



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024**

- COURSE NAME : PRODUCTION PLANNING AND CONTROL
- COURSE CODE : BNM 30803
- PROGRAMME CODE : BNM
- EXAMINATION DATE : JULY 2024
- DURATION : 3 HOURS
- INSTRUCTIONS :
1. ANSWER ALL QUESTIONS
 2. THIS FINAL EXAMINATION IS CONDUCTED VIA
 - Open book
 - Closed book
 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

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Q1 The following questions are related to the introduction to Aggregate Planning.

- (a) Define the term disaggregation about aggregate planning. (2 marks)

- (b) Aggregate planning is the intermediate-range planning that determines the best way to meet forecasted demand while minimizing cost over the planning period. Aggregate planning strategies comprise of five capacity options and three demand options. Explain **THREE (3)** out of capacity or demand options available. Support your answer with examples. (6 marks)

- (c) A manufacturing factory of sand bricks has developed monthly forecasts for a series of products. Data for the 6 months of January to June are presented in **Table Q1.1**. Subsequently, the factory begins to develop an aggregate planning strategy by maintaining a constant workforce at a level necessary to meet the lowest demand, and then to meet the demand above this level as well as subcontracting applies.

Table Q1.1: Monthly Forecasts of Sand Bricks

Month	Expected Demand (Unit)	No. of Production Days (Day)
Jan	900	22
Feb	600	18
Mar	800	21
Apr	1100	21
May	1400	22
Jun	900	20

Inventory Carrying Cost: RM5/unit/month
 Subcontracting Cost: RM10/unit
 Average Pay Rate: RM5/hour (RM40/day)
 Overtime Pay Rate: RM7/hour (above 8 hours per day)
 Labour-Hour: 1.6hours/unit

- (i) Sketch a graph to illustrate the expected daily demand of the product. (7 marks)

- (ii) Analyse the total cost incurred when the aggregate planning strategy is used. (5 marks)

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Q2 The following questions are related to Material Resources Planning (MRP).

- (a) A time-phased product structure outlines the hierarchical breakdown of the bicycle components and their respective lead times for procurement or manufacturing. A product bicycle is assembled from various components as depicted in **Figure Q2.1** and **Figure Q2.2**.



Figure Q2.1

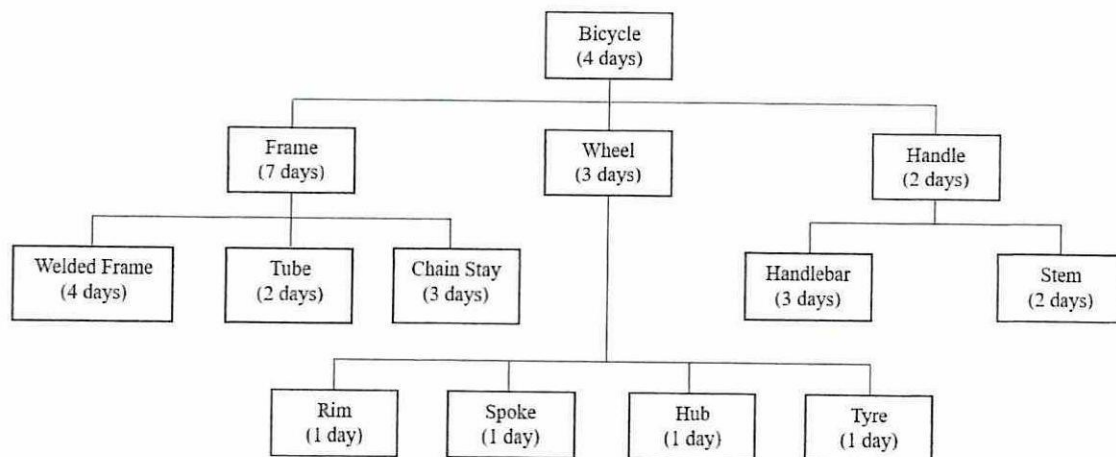


Figure Q2.2

- (i) Construct a time-phased product structure for the bicycle. (13 marks)
- (ii) Estimate the total lead time required to complete assembling a bicycle. (1 mark)
- (b) Explain **THREE (3)** advantages of Enterprise Resources Planning (ERP). (6 marks)

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Q3 The following questions are related to the job scheduling.

- (a) Scheduling is assigning jobs or tasks to specific people or machines by allocating and prioritizing those jobs or tasks according to capacity and availability. Explain **TWO (2)** strategies important of scheduling. (4 marks)

- (b) Gantt charts are visual project management tools used to illustrate the scheduling, timing, and progress of various tasks or activities within a project. Discuss the benefits of Gantt chart support with examples. (2 marks)

- (c) Western Digital has five jobs on order, as shown in **Table Q3.1**. Jobs are logged as they arrive. All dates are classified as manufacturing calendar days. Assume that all jobs arrive on day 275.

Table Q3.1

Job	Due date	Duration [Day]
A	313	8
B	312	16
C	325	40
D	314	5
E	314	3

- (i) Determine the sequence of jobs if the earliest due date (EDD) rule is to be applied. (2 marks)

- (ii) Determine the flow time and job lateness for the sequence. (4 marks)

- (iii) Evaluate the average completion time, the utilization, the average number of jobs in the system, and the average job lateness. (8 marks)

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- Q4** The following questions are related to the Programme Evaluation and Review Technique (PERT).

Intellect Properties has decided to construct a new factory plant to fulfil current demands and anticipated future customer needs. **Table Q4.1** details the primary tasks, their predecessors, and the estimated durations involved in the planning, scheduling, and control phases of the construction project.

Table Q4.1

Activity	Predecessor	Time [Month]
A	-	3
B	-	5
C	-	3
D	A, B	3
E	B	2
F	C	1
G	C	3
H	E, F	2
I	G	5
J	G, H	4

- (a) Construct a network diagram of PERT using Activity on Arrow (AOA). (8 marks)
- (b) Calculate the Earliest Event Time (EET) and Latest Even Time (LET) for each node. (8 marks)
- (c) Determine the critical path and critical activities of the project. (4 marks)

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Q5 The following questions are related to Lean Manufacturing and Just-in-Time (JIT).

- (a) One of the main focuses in lean manufacturing is waste reduction. Efforts to reduce waste often involve addressing these uncertainties through better forecasting, improved processes, and effective coordination across various operation divisions. Identify **TWO (2)** approaches support with examples.

(4 marks)

- (b) The Operation Director of Dutch Lady Milk Industries Berhad (DLMI) plans to implement the technique of lean manufacturing using the Kanban container system to improve the production efficiency of finished goods (1L Full Cream Milk) product by reducing the inventory level. Details of the production for ONE (1) carton are inclusive of set up cost = RM25, holding cost = RM200 (per unit per year), daily production = 10,000 units per day, annual demand = 1,000,000 units (with daily usage of 7,500 units), manufacturing lead time = 3 days, and safety stock 4 days of production. As an Operation Director of the Special Task Force (STF) of the company, you are needed to help the Operation Director with the following:

- (i) Calculate the size of the Kanban container.

(7 marks)

- (ii) Calculate the number of Kanban containers.

(9 marks)

- END OF QUESTIONS

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