2ND SEM. 2016/17

UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER MARKING GUIDE

PROGRAMME : FOOD SCIENCE, NUTRITION AND TECHNOLOGY YEAR II

COURSE CODE : FNS 102

TITLE OF PAPER : FOOD CHEMISTRY

TIME ALLOWED : TWO (2) HOURS

INSTRUCTIONS : ANSWER QUESTION ONE (1) AND ANY OTHER TWO (2) QUESTIONS.

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QUESTION 1 (COMPULSORY)

(a) What is a dispersion? Give **three (3)** types of dispersions and a food example in each type.

(9 Marks)

(b) What is water activity (A_w)? Give **three (3)** ways to lower the water activity of food.

(6 Marks)

(c) What is soft water and hard water?

(8 Marks)

(d) Draw the chemical structure of the following sugars and name the glycosidic bond between the sugar units. Also explain their occurrence in food.

a. Maltose
b. Lactose

(12 Marks)

(e) Give **two (2)** reasons for hydrogenating unsaturated oils.

(5 Marks)

[TOTAL MARKS = 40]

QUESTION 2

(a) Differentiate between interesterification and intraesterification. Why is it an important reaction?

(6 Marks)

(b) Draw the structure of oleic acid (9-octadecenoic acid). What is its omega name?

(6 Marks)

(c) Draw a starch pasting curve and indicate the following: peak viscosity, holding strength, final viscosity, breakdown, setback and total setback.

(14 Marks)

(d) What are cyclodextrins and give **two (2)** food applications of cyclodextrins.

(4 marks)

[TOTAL MARKS = 30]

QUESTION 3

(a) Show the chemical hydrolysis reaction of triglycerides when treated with potassium hydroxide (KOH).

(8 Marks)

(b) Saturated fatty acids have single bonds between carbon atoms. With the aid of a diagram explain how single bonds are formed between two carbon atoms.

(10 Marks)

(c) What products of industrial use are produced by the reduction reaction of sugars (glucose and xylan) to alcohol? What are these products used for?

(6 Marks)

(d) Explain the following protein structures:-

i. Tertiary structure
ii. Quartenary structure

(6 Marks)

[TOTAL MARKS = 30]

QUESTION 4

(a) Lipids are classified into five classes. List the five (5) classes

(5 Marks)

(b) Show a reaction between glycerol and three fatty acids to form a triglyceride.

(8 Marks)

(c) Briefly explain the action of the following enzymes and their application in food:-

i. α-amylase
ii. β-amylase
iii. Rennet
iv. Lipase

(8 Marks)

(d) Show the reaction of glycerol under heat treatment to produce acrolein.

(9 Marks)

[TOTAL MARKS = 30]