

**UNIVERSITY COLLEGE TATI (UC TATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: BME 3063
COURSE	: PRODUCTION PLANNING & CONTROL
SEMESTER/SESSION	: 1 - 2024/2025
DURATION	: 3 HOURS

Instructions:

1. This booklet consists of **4** questions. Answer all the questions.
2. All answers should be written in answer booklet.
3. You are allowed to open Operation Management book by William J. Stevenson any edition.
4. Write legibly and draw sketches wherever required.
5. If in doubt, ask the invigilator / Instructor

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO
THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE

Answer all the questions. (100 marks)

QUESTION 1

- a) The economic order quantity (EOQ) is a key method used in inventory management. It calculates the optimal amount of inventory a company should purchase to effectively meet demand while reducing the expenses related to storing and maintaining inventory. **Evaluate** the significance of inventory management and the emerging technologies applied in this field.

(10 marks)

- b) **HealthPlus Sdn Bhd (HSB)**, a company that markets antiseptic solutions to hospitals, would like to reduce its inventory cost by determining the optimal number of antiseptic solutions to obtain per order. The annual demand is 2,000 units; the setup or ordering cost is RM 15 per order, and the holding cost per unit per year is RM 0.75. HSB has a 300-day working year. Use inventory formulas to **Calculate**:

- i. The optimal number of units per order (EOQ). (3 marks)
- ii. The expected number of orders placed during the year). (3 marks)
- iii. The expected time between orders. (2 marks)
- iv. The total annual ordering and holding cost. (2 marks)
- v. Suppose that the ordering cost is now RM 20, and HSB has been ordering 300 units each time an order is placed. Calculate the ordering cost would have to be. (5 marks)

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QUESTION 2

- a) The Sweet Delight Candy Company operates multiple factories around the world, producing a wide range of candies. Its chocolate candy line experiences significant seasonal fluctuations in demand, with higher sales during the winter months (driven by the holiday season and Valentine's Day) and lower sales in the summer (when chocolates are prone to melting and consumers are more weight-conscious). Given a hiring cost of RM 150 per worker, a firing cost of RM 600 per worker, a regular production cost of RM 3.00 per pound, an inventory carrying cost of RM 0.70 per pound per quarter, a production rate of 1,500 pounds per employee per quarter, and a beginning workforce of 120 workers.

Table 1.0: The data forecast for candies

Quarter	Spring	Summer	Fall	Winter
Sales Forecast	60,000	90,000	110,000	130,000

Calculate the total cost of an aggregate plan using:

- i. Level strategy. (8 marks)
- ii. Chase strategy, with hiring and firing. (10 marks)

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- b) A company that produces water filters wants to prepare a master production schedule for June and July. The forecast demands are 140 filters for June and 180 filters for July (35 filters/week in June and 45 filters/week in July). The beginning inventory is 50 filters, and there are customer orders that have been committed, as shown in the Table 2.0. **Calculate** the projected on-hand inventory and the MPS. The production lot-size is 80 filters. (7 marks)

Table 2.0: The data forecast and order for water filters.

Month	Week	Forecast	Orders
June	Week 1	35	30
	Week 2	35	40
	Week 3	35	35
	Week 4	35	35
July	Week 1	45	50
	Week 2	45	45
	Week 3	45	40
	Week 4	45	45

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QUESTION 3

- a) **Differentiate** between Material Requirements Planning (MRP) and Just-In-Time system (JIT). (5 Marks)
- b) Eco Motion Solutions, a company that specializes in electric golf carts, has recently received an order for 200 carts, with a required delivery by the end of week 8. Details on the product's structure, lead times, and current inventory levels are available in Table 3.0. Currently, there are no incoming shipments scheduled.

Table 3.0: Electric golf carts

<i>Parts List for Electric Golf Cart</i>	<i>Lead Time</i>	<i>Quantity on Hand</i>
(GC) Electric Golf Cart	1	0
(T) Top	1	40
(B) Base	1	20
(T) Top		
(S) Supports (4)	1	200
(CV) Cover	1	0
(B) Base		
(M) Motor	2	300
(BO) Body	3	50
(SE) Seats (2)	2	120
(BO) Body		
(F) Frame	1	35
(CN) Controls	1	0
(WA) Wheel Assemblies (4)	1	240

- i. **Construct** a product structure tree for the Golf Carts. (3 Marks)
- ii. **Construct** an assembly time chart. (3 Marks)
- iii. **Determine** a material requirements plan that will provide 200 golf carts by week 8 using lot-for-lot ordering. (14 Marks)

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QUESTION 4

- a) **Analyse** an assignment plan that will minimize processing costs, based on given information in Table 4.0, and interpret your answer. (10 marks)

Table 4.0: Cost at a machine

	MACHINE		
	A	B	C
1	12	8	11
2	13	10	8
3	14	9	14
4	10	7	14

- b) At the end of each month, the analytics team prepares project status reports. The team leads, Jordan and Casey, missed a calendar reminder one month and realized the reports were due the following Monday. To get back on track, they decided to work on Saturday. Jordan is responsible for writing and editing the reports, while Casey collects data and creates graphs. Casey begins her tasks as soon as Jordan completes each report. The time required for each report (in hours) is as follows:

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Table 5.0: Times for the reports

Projects	Jordan	Casey
A	4	2
B	3	5
C	5	1
D	7	3
E	8	6

Determine the sequence of the job by using the Johnson's Rule.

- i. How many hours will it take them to finish all the jobs? (10 marks)
- ii. How many hours is Jordan idle? (2.5 marks)
- iii. How many hours is Casey idle? (2.5 marks)

----- End of questions-----

