



**2<sup>ND</sup> SEM. 2015/16**

**PAGE 1 OF 3**

**UNIVERSITY OF SWAZILAND**

**FINAL EXAMINATION PAPER**

**PROGRAMME : FOOD SCIENCE, NUTRITION AND TECHNOLOGY YEAR I**

**COURSE CODE : FNT 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) Explain the different types of food dispersions, giving a food example in each type. (14 Marks)
- (b) Explain why water is polar, how its molecules form a three dimensional, why its viscosity is low and what type of substances can it dissolve. Include diagrams. (10 Marks)
- (c) Draw the structure of 9, 12 Octadecadienoic acid. (4 Marks)
- (d) Draw the structure of the following sugars and name the glycosidic bond in the disaccharides:-
- i.  $\alpha$ -D-Glucose (2 Marks)
  - ii.  $\beta$ -D-Galactose (2 Marks)
  - iii. Maltose (4 Marks)
  - iv. Cellobiose (4 Marks)
- [TOTAL MARKS = 40]

**QUESTION 2**

- (a) Calculate the boiling point of water containing 3.5% (by weight) dissolved sodium chloride (NaCl), given that the molecular weight of NaCl is 58.5 moles/g, the boiling point elevation constant of water is  $0.51^{\circ}\text{C}$  and the boiling point of pure water in Swaziland is  $98^{\circ}\text{C}$ . (8 Marks)
- (b) Show how lipase can cleave all three fatty acids from a triglyceride during lipolytic rancidity. (10 Marks)
- (c) Explain the composition of starch stating the monosaccharide units and type of bonds between the units. (12 Marks)

[TOTAL MARKS = 30]

**QUESTION 3**

- (a) Discuss the role of fat in baking of pastry, cake and bread. (12 Marks)
- (b) What is starch gelatinization? (6 Marks)
- (c) Explain **five (5)** factors that may be responsible for the variation in vitamin content of foods. (12 Marks)

**[TOTAL MARKS = 30]****QUESTION 4**

- (a) Discuss the effect of heat on fats resulting in the formation of acrolain. Give equation for the chemical reaction. (10 Marks)
- (b) Explain the Maillard reaction. Under what **two (2)** conditions does it occur in food? (6 Marks)
- (c) Briefly discuss the application of pectin degrading enzymes in the food industry? (4 Marks)
- (d) Explain **five (5)** forces that are responsible for the tertiary structure of proteins. (10 Marks)

**[TOTAL MARKS = 30]**