented foods like yogurt, cheese, and bread?

Or

- (b) How does the use of antioxidants and antimicrobial agents contribute to the preservation of foods like fruits, vegetables, and meats?

22. (a) Explain the role of *Giardia lamblia* in foodborne illnesses. How does it affect the digestive system, and what are the methods of treatment for this infection?

Or

- (b) Discuss the seven principles of HACCP. How does each principle contribute to reducing foodborne hazards in food production?

23. (a) Explain the concept of trophic levels in an ecosystem. How does energy flow through these levels, and what happens to the energy at each level?

Or

- (b) Discuss how poor sanitation and lack of clean water can predispose populations to waterborne diseases like cholera and dysentery.

24. (a) How can e-waste be safely disposed of or recycled in a way that prevents the release of toxic substances like lead, mercury, and cadmium into the environment?

Or

- (b) How are medical solid wastes classified, and what are the key considerations for their safe disposal to avoid contamination and disease transmission?

25. (a) Explain the different types of pesticide degradation processes, including chemical, biological, and photodegradation.

Or

(b) How does the Environment Impact Assessment (EIA) Notification influence development projects in India? What role does it play in ensuring environmental sustainability?

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