



**PIABC LEVEL 5 DIPLOMA
IN PACKAGING TECHNOLOGY (QCF)**
(Qualification Number: 600/0017/X)

EXAMINATION PAPER

June 2017

J/502/5923 UNIT 02

Packaging Materials and Components

Paper A

Reading Time: 5 minutes

Time Allowed: 3 Hours

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

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)

***INSTRUCTIONS TO CANDIDATE: YOU ARE REQUIRED TO ANSWER
TWO QUESTIONS FROM THE FOLLOWING THREE QUESTIONS ONLY***

Question 1

- 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 spirit based beverages. (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 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

- A) Discuss each of the key criteria to be considered when selecting a metal suitable for a food or drink product of your choice (5 marks). Discuss the relative merits of steel and aluminium for your chosen product (5 marks).
- B) Discuss the advantages and disadvantages of using a flexible pouch instead of a rigid container for a food product of your choice (5 marks). Suggest a suitable material of construction for the pouch, giving reasons for your selection (5 marks).

Learning Outcome 2

Understand the synthesis and properties of polymers

(This learning outcome is worth 20% of the marks for this paper)

INSTRUCTIONS TO CANDIDATE: YOU ARE REQUIRED TO ANSWER THIS QUESTION

Question 4

- A) Describe the polymerisation of low density polyethylene (LDPE). (6 marks)
- B) Describe how the production of high density polyethylene (HDPE) and linear low density polyethylene (LLDPE) is different from that of LDPE and what impact this has on the materials' properties? (2 x 3 marks)
- C) Explain the meaning of the following polymer characteristics and describe how they can influence their properties:
- Crystallisation (2 marks)
 - Orientation (2 marks)
 - Glass transition (2 marks)
 - Melt flow index (2 marks)

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)

INSTRUCTIONS TO CANDIDATE: YOU ARE REQUIRED TO ANSWER TWO QUESTIONS FROM THE FOLLOWING THREE QUESTIONS ONLY

Question 5

Describe in detail, with the aid of diagrams, the conversion process to manufacture a glass jar used to pack jam (fruit preserve). Start with raw materials added to the furnace and finish with jars packed ready for despatch. You are expected to explain how each stage of the process contributes to the delivery of a fit for purpose container to the customer. (20 marks)

Question 6

- A) Describe, with the aid of diagrams, the manufacture of a coloured extrusion blow moulded plastic bottle to hold 750ml of a liquid household chemical (e.g. bleach). In your answer describe the process from receipt of raw materials to despatch of finished container to the filler, name a suitable material for the container and explain why. (15 marks)
- B) What are the advantages and disadvantages of the extrusion blow moulding process? (10 x ½ mark)

Question 7

- A) For a collapsible aluminium tube suitable for an eye cream, list and explain the importance of each of the criteria which should be stated on the specification. (10 marks)
- B) Outline the production process for such a tube, including how its quality would be assured. (10 marks)