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Question Paper Code : 91520

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Sixth/Eighth Semester

Biomedical Engineering

OBT 351 – FOOD, NUTRITION AND HEALTH

(Common to: Computer Science and Design/Computer Science and Engineering/
Computer Science and Engineering (Artificial Intelligence and Machine Learning)/
Computer Science and Engineering (Cyber Security)/ Computer and Communication
Engineering/Electronics and Communication Engineering/Electronics and
Telecommunication Engineering/Medical Electronics/Artificial Intelligence and Data
Science/Computer Science and Business Systems/Information Technology)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How do sugar, protein and fat substitutes impact food formulations and nutrition?
2. What is the significance of microbial indicators in assessing product quality and safety?
3. Define the bioflavors and bio-colors, and how are they produced using biotechnology?
4. What is the role of recombinant enzymes in the food sector?
5. How does nanomaterial enhances texture, flavor, or nutritional properties?
6. Mention the safety guidelines or regulations by organizations like the FDA or EFSA on usage of nanomaterials in food.
7. What is the purpose of shelf-life assessment in food product development?
8. Identify the main causes of lifestyle and stress-related diseases, including cardiovascular diseases and obesity.

9. What are transgenic foods?
10. How does the technology of labeling systems contribute to the regulation of GM foods and ingredients, ensuring consumer awareness and product transparency?

PART B — (5 × 13 = 65 marks)

11. (a) Explore the concept of functional foods and their role in promoting optimal nutrition and Give the examples of such foods and their specific health benefits, such as immune support or improved digestion.

Or

- (b) (i) Analyze the importance of microbial safety in food production. (6)
(ii) Discuss control strategies like HACCP and microbiological criteria, and provide examples of their implementation in the food industry. (7)

12. (a) Discuss the digestion, absorption, and utilization of major nutrients such as carbohydrates, proteins, and lipids in the human body.

Or

- (b) Explain the significance of micronutrients such as calcium, magnesium, iron, zinc, copper, and selenium in human nutrition. Discuss their functions, deficiency symptoms and dietary sources.

13. (a) "Nanomaterials have the potential to revolutionize food product development." Justify this statement by discussing their applications as food components, in food packaging.

Or

- (b) Explain how the different stages of food product development, including concept formulation, sensory testing, and shelf-life assessment, help in ensuring the safety, quality and commercial viability of the product.

14. (a) (i) Explain Type-II disorders such as cancer, diabetes, and ulcers. (5)
(ii) Analyse the role of lifestyle, nutrition, and environmental factors in their development and propose remedial measures to manage and prevent these conditions. (8)

Or

- (b) (i) Discuss the concept of energy balance and its role in maintaining a healthy body weight. (5)
(ii) Explain methods to calculate individual nutrient and energy needs based on factors like age, gender and physical activity. (8)

15. (a) Consider the major concerns regarding GM foods, focusing on consumer perception, safety, bioavailability and labeling requirements.

Or

- (b) Highlight the role of different regulatory agencies involved in GM food safety, such as the FDA, EFSA and WHO and explain the processes they follow to assess GM foods for public consumption.

PART C — (1 × 15 = 15 marks)

16. (a) Design a personalized energy balance and nutrient intake plan based on age, gender, physical activity, and health status. Explain the calculation methods used and evaluate how this plan promotes a healthy lifestyle.

Or

- (b) Analyze the food product development process for a gluten-free bakery item. Evaluate challenges in ingredient sourcing, recipe formulation, and testing, and propose solutions to meet quality and consumer demands.
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