

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

**THIRD YEAR SECOND SEMESTER EXAMINATION FOR THE AWARD OF  
DEGREE OF BACHELOR OF SCIENCE IN FOOD SCIENCE AND  
TECHNOLOGY**

**FOST 345: EDIBLE FATS AND OILS**

**STREAMS: BSC. FOST**

**TIME: 2 HOURS**

**DAY/DATE: WEDNESDAY 07/07/2021**

**8.30 A.M. – 10.30 A.M.**

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**SECTION A – 30 MARKS – Answer all questions**

1. A fat is an ester of a glycerol and fatty acid. Using a diagram illustrate the basic structure of a fat molecule. (4 marks)
2. Explain any 3 characteristics of fatty acids that may affect the properties of different fats and oils. (6 marks)
3. Explain the differences in fats obtained from the following sources. (3 marks)
  - (i) Land animal fats
  - (ii) Marine oils
  - (iii) Vegetable oils
4. Seed oils can be extracted by pressing, an auger is an equipment used in this process. Using a diagram explain the working principle of an auger. (6 marks)
5. a) Explain how a deodorization unit works in crude oil refining. (5 marks)  
b) During hydrogenation 4 different side reactions occur, explain them. (2 marks)

6. Explain the difference between Alcoholysis and Acidolysis in chemical modification of fats. (4 marks)

**SECTION B – Answer any two questions (40 marks)**

7. a) Discuss the nutritional and technological properties of fats. (10 marks)
- b) With the aid of a diagram, discuss the production of oils from seeds (E.G. Soybeans). (8 marks)
- c) The following is a naming system of fatty acid. From the formula identify the number of carbon atoms, double bonds and the location of the first double bond from the methyl end of the fatty acid molecule. (2 marks)
- C18:3 n-6 (all Cis)
- C10:1 n-3 (trans)
8. a) Crude oil refining has several processes. Explain the processing steps involved in this technology. (8 marks)
- b) Solvents are commonly used in extraction of fats and oils. Discuss the main characteristics to consider when choosing a suitable solvent in extracting edible fats. (6 marks)
- c) Polyunsaturated fatty acids (PUFAs) can further be categorized into 3 different groups. State and explain the differences between these groups. (6 marks)
9. Describe the following chemical modification processes of fats. (8 marks)
- (i) a) Alkaline hydrolysis
- b) Winterisation
- c) Interesterification
- d) Hydrogenation
- (ii) Differentiate between butter and margarine. (4 marks)
- (iii) Explain the procedure for Margarine manufacture. (8 marks)
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