PIABC LEVEL 5 DIPLOMA IN PACKAGING TECHNOLOGY

(Qualification Number: 600/0017/X)

EXAMINATION PAPER

November 2021

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

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Reading Time: 5 minutes

Examination Time: 3 Hours

Issued under the authority of the
PACKAGING ASSESSMENT BOARD
30 October 2021

PIABC Level 5 Diploma in Packaging Technology
Unit 2 – Packaging Materials and Components (Paper A)
November 2021

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

A) Identify the KEY ingredients and their relative proportions used to make container glass. (3 marks)

B) Pharmaceutical glass can be identified as types I, II and III. Explain how they differ from each other and justify the application of where they are used. (3 x 3 marks)

C) Identify, with reasons, FOUR characteristics/properties of a glass jar containing instant coffee that need to be evaluated to ensure it meets the needs of the product, packing line and distribution chain. (4 x 2 marks)

Question 2

A typical corrugated board is made up of a Kraft outer liner, a middle fluting paper and an inner test liner.

Explain how

- raw materials (5 marks)
- the pulping and fibre treatment (5 marks)
- additives (5 marks)
- the papermaking process (5 marks)

impact on the properties of these papers used to make corrugated board.

Note to candidate: A detailed description of the various processes is not required.

Question 3

A) Explain how the construction and material properties of a 3-piece steel can help to protect and preserve a can of beans over its shelf life. (5 x 2 marks)

B) Using examples, discuss TEN characteristics of aluminium foil packaging. (10 x 1 mark)

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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 the polymerisation of Polyethylene (PE). (5 x 1 mark)

B) Explain the following terms and discuss their effect on polymer characteristics:

a) Co-polymerisation (2½ marks)
b) Branching (2½ marks)
c) Molecular weight (2½ marks)
d) Crystallinity (2½ marks)
e) Tacticity (2½ marks)
f) Orientation (2½ marks)

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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) Describe, with the aid of diagrams, the manufacture of a 70cl glass wine bottle from raw materials to bottles ready for despatch to a bottling plant. (15 marks)

B) What additional manufacturing processes or features can be applied to improve the appearance of a glass bottle to gain marketing advantage? (5 x 1 mark)

Question 6

A) Describe the production of a metal can for a carbonated beverage from coil of material to can bodies packed ready for despatch to the packer filler. (12 marks)

B) Describe the production of a ring pull can end for a carbonated beverage can from coil of material to can ends ready for despatch to the packer filler. (4 marks)

C) Justify why the use of this container and closure is appropriate for a carbonated drinks product. (4 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