BACHELOR OF ENGINEERING IN FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING EXAMINATION, 2023

(2nd Year, 1st Semester)

FOOD CHEMISTRY

Time : Three hours | Full Marks : 100

(50 Marks for each Part)

(Use separate answer script for each Part)

PART I (50 Marks)

ANSWER Q1 AND ANY TWO FROM THE REST

Q1. a. Explain protein gelation with special emphasis on its stabilizing factors and the intrinsic water types associated with the protein structure. How would you quantify limiting amino-acids in a protein-rich food? **8 + 5**

b. How is selectivity governed during hydrogenation of oleic-acid rich oils? How does nutritional profile and storage-stability of these oils change during hydrogenation? **5 + 2**

Q2. **a.** How are PER, BV and NPU values of milk protein analyzed? **3 × 5 = 15**

b. The 'water binding' and 'swelling' capacities of soya flour would be influenced by types of water surrounding the protein in the flour. Identify and define those water types.

c. Considering SFA, MUFA and ω-3/ω-6 PUFA contents, storage-stability criteria and the data given below, recommend oils suitable as summer and winter oils.

Oil	Smoke point (°C)	Flash point (°C)	Fire point (°C)
Corn, crude	178	294	356
Corn, refined	227	326	359
Linseed, refined	160	309	360
Olive, virgin	199	321	361
Soybean, crude	210	317	354

Q3. Write short notes on (any two): **2 × 7.5 = 15**

a. Importance of evaluating RM, K and P values for edible fats and oils with examples

b. Fats display slip melting point and its relation to occurrence of fat blooms

c. Ranking of commonly consumed vegetable oils based on their SFA, MUFA and ω-3/ω-6 PUFA contents, and their storage-cum-stability criteria

Q4. Differentiate between (any 3): **3 × 5 = 15**

a. True fat vs. Crude fat

b. Hydrolytic vs. Oxidative rancidity

c. Denaturation vs. Proteolysis

d. Prooxidants vs. Antioxidants

e. TD vs. co-efficient of protein digestibility

Ref. No. : Ex/FTBE/BS/B/T/213/2023

B.E (FTBE) 2ND YEAR-1ST SEMESTER 2023

Food Chemistry

Part II

(50 Marks)

Answer any five questions from the following: 5x10

1. Define carbohydrate. Give one example each of monosaccharide, reducing disaccharide, non reducing disaccharide and polysaccharide. Explain Molish Test for identification of carbohydrates. 2+4+4

2. Differentiate between:
   a) amylose and amylopectin.
   b) starch and cellulose 5+5

3. What is pectin? What are the factors affecting gel formation? What is meant by 100 grade pectin? 3+5+2

4. Comment on sources, functions and uses of Anthocyanin. Give one example of water soluble pigment. 2+5+2+1

5. Mention two examples of fat soluble vitamins. State the sources, functions and deficiency problem of vitamin E. 2+2+4+2

6. What are the sources and functions of Calcium, Potassium and Iodine. 4+3+3

7. Write short notes on any two of the following: 2x5
   a) Gelatinization and retrogradation of starch
   b) Betalain
   c) Seliwanaff's test