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University Examinations 2012/2013

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY

AFS 2211: FUNDAMENTALS OF FOOD CHEMISTRY

DATE: APRIL 2013 **TIME: 2 HOURS**

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE – 30 MARKS

a. List two types of phospholipids commonly found in foods. (1 Mark)
b. Discuss the hydrophobicity of amino acids. (2 Marks)
c. Discuss the principle behind:
   i. Calorimetric determination of amino acids. (4 Marks)
   ii. Using examples, reducing of amino acids. (4 Marks)

d. Show the primary structure of a protein. (3 Marks)
e. Describe the helical structure of a protein. (3 Marks)
f. Describe a fatty acid. (1 Mark)
g. Describe retrogradation and staling. (1Mark)
h. List two chiral atoms for glucose and fructose. (2 Marks)
i. With examples, discuss monosaccharide isomerisation. (2 Marks)
j. Discuss moisture sorption and desorption within the context of hysteresis. (2 Marks)
k. Describe the three zones in moisture sorption isotherms. (MSI) (2 Marks)
l. Moisture content is the most appropriate determination of food stability. Mention why or why not. (2 Marks)
m. Draw the structure of maltose. (1 Mark)

QUESTION TWO – 20 MARKS

a. With examples describe the difference between saturated and unsaturated fatty acids. (4 Marks)
b. Which fats are most abundant and are found mainly in vegetables. (2 Marks)
c. Describe lipids polymorophism and polymorphism behaviour in commercial fats. (4 Marks)
d. Discuss factors which influence lipid consistency. (3 Marks)
e. How does the general characteristics of the autoxidation reaction. (4 Marks)
f. List the general characteristics of the autoxidation reaction. (3 Marks)

QUESTION THREE – 20 MARKS

a. Describe cholesterol oxidation. (3 Marks)
b. How are dimmers and polymers formed? (2 Marks)
c. Discuss the following:
    i. Addition of free radicals to double bonds. (1 Mark)
    ii. Enzyme catalysed oxidation of lipids. (2 Marks)
    iii. Lipid oxidation in mixed lipid complex systems. (2 Marks)
d. How would lipid oxidation be influenced by the presence of non lipid substances (3 Marks)
e. List the factors affecting lipid oxidation in foods. (6 Marks)

QUESTION FOUR – 20 MARKS

a. Describe a pro-oxidant. (4 Marks)
b. Discuss the following methods for measurement of lipid oxidation. (2 Marks)
    i. Peroxide value (6 Marks)
    ii. Thiobarbituric acid test. (6 Marks)
    iii. Total and volatile carbonyl compounds. (4 Marks)

QUESTION FIVE – 20 MARKS

a. What is the man disadvantage of using ash to estimate minerals in foods? (1 Mark)
b. Mineral composition of foods is not influenced by fertility of the soil. Explain why or why not. (2 Marks)
c. List two polyphenolic compounds which inhibit nonheme iron form absorption. (2 Marks)
d. Describe bioavailability of foods giving examples. (2 Marks)
e. Draw the structure of B-carotene (1 Mark)
f. List two limiting amino acids in plant proteins. (2 Marks)
g. Describe enzyme hydrolysis of food proteins. (2 Marks)
h. Discuss phosphorylation of food proteins. (2 Marks)
i. Describe acylation of amino crops with the help of chemical structures.
j. (2 Marks)
k. With the help of structure(s), describe how alkylation occurs. (2 Marks)
l. How does protein react with amines? (2 Marks)