Qualifications

Diploma in Packaging

Module 2

Examination Syllabus 2022

Unit 1: Quality

Topic	Candidates should understand and be able to demonstrate using detailed examples:

Quality management	• Quality management
	  ○ definition of quality
	  ○ quality control
	  ○ quality assurance
	• Quality management systems (QMS)
	  ○ QMS types and objectives
	  ○ document control
	  ○ QMS implementation
	  ○ QMS operation

Food safety	• Food safety
	  ○ food safety hazards
	• Food legislation
	  ○ labelling regulations
	• Procedures and controls
	  ○ allergen control
	  ○ GMP
	• Hazard Analysis Critical Control Point (HACCP)
	  ○ prerequisite programmes
	  ○ key stages in a HACCP analysis
	  ○ maintaining a HACCP system
	• Food integrity
	  ○ threats and vulnerability control (TACCP VACCP)

Laboratory and at-line analysis	• Key analyses on beer and cider
	• Key analyses on packages
	• The basic concepts applied to interpretation of analytical data
	  ○ sampling requirements
	  ○ setting specifications
	• Lab operation
	  ○ lab certification
	  ○ the relevance of inter-laboratory collaborative checks

Statistical process control and inline control	• Statistical process control
	  ○ causes of variation
	  ○ statistical analyses of variation
	  ○ inline analyses and control
	• Control charts
	  ○ run charts
	  ○ X-bar and R charts
	• Process capability
	• Calculation of Cp and Cpk

	• Application of control charts • Inline process control

Unit 2: Hygiene

Topic	Candidates should understand and be able to demonstrate using detailed examples:

Hygiene	• Design principles for hygienic packaging
	• CIP principles
	  ○ factors affecting cleaning system performance
	  ○ composition of soil, scale and biofilms
	  ○ microbiology of cleaning
	  ○ safety requirements
	• Detergents and sanitising agents
	  ○ detergent and sanitiser chemistry
	• Design and operation of CIP systems
	  ○ design principles
	  ○ CIP of vessels, pipework, hoses and fillers
	  ○ types of CIP systems and their optimisation
	• Measurement of cleaning effectiveness

Types of microorganism	• Microbial contamination of liquid product
	  ○ sources of microbial contamination
	  ○ typical microorganisms
	  ○ effects of typical contaminating microorganisms

Microorganism detection and identification	• Microbiological sampling methods • Methods of detecting and identifying and quantifying contaminations

Unit 3: Planning and Line Design

Topic	Candidates should understand and be able to demonstrate using detailed examples:

Capacity planning	• Business strategy
	  ○ operations strategy
	• Strategic planning
	  ○ mission, vision and values
	  ○ strategic planning process
	• Capacity
	• Capacity planning
	  ○ capacity planning strategies
	• Strategic and tactical planning

	○ the difference between the two and the key elements of strategic and tactical plans • Forecasting demand ○ market and category forecasting ○ methods for forecasting demand • Enterprise resource planning
Operational planning	• Operational planning ○ planning and scheduling • Master production schedule • Bill of materials • Material requirements planning • Manufacturing requirements planning • ERP systems • Just in time ○ Kanban • Vendor and customer managed inventory
Line design	• Line design theory ○ principles of line design ○ design constraints • Elements of line design ○ location of warehouses, labs and product supply ○ machine accessibility ○ health and safety ○ information systems ○ material storage and supply • The V curve ○ line balance and accumulation ○ advantages and disadvantages of line layout formats ○ line design calculations • Conveyors ○ design ○ set up ○ large pack conveyors ○ small pack conveyors ○ air conveyors • Waste ○ waste handling ○ floor and drain design

Unit 4: Large Pack Operations

Topic	Candidates should understand and be able to demonstrate using detailed examples:

Fundamental considerations	• Role and importance of keg and cask beer and cider
	• Kegs, casks and spears
	  ○ keg/cask components
	  ○ keg manufacturing and materials
	  ○ types of spear and spear safety
	  ○ mini keg manufacture
	• Typical keg and cask line layouts
	  ○ schematic diagrams showing configuration of complete line with all key plant items and conveyoring
	  ○ simple flow diagrams showing key plant items and product flow
	  ○ pneumatic cylinders in packaging

Pre-filling operations	• Container collation methods • Pallet conveying and inspection • De-unitising and depalletising ○ robot depalletisation • Selective keg turning • Cap or bung removal • External keg and cask washing and label removal • Cask and keg inspection • Keg spear torque testing

Theory and practice of keg and cask filling	• Large pack container cleaning
	  ○ infeed conveying
	  ○ pressure check
	  ○ cleaning process steps, parameters and objectives
	  ○ monitoring and validation
	• Container sanitisation
	  ○ steam
	  ○ hot water
	  ○ chemical
	• Filling theory and principles
	  ○ the filling cycle
	  ○ filling non-returnable kegs and mini kegs
	• Design and operation of cleaning/filling machines
	  ○ lane cleaning/filling machines
	  ○ rotary cleaning/filling machines

Post-filling operations	• Container tracking
	  ○ purposes of container tracking
	  ○ container security
	  ○ transponders, labels and etching
	  ○ systems for tracking
	• Contents verification
	  ○ volume calculations
	  ○ weighing systems
	• Labelling, coding and capping
	  ○ purpose of labels and caps
	  ○ design and operation of labelling machines
	  ○ design and operation of capping machines

	○ label and cap validation • Leak detection ○ detection of hydrocarbon contamination • Unitising • Warehousing ○ use of automated guided vehicles ○ temperature control and stock rotation
Draught dispense	• Design and operation of dispense equipment • Dissolved gas control • Temperature control • Hygiene

Unit 5: Operations Management

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Line operations	• Operating practices ○ organisational structure, culture, roles and responsibilities ○ shift working • The packaging team ○ team working ○ training needs and development ○ multiskilling ○ interface with other departments ○ maintenance planning • Measuring performance ○ performance measures and their impact on plant efficiency and losses ○ SMART targets ○ efficiency calculations ○ time calculations ○ changeovers ○ SMED
Supply chain and procurement	• Supply chain operating principles ○ value chain ○ customer/supplier relationships ○ material flow • Markets and suppliers ○ supply sourcing ○ vendor selection ○ supplier appraisal • Specifications and tenders ○ tender process • Contract management ○ supplier relationships

	○ service level agreements • End to end procurement suites
Finance	• Financial reporting ○ balance sheet ○ cashflow statement ○ profit and loss statement • Financial ratios • Cost accounting • Construction of departmental budgets ○ zero based budgeting ○ incremental budgeting ○ fixed versus variable cost budgeting • Management level financial reporting ○ annual budgets and period operating statements ○ variance reporting
Project management	• Revenue and capital projects • Project justification ○ investment consideration and analysis ○ return on investment • Project lifecycle • Roles and responsibilities • Project constraints • Project timeline tools ○ Gannt charts ○ PERT • Dealing with delays • Project cost management

World-class manufacturing	• WCM origins and modern form
	• WCM structure
	  ○ management and technical pillars
	• WCM people and culture
	  ○ WCM culture
	  ○ involvement of people
	  ○ cross-functional teams
	• Continuous improvement
	  ○ PDCA, OPDCA and SDCA
	  ○ visual tools
	  ○ root cause analysis tools
	• Lean manufacturing
	  ○ forms of waste
	  ○ 5S
	  ○ TPM
	  ○ standard operations
	  ○ Kaizen
	  ○ JIT and Heijunka
	  ○ Jidoka, Poka yoke, Andon and autonomation
	  ○ Lean supplier and customer relationships
	• World-class quality
	  ○ TQM
	  ○ ISO systems
	  ○ EFQM
	• Six Sigma
	• Other WCM tools
	  ○ short interval control
	  ○ value engineering