

1ST SEM. 2018/19

UNIVERSITY OF ESWATINI



FINAL EXAMINATION PAPER

PROGRAMME: BACHELOR OF SCIENCE IN FOOD SCIENCE, NUTRITION, AND TECHNOLOGY;
BACHELOR OF SCIENCE IN CONSUMER SCIENCE;
BACHELOR OF SCIENCE IN CONSUMER SCIENCE EDUCATION.

COURSE CODE: FNS205

TITLE OF PAPER: FOOD SCIENCE

TIME ALLOWED: TWO (2) HOURS

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

DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE CHIEF INVIGILATOR.

QUESTION 1 (COMPULSORY)

THERE IS ONLY ONE CORRECT ANSWER PER QUESTION. CHOOSE THE CORRECT ANSWER AND WRITE THE QUESTION NUMBER AND YOUR ANSWER CHOICE ON THE ANSWER SHEET. For example, if the answer for number 1 is "a" then you should write "1. a" on your answer sheet.

1. Fats and oils are constructed of building blocks called "triglycerides" resulting from the:
 - a. Combination of one unit of glycerol and three units of fatty acids
 - b. Combination of three units of glycerol and one unit of fatty acids
 - c. Combination of one unit of fat and three units of oils
 - d. b and c
 - e. All of the above
2. A saturated fatty acid contains:
 - a. 2-12 double bonds
 - b. No double bonds
 - c. One double bond
 - d. a and c
 - e. None of the above
3. Disaccharides consist of two monosaccharide units joined together. They include:
 - a. Lactose, maltose, glucose,
 - b. Lactose, maltose, galactose
 - c. Lactose, maltose, sucrose
 - d. Lactose, maltose, fructose
 - e. All of the above
4. A carbohydrate with an aldehyde as its carbonyl unit is called an (a):
 - a. Ketose
 - b. Aldehyde
 - c. Ketone
 - d. a and c
 - e. Aldose
5. When a hydroxyl reacts with a hydroxyl on another monosaccharide, a _____.
 - a. Glycosidic bond breaks
 - b. Hydrolysis bond forms
 - c. a only
 - d. Glycosidic bond forms
 - e. All of the above
6. Starch is a mixture of:
 - a. 2% amylose and 8% amylopectin
 - b. 80% amylose and 20% amylopectin

- c. 20% amylose and 80% amylopectin.
 - d. All of the above
 - e. None of the above
7. _____ is a process whereby the hydrophilic groups in the starch molecule start imbibing or taking up moisture, when the granule is suspended in water.
- a. Retrogradation
 - b. Emulsification
 - c. Condensation
 - d. Gelatinization
 - e. None of the above
8. _____ are found universally in the primary cell wall and intercellular layers in plants.
- a. Gums or gum substances
 - b. Pectin or pectin substances
 - c. Hydrocolloids
 - d. a and b
 - e. All of the above
9. The amino acids in a polymer chain are joined together by the _____ between the carboxyl and amino groups of adjacent amino acid residues.
- a. Glycosidic bonds
 - b. Peptide bonds
 - c. Carbon bonds
 - d. Polymer bonds
 - e. All of the above
10. _____ occurs because the bonding interactions responsible for the secondary structure (hydrogen bonds to amides) and tertiary structure are disrupted.
- a. Denaturation
 - b. Synthesis
 - c. Retrodegradation
 - d. Foaming
 - e. Emulsification
11. _____ are a group of complex organic compounds, generally required in the diet in small amounts for normal growth and maintenance of health.
- a. Emulsifiers
 - b. Enzymes
 - c. Organic acids
 - d. All of the above
 - e. Vitamins

12. _____ are biological catalysts that promote a wide variety of biochemical reactions.

- a. Emulsifiers
- b. Enzymes
- c. Organic acids
- d. All of the above
- e. Vitamins

13. _____ foods are by far the major source of energy, protein, B vitamins, and minerals for the world population.

- a. Fat-based
- b. Protein-based
- c. Cereal-based
- d. a and b
- e. All of the above

14. The loss of vitamins in cooking may come from destruction by heat or by _____ as well as loss in the discarded cooking water.

- a. Degradation
- b. Preparation
- c. Precipitation
- d. Oxidation
- e. None of the above

15. Meat tenderizes during storage as a result of the action of _____ on the tissues.

- a. Proteolytic enzymes
- b. Denaturation enzymes
- c. Pectinase enzymes
- d. b and c
- e. All of the above

16. _____ is a complex mixture of lipids, carbohydrates, proteins and other organic and inorganic acids dispersed in water.

- a. Tea
- b. Yoghurt
- c. Coffee
- d. Juice
- e. Milk

17. _____ this reaction occurs when sugars are treated under anhydrous condition with heat or at high concentration with dilute acid.

- a. Browning
- b. Caramelization
- c. Oxidation
- d. Reduction
- e. None of the above

18. The changes that occur to meat during cooking include:

- a. Protein denaturation
- b. Caramelization
- c. Maillard reactions
- d. All of the above
- e. None of the above

19. _____ can be defines as "any ready-to-eat food that will support the growth of pathogenic bacteria easily and does not require any further heat treatment or cooking".

- a. Medium-risk foods
- b. Low-risk foods
- c. High-risk foods
- d. No-risk foods
- e. All of the above

20. Food poisoning, also called foodborne illness, is any illness caused by eating _____ food.

- a. Dirty food
- b. Toxic food
- c. Spoiled
- d. Contaminated
- e. All of the above

(20x2=40 Marks)

[TOTAL MARKS=40]

QUESTION 2

Instructions: Fill-in the correct word(s) and select the correct response to the following statements.

1. Knowledge of food constituents and their properties is the centre of food science.
a. True b. False
2. Saturated fatty acids can exist in either the cis or trans form depending on the configuration of the hydrogen atoms attached to the carbon atoms joined by the double bonds.
a. True b. False
3. In a hazard analysis, you identify any food safety hazards and the preventive measures you can use to control the hazards.
a. True b. False
4. Food hygiene is the conditions and measures necessary to ensure the safety of food from production to consumption.
a. True b. False
5. Hydrogenation was developed as a result of the need to: (1) convert liquid oils to semi-solid form and (2) increase the oxidative and thermal stability of fat or oil.
a. True b. False
6. _____ is the application of the basic sciences (physics, chemistry and biology) and engineering to study the fundamental physical, chemical and biochemical nature of foods and the principles of food processing.
7. _____ include sugars, starches, cellulose and other compounds that generally originate from plants which are a major class of food for most animals.
8. Ordinary table sugar, sucrose, $C_{12}H_{22}O_{11}$ is a disaccharide that can be broken up, through _____, into the monosaccharides glucose and fructose.
9. _____ is a chemical process by which 2 molecules are joined together to make a larger, more complex, molecule, with the loss of water.

10. Both plants and animals have enzymes that hydrolyse starches to glucose. There are two enzymes known as _____ and _____ which are involved in the hydrolysis of starch.
11. Amino acids in a polymer chain are joined together by _____ bonds between the carboxyl and amino groups of adjacent amino acid residues.
12. These are _____ soluble vitamins (B-complex and Vitamin C) and _____ soluble vitamins (A, D, E, K).
13. _____ reaction is widespread in foods and it is a chemical and or biological reaction that alters the appearance, flavour and nutritive value of food.
14. Fermentation is the breakdown of food components by the action of _____ contained in microorganisms leading to chemical and physical changes in the food.
15. _____ browning reaction is a biological reaction that takes place in many food materials like fruits and vegetables when their tissues are subjected to mechanical injury or exposed to due to cutting and peeling.

(15x2=30 Marks)

[TOTAL MARKS=30]

QUESTION 3

- A. What are carbohydrates? (2 Marks)
- B. Where do carbohydrates originate or come from? (2 Marks)
- C. Name the TWO main types of carbohydrates and give food examples for each type. (2 Marks)
- D. Discuss the classification of carbohydrates, providing detailed information on the different classes/subclasses, including definitions, characteristics, and food examples. (24 Marks)

[TOTAL MARKS=30]

QUESTION 4

A. Discuss the application of protein functionality in foods, during:

- I. Emulsification
- II. Maillard browning

(2x4=8 Marks)

B. Discuss any FOUR factors affecting physical characteristics of fats and oils.

(4x4=16 Marks)

C. Discuss the uses of enzymes during the following food processes:

- I. Enzymes in bread making
- II. Enzymes in cheese production
- III. Meat tenderizing enzymes

(3x2=6 Marks)

[TOTAL MARKS=30]
