



Qualifications

Diploma in Packaging

Module 1

Examination Syllabus 2022

Unit 1: Packaging Theory and Small Pack Materials

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Development of packaging	<ul style="list-style-type: none"> • The history and development of packaging • Packaging principles
Materials used in packaging	<ul style="list-style-type: none"> • Glass bottles: <ul style="list-style-type: none"> ○ advantages and disadvantages of glass ○ bottle manufacturing ○ bottle faults and testing • Plastic bottles: <ul style="list-style-type: none"> ○ advantages and disadvantages ○ principles of bottle manufacturing ○ bottle faults and testing • Emerging bottle formats • Crowns and caps: <ul style="list-style-type: none"> ○ types of closure ○ crown and cap manufacturing ○ sealing • Cans and ends: <ul style="list-style-type: none"> ○ advantages and disadvantages of cans ○ can and end manufacturing ○ shell and tab assembly ○ inspection and palletisation • Paper and cardboard: <ul style="list-style-type: none"> ○ paper labels ○ advantages and disadvantages of paper and cardboard ○ principles of manufacturing ○ different types of paper and cardboard • Plastics: <ul style="list-style-type: none"> ○ plastic labels ○ plastic films and other polymers ○ plastic crates • Adhesives: <ul style="list-style-type: none"> ○ types of adhesives ○ principles of adhesion

Unit 2: Product Preparation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Dilution, carbonation, and product handling	<ul style="list-style-type: none"> • De-aerated liquor (water) and beer/cider/RTD dilution <ul style="list-style-type: none"> ○ use in high gravity brewing ○ quality requirements for dilution liquor ○ the production of de-aerated liquor ○ blending procedures and calculations • Purposes and principles of carbonation <ul style="list-style-type: none"> ○ principles of gas solubility ○ carbonation equipment • Bright beer/cider/RTD storage and release of product for packaging • Maintaining product quality up to the filler <ul style="list-style-type: none"> ○ design and procedural methods to control product dilution ○ variations in CO₂ levels, O₂ pick-up and loss of foam potential ○ microbiological and chemical contamination risks
Theory and practice of microbial stabilisation	<ul style="list-style-type: none"> • Sterile filtration theory, filter design and operation • Definition and aims of pasteurisation including pasteurisation units (PU) • Effects of pasteurisation on different microbiological organisms • Design, operation, and control of a flash pasteuriser • Principal effects on product quality during pasteurisation • Design, operation, and control of a tunnel pasteuriser • Measurement of PUs • Chemical treatment of pasteuriser water

Unit 3: Small Pack Operations

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Fundamental considerations	<ul style="list-style-type: none"> • Typical small pack line layouts showing schematic designs and flow diagrams • Conveyor systems • Influence of container design and dimensions (on packaging line performance) <ul style="list-style-type: none"> ○ container standardisation and product differentiation ○ the impact of container design on conveying and handling ○ for bottles only: the filled appearance after labelling vs fill height control
Pre-filling operations	<ul style="list-style-type: none"> • Container reception, de-palletising, and returnable bottle handling • Container preparation for filling • Crate washing • Bottle washing • Bottle and can rinsing • PET bottle blowing • Container inspection
Theory and practice of filling technology	<ul style="list-style-type: none"> • Filling theory and principles <ul style="list-style-type: none"> ○ the filling cycle ○ types of fillers • The design and operating principles of glass bottle fillers and the filling process carbonated beverages • The design and operating principles of PET bottle fillers and the filling process • The design and operating principles of a can filler and the filling process • The design and operating principles of a sterile/aseptic filler and the filling process • Widget technology <ul style="list-style-type: none"> ○ the purpose and development of widgets ○ operating principles ○ types of widget and associated technology
Container closing	<ul style="list-style-type: none"> • The design and operating principles of a bottle crowner and the crowning process • The design and operating principles of a can seamer and the seaming process
Post-filling operations - labelling and coding	<ul style="list-style-type: none"> • Drying containers <ul style="list-style-type: none"> ○ the purpose of drying bottles and cans • The design and operation principles of a bottle labeller and the labelling and foiling process • Container sleeving and coding
Post-filling Operations -	<ul style="list-style-type: none"> • The design and operating principles of a secondary packaging machine and the packaging process

Secondary packaging, palletisation, and warehousing

- The design and operating principles of a palletiser and the palletising process
- Warehousing, storage conditions and stock rotation