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**UNIVERSITI TUN HUSSEIN ONN
MALAYSIA**

**FINAL EXAMINATION
SEMESTER I
SESSION 2013/2014**

COURSE NAME : FOOD BIOCHEMISTRY
COURSE CODE : BWD 20103
PROGRAMME : 2BWD
EXAMINATION DATE : DECEMBER 2013/JANUARY 2014
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL **FIVE (5)**
QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) Proteins are complex molecules that help human body perform a wide variety of biological functions. List down **five (5)** types of proteins according to function. (5 marks)
- (b) Give the **five (5)** common classifications used to differentiate each amino acid. (5 marks)
- Q2** (a) Quality products for consumers are basically produced in the fields, but the quality of these products are maintained and even enhanced during the post-harvest period. Describe **two (2)** important post-harvest innovations related to manipulation of the environment around the produce. (5 marks)
- (b) Both fruit ripening and senescence are important aspects of post-harvest which are initiated by internal and environmental factors. Explain the mechanism involve, which is most common to both. (5 marks)
- (c) The demand for chevon has increased dramatically in recent years due to its characteristics particularly attractive to health conscious consumers. What is chevon? Explain the characteristics that make this product attractive to consumers. (5 marks)
- Q3** (a) During postharvest handling and storage, fresh fruits and vegetables lose moisture through their skins via the transpiration process. Commodity deterioration, such as shriveling or impaired flavor, may result if moisture loss is high. Provide **five (5)** practical solutions appropriate in order to minimize losses due to transpiration. (5 marks)
- (b) The freshness of meat is one of the important qualities that consumers look for in meat products. Explain how the freshness of meat is judged in terms of physical attributes. What is/are the main characteristic(s) to look for in fresh meat? (5 marks)
- (c) Milk spoilage can be detected visually by the presence of coagulated curd.
- (i) Explain the chemical mechanisms responsible for coagulation in this case. (3 marks)
- (ii) Is the curd resulting from spoilage the same as that you have obtained from home-made cheese? (1 marks)

(iii) If they are the same, why would you consume cheese but not spoiled milk?

(1 marks)

(d) Due to the health problems associated with trans fats, the food industry has come up with an innovative solution, a process called interesterification. Describe the process involve in this innovative solution.

(5 marks)

Q4 (a) The nutrient value of food can be changed by the way it is processed, cooked and stored. While food processing may destroy the water-soluble B-group and C vitamins, processing and cooking food can also make it safer to store and eat. Outline the different techniques used in food processing and describe the implications of each method on the nutritional components of the food being processed.

(15 marks)

(b) Enzymatic browning is one of the most important colour reactions that affect fruits, vegetables and seafood. Compare and contrast the economics of enzymatic browning of fruits, vegetables and aquatic food harvest.

(15 marks)

(c) In food industry, enzyme has been used to produce and to increase the quality and the diversity of food. In addition, enzymes offer potential for many exciting applications for the improvement of foods. Differentiate the major enzymes according to their application in food industry.

(15 marks)

Q5 (a) There are several procedures to be followed in meat fermentation. Particularly, in fermented sausage production, five important processing stages must be followed in sequence. Evaluate the process listed below and determine if the stages presented are in proper order. If not, rearrange the processing stages accordingly, or as necessary and explain why the stages has to be followed in such order.

Processing stages	Description
Stuffing	The mixture is stuffed under vacuum into casings—natural, collagen-based, or synthetic—with both extremes clipped. The vacuum avoids the presence of bubbles within the sausage and disruptions in the casing.
Ripening and drying	Ripening and drying are important for enzymatic reactions related to flavor development and obtaining the required water loss and thus reduction in a_w . The length of the ripening/drying period takes from 7 to 90 days, depending on many factors, including the kind

	of product, its diameter, dryness degree, fat content, desired flavor intensity, and so on.
Fermentation	In this procedure, temperature, relative humidity, and air speed must be carefully controlled in order to have correct microbial growth and enzyme action. The whole process can be considered as a lactic acid solid-state fermentation in which several simultaneous processes take place. The time required for the fermentation stage is a function of the temperature and the type of microorganisms used as starters.
Comminution	Salt, nitrate and/or nitrite, carbohydrates, microbial starters, spices, sodium ascorbate, and optionally, other nonmeat proteins are added to the ground mass, and the whole mix is homogenized under vacuum to avoid bubbles and undesirable oxidations that affect color and flavor.
Smoking	Smoking can be accompanied by heating at 60°C and has a strong impact on the final sensory properties. It has a strong antioxidative effect and gives a characteristic color and flavor to the product, which is the primary role of smoking.

(7 marks)

- (b) Characterise and group each food according to the toxin that each item naturally contains.

Food	Toxin
Green beans	Lectin (Phytohaemagglutinins)
Red kidney beans	Cyanogenic glycoside
White kidney beans	Glycoalkaloids
Potatoes	
Bitter apricot seeds	
Bamboo shoots	
Cassava	
Flaxseeds	

(3 marks)

- END OF QUESTION -