

**POLITEKNIK**  
Jabatan Pengajian Politeknik

EXAMINATION AND EVALUATION DIVISION  
DEPARTMENT OF POLYTECHNIC EDUCATION  
(MINISTRY OF HIGHER EDUCATION)

MECHANICAL ENGINEERING DEPARTMENT

FINAL EXAMINATION  
DIS 2011 SESSION

**J3281 : PRINCIPLES OF PACKAGING**

**DATE : 02 MAY 2012 (WEDNESDAY)**  
**DURATION : 2 HOURS (08:30 AM – 10:30 AM)**

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This paper consists of **FIVE (5)** pages including the front page.  
Essay ( 6 questions – answer 4 questions )

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**THE CHIEF INVIGILATOR**

**QUESTION 1**

- a. Define packaging. (4 marks)
- b. Referring to Figure 1, explain in detail the main THREE (3) functions of the primary packaging of the sandwiches. (9 marks)



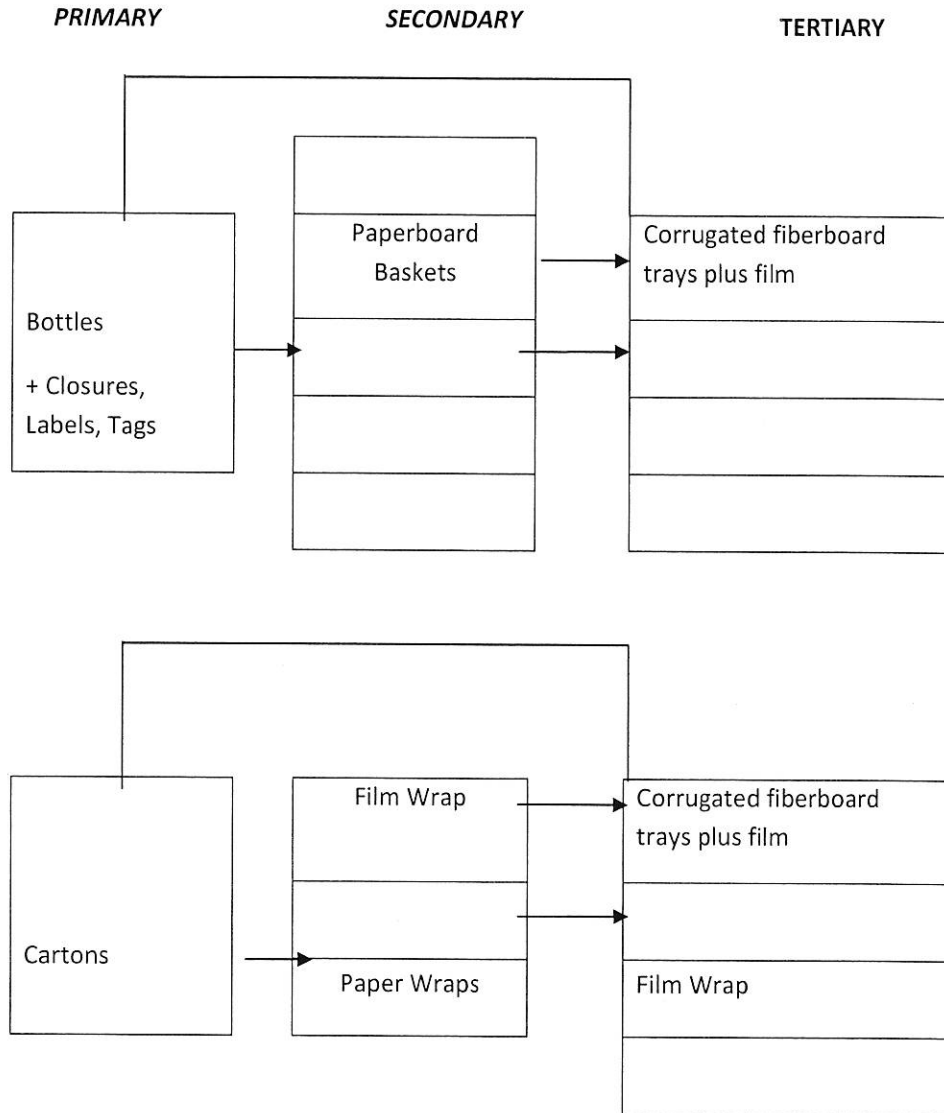
Figure 1: Sandwiches

- c. Referring to Figure 1, explain in detail FOUR (4) of the main hazards which could be encountered for the sandwiches. (12 marks)

**QUESTION 2**

- a. State FIVE (5) factors that influence the degree of thermal processing method in increasing the shelf life of food. (5 marks)
- b. State and illustrate FOUR (4) varieties of tablet shape. (8 marks)
- c. Copy and fill in the blanks for Table 1. (12 marks)

Table 1: Typical Combinations of Primary, Secondary and Tertiary Packaging.



**QUESTION 3**

- a. Define shelf life. (4 marks)
- b. Copy Table 2 and list the quantification or design requirement for each of the following conditions: (9 marks)

Table 2: Typical preservation and protective packaging problems and concerns

Condition	Quantification or Design Requirement
Oxygen	
Light	
Spoilage	
Deterioration overtime	
Vibration	
Mechanical shock	
Deformation	
Temperature	
Water	

- c. Referring to Figure 2, list and explain in detail THREE (3) of the factors that influence the shelf life of “Twisties” cheese. (12marks)

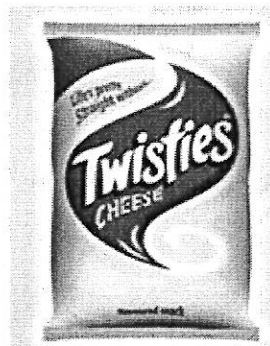


Figure 2 : Twisties Cheese

**QUESTION 4**

- a. Define secondary packaging. (4 marks)
- b. List THREE (3) characteristics of EACH class of the following packaging media:
- i) Paper (3 marks)

- ii) Glass (3 marks)
- c. Suggest ONE (1) type of packaging media for the secondary packaging of each product. Then, explain briefly the functions of the mentioned secondary packaging
- i) Perfume in glass container
- ii) 20g 3-in-1 Regular Milo in laminated flexible pouch (15 marks)

**QUESTION 5**

- a. Explain THREE ( 3 ) situation when shelf life estimation might be required. (6 marks)
- b. Give a brief explanation about THREE ( 3 ) types of Computer Models for shelf life prediction. ( 9 marks )
- c. Explain how the shipping test conducted and explain FOUR ( 4 ) equipment that used in this test. ( 10 marks)

**QUESTION 6**

- a. Give a sequential for the typical approach of packaging. ( 4 marks )
- b. Explain the system approach to distribution packaging design considers all input based on your figure. ( 9 marks )
- c. Explain the damages encountered in biological and contamination hazards. ( 6 marks )
- d. Most of the pallets are made by various materials such as wood, fiber board, metal and plastics. Explain the characteristics of the pallets that made from wood, plastic and metal. ( 6 marks )