

LS2JPHC500

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St Aloysius (Deemed to be University)

Mangaluru

Semester I – P.G. Examination –M.Sc. Food Science Nutrition and Dietetics

November - 2024

Food Chemistry

Time: 2 ½ hrs.

Max Marks: 60

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary.

I. Write short notes on any **FIVE** of the following. (5x3=15)

1. Name three commonly used sweeteners and give an example of each.
2. Describe what is meant by a colloidal system.
3. What is gelatinization in the context of starch?
4. Define carbohydrates and list reasons why they are important in the human diet.
5. Explain the process of acetylation in modifying fats.
6. What is the difference between saturated and unsaturated fatty acids?
7. Write a note on essential amino acids.
8. Explain the properties of fatty acids.

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II. Write explanatory notes on any **FIVE** of the following: (5x5=25)

9. Explain the physico-chemical properties of carbohydrates.
10. Describe the phase transition of water from liquid to ice and explain the energy changes involved.
11. Discuss on the classification of amino acids.
12. Describe how denaturation affects the functional properties of proteins in food products.
13. Explain how water-soluble interactions affect the solubility of solutes in water. Provide examples.
14. Discuss the key factors that influence the Maillard reaction in foods.
15. Discuss the process of lipolysis and how it leads to the development of rancidity in fats and oils.
16. Discuss secondary and tertiary structure of proteins.

III. Answer any **TWO** of the following: (2 x10=20)

17. How does food chemistry contribute to the development of processed foods?
18. Explain the roles of different hydrocolloids such as xanthan gum, guar gum, carrageenan, algin, pectin's and starch in food processing.
19. Analyze the processes of acetylation and interesterification and explain how they modify the functional properties of fats and oils in the food industry. Provide examples of food products that use these modified fats.
20. Discuss the classification, properties and functions of fatty acids and lipids in detail.

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**Principles of Food Processing and Preservation**

Time: 2 ½ hrs.

Max Marks: 60

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary.

**I. Write short notes on any FIVE of the following. (5x3=15)**

1. What is water activity? What are intermediate moisture food?
2. What is deep frying?
3. What are the advantages and limitations of sun drying?
4. List the names of microorganism that are of safety concern in foods.
5. What is the principle of hypobaric storage?
6. What is membrane filtration?
7. List the principles of hurdle technology.
8. Name three types of packaging materials designed for processed foods.

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**II. Write explanatory notes on any FIVE of the following: (5x5=25)**

9. Describe the changes that occur in food during dehydration.
10. What are the different types of freezers and state their principles?
11. Discuss the working mechanism and applications of ohmic heating in the food industry.
12. Differentiate between quick and slow freezing.
13. What are the effects of microbial spoilage on food quality and safety?
14. Discuss the advantages and limitations of ultrasound treatment in food processing.
15. Explain the principles of refrigeration and how it is used in food preservation.
16. Compare salting and smoking as food preservation methods.

**III. Answer any TWO of the following: (2 x10=20)**

17. Describe the canning process as a method of food preservation, and discuss its principles and steps.
18. Discuss in detail the different types of dryers used in the food industry and their specific applications.
19. Discuss in detail about frozen food transportation.
20. Explain in detail about food irradiation.

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**Semester I – P.G. Examination –M.Sc. Food Science Nutrition and Dietetics  
November - 2024**

**Macronutrients in Human Nutrition**

Time : 2 ½ Hours

Max. Marks : 60

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary.

**I. Write short notes on any FIVE of the following.**

(5x3=15)

1. Compare the energy needs during pregnancy and lactation.
2. Give the RDA of energy needed by elderly population with sources.
3. Name the primary enzyme and their role in fat digestion.
4. Define the terms "conditionally essential" amino acids with example
5. Write a note on factors that influence TEF.
6. What are Branched chain amino acids?
7. Write a note on NPU and BV.
8. Energy requirements are estimated based on which factors?

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**II. Write explanatory notes on any FIVE of the following**

(5x5=25)

9. Analyze the mechanisms by which LDL is taken up by cells and how would dietary components enhance this pathway?
10. How do economic factors such as poverty and inequality contribute to global malnutrition, and what strategies can be implemented to address these challenges?
11. What is Amino Acid Scoring and how is it calculated?
12. Compare and contrast prebiotic and probiotics
13. Discuss the synthesis and  $\beta$  - oxidation of Fatty acids.
14. Create a flowchart illustrating the journey of a dietary fat molecule from ingestion to its incorporation into cells.
15. How does the body utilize amino acids for energy production during periods of fasting?
16. Explain the different types of fibres with mentioning their food sources.

**III. Answer any TWO of the following:**

(2x10=20)

17. Discuss the consequences of long term diabetes.
18. Review the metabolism of amino acids.
19. Discuss the role of Triglycerides and Cholesterol in development of CVD.
20. Discuss the deliberations on the DIAAS method of protein quality evaluation over the PDCAAS method.

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**Semester I – P.G. Examination – M.Sc. Food Science Nutrition and Dietetics  
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**Human Physiology**

Time : 2 ½ Hours

Max. Marks : 60

**Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary.**

**I. Write short notes on any FIVE of the following. (5x3=15)**

1. Name the segment of the small intestine where most nutrient absorption occurs.
2. List the main characteristics of cancer cells, including uncontrolled growth and division.
3. Describe the structure of a neuron.
4. How does the skin contribute to maintaining internal temperature?
5. Describe the process of erythropoiesis.
6. Sketch the main parts of the renal corpuscle
7. What role does the nucleus play in cellular activities?
8. What is the difference between oxygenation and ventilation?

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**II. Write explanatory notes on any FIVE of the following (5x5=25)**

9. Apply your knowledge of muscle physiology to explain muscle contraction
10. Explain the process of vaccine-induced immunity.
11. Explain the effects of sleep deprivation on hypothalamic function
12. Describe the mechanisms of appetite regulation, including the roles of leptin and ghrelin
13. Discuss how blood indices can be used to diagnose different types of anemia.
14. Discuss the importance of omega-3 fatty acids in cardiovascular health.
15. Discuss the role of bicarbonate in maintaining pH.
16. Discuss the stages of the inflammatory response and their significance.

**III. Answer any TWO of the following: (2x10=20)**

17. Evaluate the role of WBC activation and anti-body production in the prevention of auto-immune diseases.
18. Discuss the physiology of stress hormones and their effects on the body. Analyze the consequences of chronic stress.
19. Critically assess the impact of dietary changes on the secretion of digestive enzymes and overall digestive health
20. Analyze the effects of genetic disorders on erythropoiesis (e.g., thalassemia, sickle cell disease).

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**Semester I – P.G. Examination –M.Sc. Food Science Nutrition and Dietetics  
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**Micronutrients in Human Nutrition**

Time : 2 ½ Hours

Max. Marks : 60

**Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary.**

**I. Write short notes on any FIVE of the following.**

(5x3=15)

1. Define Uni port, Symport and antiport. Give examples.
2. What are the different forms of iron the human body and its role.
3. Explain the role of copper in enzymatic reactions in the body.
4. With an example explain why carotene act as act as pro-oxidant under high partial pressure of oxygen?
5. How is vitamin K involve in growth and development? Mention its deficiency.
6. Write the concept of balance studies in nutrient bioavailability.
7. What is retinol binding protein?
8. Write a short note on the water balance.

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**II. Write explanatory notes on any FIVE of the following**

(5x5=25)

9. Discuss the interaction of Vitamin A with certain drugs and other nutrient.
10. Evaluate the relation of Vitamin K to bone and cardiovascular health.
11. Discuss the Wilsons disease and Menkes disease.
12. Discuss the metabolic role and deficiency of Vitamin - C.
13. Discuss the role of potassium in the prevention of conditions like stroke and kidney stones.
14. Explain in detail the sodium reabsorption process.
15. The formation of Acetyl CoA is highly dependant on B5 as a co-enzyme. Elucidate the pathways to justify the statement.
16. What are electrolytes? Explain its functions.

**III. Answer any TWO of the following:**

(2x10=20)

17. Illustrate and explain the metabolism of iodine in enterocyte and thyroid gland.
18. THIAMINE in its Co-enzyme forms is crucial in the metabolism of macro-nutrients. Explain.
19. Explain the factors affecting the bioavailability of micronutrients.
20. Illustrate and explain the metabolism of a) Calcium b) Folic acid.

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