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Roll No. | | | | | | | | | | |

S. No. of Question Paper : **5703**

Unique Paper Code : **2173012017**

Name of the Paper : **DSE : Basic Principles of Food Chemistry**

Name of the Course : **B.Sc. (Hons.) Chemistry**

Semester : **IV/VI**

Duration : **3 Hours** Maximum Marks : **90**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any *six* questions.

All parts of a question should be attempted together.

Each question carries **15** marks.

1. (*a*) Water activity has profound influence on the rate of many chemical reactions in food :

   (*i*) Define water activity (a_w).

   (*ii*) Explain the significance of a_w for food preservation.

   (*iii*) How does a_w influence lipid oxidation ? Explain it using suitable curve.

   (*b*) Write their functions and importance in food chemistry. Also give examples :

   (*i*) Antioxidants

   (*ii*) Emulsifiers.

P.T.O.

(c) Proteins are the common constituents of all biological materials without which life is not possible. Explain the following in context of proteins :

(i) Iso-electric point and its significance

(ii) Salting In and Salting Out. 5,5,5

2. (a) What do you understand by interesterification of lipids ? Differentiate between chemical and enzymatic interesterification.

(b) Write short notes on the following :

(i) Water soluble and insoluble vitamins.

(ii) Food Fortification and enrichment of foods with minerals.

(c) Give an example of the following, along with the structure and sources :

(i) Carotenes

(ii) Xanthophylls. 5,5,5

3. (a) What are nutritive and non-nutritive sweeteners ? Give *two* examples of each with their structure.

(b) Discuss the mechanism of taste and odour perception.

(c) Autoxidation of lipids leads to food spoilage and potential health risks. Explain. 5,5,5

4. (a) Differentiate between :

(i) Simple Lipids and Compound Lipids

(ii) Enzymatic and non-enzymatic browning.

(*b*) How the structure of water has different features, which makes it unique in terms of food chemistry ?

(*c*) What do you understand by lake dyes ? What are their advantages over normal food colours ? 5,5,5

5. (*a*) Explain the significance of food preservatives in food chemistry and describe their impact on shelf life and food quality.

(*b*) Elucidate the importance of the following polysaccharides in food chemistry :

(*i*) Agar

(*ii*) Gums.

(*c*) What do you understand by the rancidity of oil ? Distinguish between hydrolytic and oxidative rancidity. 5,5,5

6. (*a*) Explain the formation of acrylamide in food. What are its health implications ?

(*b*) Discuss various methods used for the determination of moisture in food.

(*c*) Classify proteins on the basis of composition, shape and solubility giving appropriate examples. 5,5,5

7. (*a*) Hydrogenation of fats and oils is an important chemical process. Explain the following in context to lipids :

(*i*) Significance of hydrogenation in food industry.

(*ii*) Drawbacks of this process.

(*b*) Enlist the food sources, physiological roles and food applications of the following minerals :

(*i*) Calcium

(*ii*) Phosphorous

(*iii*) Magnesium.

(*c*) What is protein denaturation and how can it be measured ? What role does it play in food processing ? 5,5,5

8. (*a*) Discuss the chemical dimension of tastes. Mention the taste or sensation associated with the following :

(*i*) Menthol

(*ii*) Black pepper

(*iii*) Tomato

(*iv*) Soda water

(*v*) Caffeine.

(*b*) Colour is the first sensory quality by which foods are judged. Explain the statement with relevant examples of food colorants used frequency.

(*c*) How do food additivies play a crucial role in taste modification and enhancement, influencing flavour profile and overall sensory experience of food ? 5,5,5