



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2018/2019**

COURSE NAME : PACKAGING EQUIPMENT AND OPERATION  
COURSE CODE : BNK 40603  
PROGRAMME CODE : BNK  
EXAMINATION DATE : DECEMBER 2018 / JANUARY 2019  
DURATION : 2 HOURS 30 MINUTES  
INSTRUCTION : ANSWERS **FOUR (4)** QUESTIONS ONLY

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THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

- Q1** (a) The packaging line consists of a group of packaging machines with controls that make them work together as one. List out **THREE (3)** reasons why we need machinery in packaging line. (3 marks)
- (b) Product is in the form of solid or liquid is one of the key factor of selecting packaging machinery. Categorize the types of liquid for filling machine with explanation. (4 marks)
- (c) Solid product fillers have been designed to handle a wide range of products. Classify **TWO (2)** methods of solid products are filled into the container with process explanation. (6 marks)
- (d) Liquid filling can be done by level and volume fillers. Differentiate between level and volume fillers with explanation and sketch. (8 marks)
- (e) Weighing filler typically used scale to weight the desired quantity. Describe the advantages and disadvantages of weighing filler. (4 marks)

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- Q2** (a) The closing method of a pack product containment is the interface between the product and the environment. List **THREE (3)** of closure interfaces for product and environment requirements. (3 marks)
- (b) Push fit closure: a closure, usually plastic, that is pushed into the neck or opening of a container to form a seal and is held in place by friction. Explain **TWO (2)** types of push fit closure. (4 marks)
- (c) Two alternatives closure thread option were developed after the rounded thread which are the symmetrical buttress or L-style, in which the threads are angled at 30°, and the modified buttress or M-style in which the thread angles are 10° (lower) and 45° (upper). Differentiate with sketch the engagement quality between the symmetrical buttress and modified buttress thread for both container and closure. (6 marks)
- (d) Material consideration is often done in order to manufacture screw-threaded closure. Explain the commonly used materials in manufacturing metal-threaded and plastics screw-threaded closures. Point out the benefit of using each material. (6 marks)
- (e) Metal can closure usually used for sealed the food in metal container and blow up the air in container. Sketch and explain the can seaming process in the industry. (6 marks)

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- Q3** (a) Bearing are the importance part in energy transform for the packaging machine. It has specific function to assist motor, shaft and gear for energizing the mechanical part Mechanical component is one of the largest part on the packaging machine. Compare with explanation and sketch **THREE (3)** types of bearing load.
- (6 marks)
- (b) A belt drive can handle power ranging from less than one horsepower to more than 1000 horsepower. Explain how a belt drive works to transmit the power.
- (4 marks)
- (c) Most popular type of belt used in power drive is V-Belt. Illustrate and sketch the V-Belt construction.
- (6 marks)
- (d) Chain is used in packaging machinery for power driven. Differentiate **TWO (2)** types of chain.
- (6 marks)
- (e) Most widely used in packaging is electric heater. Describe **THREE (3)** types of electric heater.
- (3 marks)

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- Q4** (a) The packaging line is set up in order to meet the speed and overall quantities of the product to be packed and may range from manual operation up to high speed fully automatic operation. Identify **THREE (3)** efficiency factors for the packaging line to ensure the operation line running smoothly. (3 marks)
- (b) A food industry company plan to build a packaging plant. As packaging engineer, classify the company goals that could affects the decision on the new plant. (4 marks)
- (c) Military packing is an application of any exterior protective methods, materials, or devices to assure the integrity of the preserved item. Explain the items standard practice for which military packaging is required to meet operational demands. (4 marks)
- (d) Packaging based on paperboard gives the best performance, uniformity and consistency. Classify and sketch the sequence in carton box packaging line. (6 marks)
- (e) Paperboard characteristics were considered in the packaging line operation. Point out **EIGHT (8)** paperboard key features for performing packaging line operation. (8 marks)

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- Q5** (a) As packaging engineer, classify the process step in developing a packaging specification. (6 marks)
- (b) Product protection should be considered in packaging specification. List out **THREE (3)** types of product protection and its element that commonly stated in packaging specification. (6 marks)
- (c) Quality is one of the important criteria considered in packaging manufacturing specification. Quality to packer's view is packaging operation operate well on packing line, protects his product and perform their consumer functions. Explain **FOUR (4)** criteria of quality factor in manufacturing specification. (4 marks)
- (d) Quality control is the process of control where the management tries to conform the quality of product in accordance with the pre-determined standards and specifications. As a packaging quality engineer, list out **SIX (6)** activities involve in packaging quality control. (6 marks)
- (e) Glass containers are intended to come into direct contact with the main products. Identify **THREE (3)** elements of glass package specification. (3 marks)

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- Q6** (a) The sensation of colour is our brain interpretation of signal received by the eye. Identify **THREE (3)** important aspects required to see colours. (3 marks)
- (b) Special color in printing are commonly used to give value added for an image or artwork of the product. Differentiate:
- (i) Special effect
  - (ii) Metallic effect
  - (iii) Pearlescent effect
- (6 marks)
- (c) The purpose of ink is to impart the information by producing an image on a substrate. Differentiate with sketch **TWO (2)** types of dominant ink formulations. (6 marks)
- (d) Letterpress printing is the oldest print process in printing industry. The process required high pressure between 5 to 15 Mpa to substrate the plate. Illustrates with a sketch about the basic letterpress printing concept. (6 marks)
- (e) Flexographic printing is a fast, economical method for printing large runs of labels, as well as many other print products. Explain the flexography printing concept. (4 marks)

**-END OF QUESTION-**

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