



SUMMER EXAMINATIONS 2017

EXAMINATION: UNIT 3 Packaging Materials and Containers 2

COURSE: CPD Diploma in Packaging Technology

**DATE: 11th May 2017
10am to 12pm**

EXAMINERS: Colm Munnelly, Tony Duffy, Ron Gardiner

TIME ALLOWED: 2 hours

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

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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) Describe the polymerisation of low density polyethylene (LDPE).
(9 marks)
- b) Briefly describe two other polymerisation processes and give an example of a material made from each
(6 marks)
- c) Explain the following terms as applied to polymer characteristics.
- i. Polymer chain branching
 - ii. Crystallinity
 - iii. Orientation
 - iv. Copolymer
 - v. Thermoplastic
- (10 marks, 5 X 2 marks)

Question 2 (25 marks)

- a) Select and justify an appropriate plastic material or combination of plastic materials and manufacturing method for the packaging for the following products.
- i. Vacuum bag for large meat cut.
 - ii. Carbonated soft drink
 - iii. 1 litre of fresh milk
 - iv. Flip top closure for shampoo bottle
 - v. Oven ready meal tray (Heated at 220°C)
- (15 marks, 5 x 3 marks)
- b) Identify 5 different additives which can be added to plastics. For what applications would their use be appropriate
(10 marks, 5 x 2 marks)

Question 3 (25 marks)

- a) Laminates are often used in packaging applications. Briefly describe 3 examples of laminates being used in packaging. For each example identify the function of each layer within its structure.
(15 marks, 3 X 5 marks)
- b) Briefly describe three different methods for combining materials.
(10 marks)

Question 4 (25 marks)

- a) Describe, with the aid of a diagram where appropriate, the production of a polypropylene sheet which may be used for thermoforming trays. Start with polymer granules and end with the reeled sheet material.

(15 marks)

- b) Describe how this sheet can be thermoformed into a tray.

(5marks)

- c) Discuss how the thermoforming process alters material thickness and properties

(5 marks)

Question 5 (25 marks)

Consider a glass bottle for Carlsberg.

- a) Describe the application of a paper label to this bottle

(10 marks)

- b) Justify a suitable glue for this application process

(5 marks)

- c) Why is it important to control the Machine Direction and Cross Direction of the Label

(3 marks)

- d) Name two other methods of labelling this bottle

(2 marks)

- e) Briefly review material considerations you should review with your label supplier

(5 marks)