



# **PIABC LEVEL 5 DIPLOMA IN PACKAGING TECHNOLOGY**

(Qualification Number: 600/0017/X)

## **EXAMINATION PAPER**

**November 2019**

**J/502/5923 UNIT 02**

**Packaging Materials and Components**

**Paper A**

### **INSTRUCTIONS TO CANDIDATES**

You are required to pass **ALL** the learning outcomes

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

Reading Time: 5 minutes

Examination Time: 3 Hours

**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**

(This learning outcome is worth 40% of the marks for this paper)

**Question 1**

For each of the following packed products; discuss the suitability of the given material:

- A) An injection blow moulded polyethylene terephthalate (PET) bottle to contain washing up liquid. (4 x 1 mark)
- B) A polyamide/polyethylene (PA/PE) film to vacuum pack meat. (4 x 1 mark)
- C) High density polyethylene extrusion (HDPE) blow moulded bottle to contain bleach. (4 x 1 mark)
- D) A thermoformed sheet of crystalline polyethylene terephthalate (CPET) for a ready meal. (4 x 1 mark)
- E) Metallised biaxially orientated polypropylene (BOPP) film for the packaging of nuts. (4 x 1 mark)

**Question 2**

- A) List the ingredients used in the manufacture of glass bottles to pack a UV sensitive product (6 x ½ mark) and explain how they affect the properties of the glass (6 x ½ mark).
- B) Discuss why glass is the material of choice for packing perfume. (8 x 1 mark)
- C) The pharmaceutical industry classifies glass as I, II and III; describe the differences and applications of these types. (3 x 2 marks)

**Question 3**

- 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)

**INSTRUCTIONS TO CANDIDATE**

**You are required to answer this question**

**Learning Outcome 2**  
**Understand the synthesis and properties of polymers**  
(This learning outcome is worth 20% of the marks for this paper)

**Question 4**

- A) Describe what a polymer is. (2 marks)
- B) Describe, with use of diagrams, the polymerisation process for the production of low density polyethylene (LDPE). (10 marks)
- C) Explain how each of the following affects the properties of a polymer:
- Copolymerisation (2 marks)
  - Chain branching (2 marks)
  - Choice of monomer(s) (2 marks)
  - Glass Transition Temperature (2 marks)

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Unit 2 – Packaging Materials and Components (Paper A)  
November 2019**

**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**  
(This learning outcome is worth 40% of the marks for this paper)

**Question 5**

- A) Briefly describe FOUR different types of materials used to make rigid metal packaging and their typical applications. (4 x 2 marks)
- B) Describe, with the aid of a diagram, the manufacture of the body of a printed 3 piece metal can from receipt of unprinted reels of metal to despatch of cans for a retorted food product. Detailed description of the printing process is not required. (12 marks)

**Question 6**

- A) Describe, with the aid of diagrams, the manufacture of a coloured extrusion blow moulded plastic container to hold 4.5 litres of motor oil. In your answer describe the process from receipt of raw materials to despatch of finished container to the filler and justify a suitable material for the container. (15 marks)
- B) What are the advantages and disadvantages of the extrusion blow moulding process? (5 marks)

**Question 7**

- 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)