The Irish Packaging Society
Affiliated to the Institute of Materials, Minerals and Mining

SUMMER EXAMINATIONS 2020

EXAMINATION: **UNIT 1 Fundamentals of Packaging Technology and Packaging in the Supply Chain**

COURSE: **CPD Diploma in Packaging Technology**

DATE: **13th May 2020**
10am to 12pm

EXAMINERS: Colm Munnelly, David Little

TIME ALLOWED: 2 hours

INSTRUCTIONS: Please answer four questions. All questions carry equal marks

PLEASE DO NOT TURN OVER THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO

The use of programmable or text storing calculators, smart phones etc are expressly forbidden. Please note that where a candidate answers more than the required number of questions, the examiner will mark all questions attempted and then select the highest scoring ones.

Question 1 (25 marks)

a) Briefly explain what the Industrial Revolution was **(2 marks)**
b) Describe what changed during this period compared to previous society **(7 marks)**
c) Discuss how the industrial revolution affected packaging methods. **(7 marks)**

Recovery is a broad term that can apply to i) Recycling, ii) Energy Recovery (Incineration), or iii) Composting and Biodegradation.

d) Discuss what must be considered for each of these three categories when choosing a packaging material **(3 X 3 marks)**

Question 2 (25 marks)

Packaging is produced in large quantities, particularly for the FMCG market and is shipped and displayed stacked and under compression forces. Discuss the causes of compression hazards and the effects of these hazards.

(15 marks)

List five Hazards of Distribution and briefly suggest a solution to deal with each issue.

(10 marks)

Question 3 (25 marks)

a) Define the Functions of Packaging.

(5 marks)

b) List and explain the different levels of packaging.

(10 marks)

c) Evaluate how the various levels of packaging perform the functions of packaging for their product for two of the following packs. Focus on the top 3 relevant functions, and show in order of importance. Give a brief reason for your choices.

- Large Screen TV
- Egg box for 6 eggs
- SRP for ground coffee bags
- 3 pack tins of beans

(2 X 5 marks)

Question 4 (25 marks)

a) Calculate the fragility factor, G for a glass bottle dropped from a height of 900 mm that decelerates to 0 on impact in 0.002 seconds.

Note: $v^2 = u^2 + 2as$ and $v = u + a\tau$ where:

v: final velocity (m/s)
u: initial velocity (m/s)
a: acceleration (m/s/s)
s: distance travelled (m)
τ: time taken(s)
g: acceleration due to gravity (9.81m/s/s)

(12 marks)

b) What thickness of expanded polyurethane foam (EPU) would be required to protect this cup, dropped from the same height, knowing that the cushion factor for EPU is 1.4

(3 marks)

c) What are the internal dimensions of a container required to pack this cup in EPU if the dimensions of the bottle are 90 mm in diameter and 150 mm high?

(3 marks)

d) Imagine you have been asked to hire an external test centre or laboratory to perform packaging testing. Briefly discuss the factors you would consider choosing such a centre.

(7 marks)

Question 5 (25 marks)

Understanding your product and how it will be affected by, and react to, the distribution supply chain challenges, is crucial to specifying the right level and performance of packaging.

a) Select a particular product and envision it packed and palletised ready for distribution. State the product and describe briefly, the various levels of packaging used.

(7 marks)

b) What are the key questions you must ask, to understand the challenges faced in distribution?

(18 marks)