



REPORT ON THE NOVEMBER 2023 EXAMINATIONS

PIABC LEVEL 3 CERTIFICATE IN PACKAGING (QN: 610/0741/9) **AND** **PIABC LEVEL 5 DIPLOMA IN PACKAGING TECHNOLOGY** (QN: 610/0740/7)

This report is concerned with the November 2023 examinations of both the PIABC Level 3 Certificate in Packaging (QN: 610/0741/9) and the PIABC Level 5 Diploma in Packaging Technology (QN: 610/0740/7).

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PIABC LEVEL 3 CERTIFICATE IN PACKAGING

This examination is assessed by a 2-hour examination of short answer questions making up a total of 100 marks. Candidates are required to achieved 50% to pass the examination.

MARKER/MODERATOR REPORT

Common Errors by Candidates

- Some excellent papers but some candidates' knowledge of Unit D Packaging Materials and Unit E Printing was very poor.
- Candidates generally performed well to very well. Performance on longer/higher value questions where some structuring of answers was required appeared to be less good. Questions requiring diagrams appeared to present challenges.

Overall Impression of Candidates Performance

- Lack of knowledge and understanding of important packaging materials and processes meant candidates lost marks.
- Few common issues across the board. A few candidates did not directly answer the question, some did not provide examples, and some did not attempt to answer several questions in the same sections possible due to a lack of focus on this while revising.

PIABC LEVEL 5 DIPLOMA IN PACKAGING TECHNOLOGY

UNIT 1: UNDERSTAND THE ROLE AND FUNCTIONS OF PACKAGING

This unit is assessed by a 2-hour examination and candidates must answer eight questions. Two questions are worth 20 marks each and a further 6 questions are 10 marks each. Candidates are required to achieved 50% to pass the examination.

MARKERS REPORT

Overall Impression of Candidates' Performance

- Marker 1 - Candidates appeared to perform reasonably. Most candidates demonstrated knowledge across the unit syllabus. Most candidates how some weaknesses in their knowledge but this did not appear to be concentrated on a particular topic. The effort and detail provided by the candidates did not appear to reflect the different weightings of the questions.
- Marker 2 - Generally, well answered but marks lost through a lack of knowledge and understanding in Learning Outcomes 2.0 Sustainability, 5.0 Supply Chain and 6.0 Legislation.
- Marker 3 - Generally good. Only a few examples of poor answers. Well prepared on the whole.

Common Errors by Candidates

- Marker 1 - Candidates often did not provide detail to justify their answers and at times did not provide the examples expected in the questions. Explaining/justifying the answers and providing the extra detail are important for achieving high marks.
- Marker 2 - Generally, well answered but marks lost through a lack of knowledge and understanding in Learning Outcomes 2.0 Sustainability, 5.0 Supply Chain and 6.0 Legislation.
- Marker 3 - There weren't any specific questions that caught more than a few candidates out. Untidiness in writing can count against candidate if a marker cannot read the details.

SECTION 1 (TWO QUESTIONS - 20 MARKS EACH)

Question 1

A decorated cake intended for a child's party is sold through supermarkets.

- A) Describe an appropriate primary and secondary packaging for this product. (5 marks)
- B) Fully discuss how this packaging (primary and secondary) performs the various functions required from packaging. (15 marks)

Markers Feedback on Candidates' Performance

Most candidates performed well or very well. Most candidates described a windowed paperboard carton which is placed in a shelf ready corrugated case. Candidates did not consistently provide detail and justification for how the packaging meets the functions of packaging. Many candidates identified the importance of carton graphics in selling the product but did not discuss the type of graphics which would appeal to the target.

Question 2

- A) Define what sustainability means within the packaging industry (2 marks) and discuss what issues should be taken into consideration in the development of sustainable packaging for a new high protein drink product (13 marks). *Note: Discuss general sustainability issues rather than specific pack design.*
- B) Discuss the challenges in evaluating the environmental impact of a product/package. (5 marks)

Markers Feedback on Candidates' Performance

Most candidates achieved moderate to good marks. Most candidates provided a general discussion on environmental sustainability issues with some specific referencing to the suggested example. Some marks were lost for not addressing the specific elements of the questions e.g. few candidates defined sustainability and instead highlighted characteristics that would be required from a sustainable product. The discussion of the issues to be considered was at times more of a list with little justification or expansion of the ideas.

SECTION 2 (SIX QUESTIONS - 10 MARKS EACH)

Question 3

Packaging is constantly evolving to remain effective in the current society.

Identify FOUR factors which are driving packaging change and discuss using examples how the packaging industry has responded. (10 marks)

Markers Feedback on Candidates' Performance

Most candidates achieved only moderate marks. This question expected a level of discussion which was absent in most answers. The examples used were often very generic (e.g. more environmentally friendly packaging). While all candidates identified issues driving change in how goods are packed there was limited expansions on these topics.

Question 4

A tablet computer is delivered through the small parcel courier services to the homes of customers.

Identify FOUR hazards that this packed product may encounter in this delivery cycle, discuss how the product could be degraded and how the packaging can help to ensure that the product is received in the desired condition. (10 marks)

Markers Feedback on Candidates' Performance

Candidates achieved moderate to good marks. Many candidates failed to achieve higher grades due to a lack of detail explanations and discussion in their answers. An answer of shocks caused by drops may damage product. Cushioned packaging will mitigate against this damage. While this is correct it lacks the detail and discussion for high marks.

Question 5

- A) Identify the stages of the supply chains for the following packaging materials from raw material extraction through to final disposal. *Note: A description of the processes is not required.*
- Corrugated case (2 marks)
 - Steel food can (2 marks)
- B) Recycling materials presents some challenges. Discuss the factors which impact on the recyclability of the following materials:
- Paper based materials (2 marks)
 - Plastic film (2 marks)
 - Glass (2 marks)

Markers Feedback on Candidates' Performance

Candidates achieved moderate to very good marks. Few candidates recognised the different steps in the manufacture of packaging materials most just indicating packaging manufacture as a step. A range of recycling issues were identified. Candidates failed to get better marks in this section due to discussing a limited range of issues. Part B not well answered.

Question 6

Using FOUR examples, discuss how specific pieces of legislation help ensure customers can trust the prepacked products that they purchase. (10 marks)

Markers Feedback on Candidates' Performance

Candidates achieved moderate to very good marks. A wide range of legislation could be included. Some legislation was obvious such as Weights and Measures legislation ensures products are not sold light weight. Some candidates included other legislating such as health and safety at work and provided no justification as to how this ensures consumer trust. Without a clear link to consumer trust marks were lost. Some good but also very poor answers. Poor answers were almost certainly due to lack of knowledge on this subject. Candidates rarely cite the precise legislation – but question allows for a level of credit for general awareness.

Question 7

- A) Identify the FOUR P's of the marketing mix and discuss how these may impact on packaging design. (5 marks)
- B) Using examples, describe how packaging can communicate with users in addition to the words used. (5 marks)

Markers Feedback on Candidates' Performance

Candidates mostly achieved good or very good marks. All candidates identified the 4 P's and most were able to relate how packaging impacted on each of these areas. With respect to the pack communication with consumers most candidates identifies several methods (e.g. colour shape font etc.) but most did not support their answer with examples.

Question 8

- A) Discuss, using TWO examples, how active or smart packaging could enhance consumer convenience. Consider both the benefits and possible barriers to adoption. (5 marks)
- B) Discuss how active or smart packaging could enhance supply chain operations. Consider both the benefits and possible barriers to adoption. (5 marks)

Markers Feedback on Candidates' Performance

Most candidate achieved moderate to good marks. Candidates lost marks for failing to provide details of the technologies being identified (e.g. time temperature indicators), or by describing technologies/packaging which is unlikely to be considered as active or smart. Microwavable trays, re-closable packs and bar codes are not usually considered active or smart packaging.

UNIT 2: UNDERSTANDING PACKAGING MATERIALS & COMPONENTS **(PAPER A)**

Paper A is worth 50% of Unit 2 and is assessed by a 2-hour examination. The candidates must answer eight questions. Two questions are worth 20 marks each and a further 6 questions are 10 marks each. Candidates are required to achieved 50% to pass the examination.

MARKERS REPORT

Overall Impression of Candidates' Performance

- Marker 1 - There appeared to be some technical elements which many of the candidates found challenging suggesting some knowledge gaps across most of the candidates. Candidates' answers were often brief and explanations and descriptions somewhat limited. Performance appeared to reduce towards the later exam questions.
- Marker 2 - Lack of knowledge and understanding of materials, properties and conversion processes meant candidates lost many marks. Especially in the ISBM process and the differences between it and EBM. There was a lack of understanding in coating processes and how a corrugated case is made.
- Marker 3 - Generally good – but only a few truly excelled.

Common errors

- Marker 1 - A lot of candidates did not discuss the thermal processing of canned foods when describing the canning process. A few candidates did not read the questions closely and discussed aluminium trays when plastic-based packaging was required. When questions required justification/explanation some candidates provided very limited support.
- Marker 2 - Lack of knowledge and understanding of materials, properties and conversion processes meant candidates lost many marks. Especially in the ISBM process and the differences between it and EBM. There was a lack of understanding in coating processes and how a corrugated case is made.
- Marker 2 - Bad writing – possibly lost marks as a result. Some lack of understanding of the more technical aspects of packaging.

Other areas markers felt were an issue?

- Markers felt that the candidates didn't manage their time effectively as performance deteriorated in the later questions.

SECTION 1 **(TWO QUESTIONS - 20 MARKS EACH)**

Question 1

- A) Describe the injection stretch moulding process for the production of a plastic bottle for carbonated soft drinks, starting with selection of polymer granules and finishing with bottles. (14 marks)
- B) Extrusion blow moulding can also be used to make bottles. How do the features and performance of these containers differ from what is achieved in injection stretch blow moulding? (6 marks)

Markers Feedback on Candidates' Performance

Candidate answers varied from poor to moderate. No candidate scored highly. Part A was very poorly answered by the majority of candidates. In Part A limited detail of the processes was included in the answers. The descriptions of the operations of the injection moulding machines was very limited. The detail on some answers was so limited that it could related to alternative processing methods. In Part B answers varied from poor to good. The good answers highlighted the differences between the two processes.

Question 2

- A) Identify FOUR important paper characteristics and briefly describe how they are measured. (8 marks)
- B) Papers can have a wide range of properties. Discuss how material selection and manufacturing processes can modify these properties. (12 marks)

Markers Feedback on Candidates' Performance

Most candidates provided good answers. In Part A a range of material properties were discussed by candidates. Some marks were lost for a lack of detail on how the characteristics could be assessed. In Part B few candidates considered the formation process. Most discussed material selection, pulping, beating and some additives.

SECTION 2 (SIX QUESTIONS - 10 MARKS EACH)

Question 3

Surface coatings are often used to enhance characteristics of plastics, metals and glass.

Briefly discuss FIVE types of coatings and why they are used on these packaging substrates. (10 marks)

Markers Feedback on Candidates' Performance

All candidates provided good to excellent answers. Marks were lost for failing to provide more detail than listing the coatings and for identifying additives rather than surface coatings.

Question 4

Pure orange juice can be purchased in a range of packaging:

- glass bottles
- PET bottles
- HDPE bottles
- metal cans
- paper-based cartons

Compare and contrast the properties of these materials and formats for this application. (5 x 2 marks)

Markers Feedback on Candidates' Performance

Most candidates provided good rather than excellent answers. The answers tended to concentrate on a few characteristics across the material groups. Answers focused on the materials rather than the pack format. Decoration options were seldom considered.

Question 5

Select and justify an appropriate plastic material or combination of plastic materials for the following products:

- Vacuum bag for large meat cut (2 marks)
- Blister pack of tablets (2 marks)
- Ovenable ready meal tray (2 marks)
- Flip top closure for shampoo bottle (2 marks)
- Dissolvable bag for 1kg of agricultural chemical (2 marks)

Markers Feedback on Candidates' Performance

Not particularly well answered. Most candidate provided poor to moderate answers. Few answers provided a good justification for the materials being proposed. A significant number of inappropriate materials were proposed including aluminium when the question required plastic based materials.

Question 6

A 500 ml glass jar is made for cooking sauces.

- A) Identify the raw materials used and state their function in the glass. (5 marks)
- B) Describe how the molten glass is formed into a container. (5 marks)

Markers Feedback on Candidates' Performance

Most candidates provided good or very good answers. Some errors and or elements not considered in Part A reduced some marks. Diagrams to describe the press and blow process were effective.

Question 7

- A) Discuss using examples how the properties of metals can be modified to make them appropriate for packaging applications. (4 x 1½ marks)
- B) Discuss how the material selection and design features in a 3-piece can make this pack suitable for canned foods. (4 marks)

Markers Feedback on Candidates' Performance

Part A was poorly answered by most candidates with most not considering the use of alloys, working hardening, or annealing. Answers to Part B were reasonable and identified some key features.

Question 8

Describe the production of a shelf ready single walled corrugated case from rolls of paper to complete cases ready for despatch. (10 marks) *Note: Details of printing are not required.*

Markers Feedback on Candidates' Performance

A wide range of marks achieved by candidates. Some candidates appeared to confuse single walled board with single faced board which reduced the marks awarded.

UNIT 2: UNDERSTANDING PACKAGING MATERIALS & COMPONENTS **(PAPER B)**

Paper B is worth 50% of Unit 2 and is assessed by a 2-hour examination. The candidates must answer eight questions. Two questions are worth 20 marks each and a further 6 questions are 10 marks each. Candidates are required to achieved 50% to pass the examination.

MARKERS REPORT

Overall impression of candidates' performance

- Marker 1 - Only 1 candidate. Poor answers were provided.
- Marker 2 - Only one candidate who did well in Q3 but performed poorly in the rest.

Common errors

- The candidate provided very brief answers which lacked detail generate additional marks. Expectation of the amount of information to be provided to be awarded 5 marks may need to be discussed with candidates.

SECTION 1 **(TWO QUESTIONS - 20 MARKS EACH)**

Question 1

- A) Justify and briefly describe the key characteristics of the printing processes which would be used for the following applications. A different printing process should be used for each example.
- Corrugated case (2 marks)
 - Aluminium soft drinks can (2 marks)
 - Hemispherical screw on cap for personal care (2 marks)
 - A wrapper for a leading brand of chocolate-based snacks (2 marks)
 - Paperboard tray for a bakery to brand their packs (2 marks)
- B) Discuss FIVE common printing defects. (5 x 2 marks)

Markers Feedback on Candidates' Performance

Only 1 answer. A reasonable answer. Some marks lost due to lack of detail on some parts of the answer.

Question 2

Describe and justify the type of adhesive you would use for the following applications:

- A label for a returnable beer bottle (4 marks)
- A wrapper for a chocolate bar (4 marks)
- A label for a flow wrapped tray of tomatoes (4 marks)
- Manufacture of a corrugated board (4 marks)
- Paperboard carton closing on a high-speed packaging line (4 marks)

Markers Feedback on Candidates' Performance

Only 1 answer. A relatively poor answer. One part was not attempted. Candidate was confused between manufacture of corrugated board and the closing of a corrugated board case and selected an inappropriate choice.

**SECTION 2
(SIX QUESTIONS - 10 MARKS EACH)**

Question 3

Briefly describe FIVE tamper evident closures and explain how tamper evidence is achieved.
(5 x 2 marks)

Markers Feedback on Candidates' Performance

Only 1 answer. An excellent answer gaining full marks.

Question 4

The flaps of a paperboard carton are sealed with an hotmelt adhesive. The flaps have been found to have opened. Discuss FIVE possible reasons for this failure and how the cause could be identified.
(5 x 2 marks)

Markers Feedback on Candidates' Performance

Only 1 answer. Candidate identified 3 possible reasons for joint failure but did not provide any discussion as to how the cause could be identified.

Question 5

A) Describe how an effective closure is achieved for the following closures:

- Linerless cap on carbonated drink bottle (3 marks)
- Locking tuck flap carton (3 marks)

B) Discuss how child resistant closure are assessed. (4 mark)

Markers Feedback on Candidates' Performance

Only 1 answer. Candidate provided a brief description of one of the closure types. In Part B the candidate may have confused child resistant and child safe closures.

Question 6

Discuss TWO different methods of combining aluminium with a plastic film. (2 x 5 marks)

Markers Feedback on Candidates' Performance

Only 1 answer. Candidate identified appropriate processes but provided no detail.

Question 7

- A) Describe the differences in the performance of paper and plastic as materials for labels. (5 marks)
- B) Discuss the advantages and disadvantages of pressure sensitive labels and shrink sleeves for a shampoo product. (5 marks)

Markers Feedback on Candidates' Performance

Only 1 answer. Candidate only consider one issue for each label type.

Question 8

- A) Describe the requirements for producing a good heat seal. (6 marks)
- B) How can the quality of this seal be assessed? (4 marks)

Markers Feedback on Candidates' Performance

Only 1 answer. Candidate discussed what a good heat seal should be able to do rather than the production of the seal. Part A provides an identification of several performance indicators. Part B only provides for the identification of the evaluation methods rather than a description.

UNIT 3: UNDERSTAND THE MANAGEMENT OF PACKAGING, PRODUCTION, & BUSINESS PROCESSES

This unit is assessed by a 2-hour examination and candidates must answer eight questions. Two questions are worth 20 marks each and a further 6 questions are worth 10 marks each. Candidates are required to achieved 50% to pass the examination.

MARKERS REPORT

Overall impression of candidates' performance

- Marker 1 - In general candidates demonstrated an acceptable level of knowledge however there were important areas where the expected level of understanding was demonstrated. It is difficult to make generalised comments on a small number of answers. Candidates often provided brief answers listing factors without a more detailed discussion of the issues.
- Marker 2 - Generally, well answered but a lack of knowledge and understanding on packaging, production and business processes meant marks were lost, especially in Questions 1, 5 and 8.
- Marker 3 - Very good on the whole – those that had prepared did well. Some had a few noticeable gaps in their knowledge though!

Common errors

- Marker 1 - Two important areas stand out in this limited sample. In discussing the packaging line for canned beans no candidate recognised that the caned product would require thermal processing. No candidate appeared to be able to evaluate the impact of individual machine performance on the output of a complete line.
- Marker 2 - Generally, well answered but a lack of knowledge and understanding on packaging, production and business processes meant marks were lost, especially in Questions 1, 5 and 8.
- Marker 3 - Bad writing. Poor diagrams. Lack of knowledge didn't help them keep to the required answer structure.

Other areas you felt were an issue?

- Candidates appeared to provide brief answers. The structure of the answers could be modified to provide increased clarity.

SECTION 1 (TWO QUESTIONS - 20 MARKS EACH)

Question 1

- A) Baked beans with sausages are supplied in multi-packs of four cans. Describe the packaging process from receipt of the packaging materials to finished products ready for despatch to the retailer. (15 marks)
- B) Discuss the key issues to be considered in ensuring the safety of this product. (5 marks)

Markers Feedback on Candidates' Performance

No candidates attempted to address key specifics of this product (e.g. can head space need to be removed to achieve vacuum, hermetic seal of lid is required, and cans need to be thermally processed after filling). Only one candidate addressed the need to separately fill different elements

of the product. Generic elements of the packaging line were listed and achieved acceptable marks. No candidate addressed the key issues to be considered to ensure product safety.

Question 2

- A) Briefly describe the design and development process to introduce a packaging change, for example a change in secondary packaging to remove plastic (shrink wrap) from the collation packs. (12 marks) *Note: The focus is on the development process rather than the packaging solution.*
- B) Identify EIGHT of the main functional roles required to input into the project and state their input. (4 marks)
- C) Briefly outline how the project can be managed to ensure objectives are achieved. (4 marks)

Markers Feedback on Candidates' Performance

Answers ranges from average to good. All answers were brief and there was little expansion on the answers which limited the marks. All candidates identified the key issues in each section of the question.

SECTION 2 (SIX QUESTIONS - 10 MARKS EACH)

Question 3

1kg of potatoes are packed on a vertical form fill seal bagging machine. Describe the operation of this equipment and any specific considerations required for this product. (10 marks)

Markers Feedback on Candidates' Performance

All candidates provided reasonable answers but lacked details and explanations of operations to gain high marks.

Question 4

A company converts corrugated board into bespoke cases for customers.

Discuss how an effective quality management system should influence this process. (10 x 1 marks)

Markers Feedback on Candidates' Performance

Candidates provided reasonable answers. Some parts of answers did not gain marks as they were restating points already made or were so vague that they did not demonstrate the relationship with how the QMS influences the company activities (e.g. reduce cost).

Question 5

Briefly justify FIVE technical and FIVE administrative details which would be on a specification for a shelf ready corrugated case. (10 marks)

Markers Feedback on Candidates' Performance

Candidates provided reasonable answers. Full marks were not achieved as some points made were very similar to points already made. Some lack of knowledge about the importance of a specification and what it should contain is concerning. Some candidates fell short of the detail required and therefore lost marks as a result.

Question 6

- A) An important performance indicator for many bottle filling lines is the overall operating efficiency (OEE). Discuss how OEE is determined (7 marks)
- B) Briefly discuss factors which contribute to the determination of an economic order quantity. (3 marks)

Markers Feedback on Candidates' Performance

Candidates provided good answers to questions. Some candidates lost marks for not including the relationship between the factors contributing to OEE and the calculation of how this is undertaken.

Question 7

- A) Crisps (or chips) are filled into 25g bags. Discuss why achieving an accurate fill quantity, and reducing the variability in fill quantity is important. (3 marks)
- B) Crisps (or chips) are often dosed into the bags using a multi head weighing system. Describe the operation of this equipment and discuss why it is the preferred option for this product. (7 marks)

Markers Feedback on Candidates' Performance

The descriptions of the multi-head weighing system were poor. Little detail was provided by any candidate. No candidates indicated how the operation of the weigher achieved stable weights and two of the candidates failed to indicate that the target weight was achieved by combining the products from several of the weighing heads.

Question 8

A filling line has four processes outlined below which can run at the indicated rates and efficiencies:

- Depalletisation: 60 packs per minute with 90% efficiency
 - Filling & capping: 50 packs per minute with 90% efficiency
 - Boxing: 60 packs per minute with 80% efficiency
 - Palletisation: 70 packs per minute with 90% efficiency
- A) What is the expected output from this line per hour? (5 marks) *Note: Marks awarded for calculations.*
- B) Discuss how adding an accumulator can impact online efficiency and how they should be used. (5 marks)

Markers Feedback on Candidates' Performance

No candidate calculated the line output correctly, some answers appeared to demonstrate a lack of understanding of how a production line works by adding the output of each part of the line together to get an overall output. The candidates identified what an accumulator was but failed to expand their answers to gain higher marks.