



PIABC LEVEL 5 DIPLOMA IN PACKAGING TECHNOLOGY

(Qualification Number: 600/0017/X)

EXAMINATION PAPER

November 2023

J/502/5923 UNIT 02

Packaging Materials and Components

Paper A

INSTRUCTIONS TO CANDIDATES

You are required to pass ALL the learning outcomes

In both Learning Outcome 1 and Learning Outcome 3 – you should answer
TWO questions from the THREE questions available

Write your answers in the answer book provided

Wherever possible, use diagrams to illustrate your answer

This is a closed book examination

This examination paper is worth 70% of the total marks for Unit 2

Examination Time: 3 Hours

Issued under the authority of the
PACKAGING ASSESSMENT BOARD
24 October 2023

INSTRUCTIONS TO CANDIDATE

You are required to answer **TWO QUESTIONS** from the following three questions only

LEARNING OUTCOME 1

Understand the properties of materials which make them suitable for packaging
(40 marks)

Question 1

- A) Liquid milk can be packed in glass bottles, high-density polyethylene (HDPE) bottles and paper based liquid cartons. Describe each pack type and evaluate its use for this application. (3 x 4 marks)
- B) A dairy produces milk in high-density polyethylene (HDPE) bottles, cream in polypropylene (PP) pots, and cheese in a polyethylene (PE)/nylon laminate flow wrap. They want to move to using a single plastic material for all products. Justify why polyethylene terephthalate (PET) is the suitable material that they should select. Highlight the problems this may cause. (8 marks)

Question 2

- A) Discuss how the selection of raw materials, additives and pulp processing can influence the characteristics of paper. (14 marks)
- B) Identify and describe how SIX paper properties can be measured. (6 x 1 mark)

Question 3

Fruit jams and preserves are often packed in glass jars.

- A) Identify the ingredients used to manufacture of a glass jar and describe their function. (6 marks)
- B) Discuss why glass is the preferred material for this type of product. (6 marks)
- C) Identify and discuss how the disadvantages of glass can be overcome. (4 marks)
- D) Fruit jams and preserves are also packed in flexible film and rigid plastics. Briefly discuss the advantages of these materials/formats for this product. (4 marks)

Turn over for the next question

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Unit 2 – Packaging Materials and Components (Paper A)
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INSTRUCTIONS TO CANDIDATE

You are required to answer this question

**LEARNING OUTCOME 2
Understand the synthesis and properties of polymers
(20 marks)**

Question 4

- A) Describe the polymerisation of Polyethylene (PE). (5 x 1 mark)
- B) Explain the following terms and discuss their effect on polymer characteristics:
- a) Orientation (2½ marks)
 - b) Tacticity (2½ marks)
 - c) Crystallinity (2½ marks)
 - d) Molecular weight (2½ marks)
 - e) Branching (2½ marks)
 - f) Co-polymerisation (2½ marks)

Turn over for the next question

**PIABC Level 5 Diploma in Packaging Technology
Unit 2 – Packaging Materials and Components (Paper A)
November 2023**

INSTRUCTIONS TO CANDIDATE

You are required to answer **TWO QUESTIONS** from the following three questions only

**LEARNING OUTCOME 3
Understand the conversion of raw materials into packaging materials
and packaging components
(40 marks)**

Question 5

- A) Describe, with the use of diagrams, the production process of a wrinkle walled foil container from an aluminium ingot to despatch of containers to the customer. (14 marks)
- B) Compare and contrast wrinkle walled foil containers versus pressed paperboard containers for take away meals. (6 marks)

Question 6

- A) Briefly describe the manufacturing process for single walled corrugated board. (9 marks)
- B) Evaluate the methods available to produce a case blank for a regular slotted case style 0201 from formed corrugated material. (5 marks)
- C) Discuss THREE common faults in corrugated cases which may be created in the box cutting, creasing and folding operations. (6 marks)

Question 7

Snack foods, such as roasted nuts, are often packed in bi-axial orientated polypropylene (BOPP) laminates.

- A) Describe the manufacture of bi-axial orientated cast extrusion polypropylene from polymer granules to reels of material. (15 marks)
- B) Describe how BOPP can be metalized. (2 marks)
- C) Discuss how metalized BOPP can be combined with other materials to produce an appropriately printed pack for a snack product. (3 marks)

END OF EXAMINATION PAPER