



UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	: BME 3063
COURSE	: PRODUCTION PLANNING & CONTROL
SEMESTER/SESSION	: 1-2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer **ALL** 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, raise your hands and ask the invigilator.

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO**

**THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE**

## PRODUCTION PLANNING &amp; CONTROL (BME 3063)

Answer ALL questions.

**QUESTION 1**

Forecasting can be carried out by the use of qualitative methods and quantitative methods.

- a) A company is introducing a new product. Predict the challenges and considerations in forecasting the demand for this new product. (8 marks)
- b) Estrella Pastry sells brownies, cakes and bread. Their brownies monthly sales were as follows in Table 1.

Table 1: Monthly Sales of Brownies

Month	Sales	Month	Sales
January	20	July	17
February	21	August	18
March	15	September	20
April	14	October	20
May	13	November	21
June	16	December	23

Produce January sales forecast using each of the following:

- i. Naive method. (2 mark)
- ii. A 3-month moving average. (2.5 marks)
- iii. A 6-month weighted average using 0.1, 0.1, 0.1, 0.2, 0.2, and 0.3 with the heaviest weights applied to the most recent months. (2.5 marks)
- iv. Exponential smoothing using an  $\alpha = 0.3$  and a September forecast of 18. (7 marks)

**QUESTION 2**

Inventories are a necessary part of doing business, but having too much inventory is not good.

- a) Ain Medicare Sdn Bhd (AMSB), a company that markets antiseptic solution to hospitals, would like to reduce its inventory cost by determining the optimal number of antiseptic solution to obtain per order. The annual demand is 1,000 units; the setup or ordering cost is RM 10 per order and the holding cost per unit per year is RM 0.50. AMSB has a 250-day working year. Use inventory formulas to:
- i. Calculate optimal number of units per order. (2 marks)
  - ii. Calculate expected number of orders placed during the year. (2 marks)
  - iii. Calculate expected time between orders. (2 marks)
  - iv. Calculate total annual ordering and ordering cost. (2 marks)
  - v. Suppose that the ordering cost is not RM 10, and AMSB has been ordering 250 units each time an order is placed. Calculate the ordering cost would have to be. (2 marks)
- b) To be competitive, many fast-food chains began to expand their menus to include wider range of foods. Although contribution to competitiveness, this has added to the complexity of operations, including inventory management. Specifically, in what ways does the expansion of menu offerings create problems for inventory management? Summarise your answer. (12 marks)

## PRODUCTION PLANNING &amp; CONTROL (BME 3063)

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**QUESTION 3**

Senior manager is attempting to put together an aggregate plan for the coming nine months. He has obtained a forecast of expected demand for the planning horizon. The plan must deal with highly seasonal demand; demand is relatively high in periods 3 and 4, and again in period 8, as can be seen from the following forecasts, Table 2.

Table 2: Nine Months Forecast

Period	1	2	3	4	5	6	7	8	9	Total
Forecast	190	230	260	280	210	170	160	260	180	1940

The department now has 20 full-time employees, each of whom produces 10 units of output per period at a cost of RM6 per unit. Beginning inventory for period 1 is zero. Inventory carrying cost is RM5 per unit per period, and backlog cost is RM10 per unit per period.

- a) Will the current workforce be able to handle the forecast demand?  
Determine your answer. (10 marks)
  
- b) Prepare an aggregate plan using each of the following guidelines and compute the total cost of the plan including production, inventory, and backorder costs. (12 marks)

PRODUCTION PLANNING & CONTROL (BME 3063)

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**QUESTION 4**

End item P is composed of three subassemblies, K, L, and W. K is assembled using 3 Gs and 4 Hs; L is made of 2 Ms and 2 Ns; and W is made of 3 Zs. On-hand inventories are 20 Ls, 40 Gs, and 200 Hs. Scheduled receipts are 10 Ks at the start of week 3, 30 Ks at the start of week 6, and 200 Ws at the start of week 3. One hundred Ps will be shipped at the start of week 6, and another 100 at the start of week 7. Lead times are two weeks for subassemblies and one week for components G, H, and M. Final assembly of P requires one week. Include an extra 10 percent scrap allowance in each planned order of G. The minimum order size for H is 200 units.

- a) Illustrate a product structure tree. (8 marks)
  
- b) Prepare a Material Requirements Plan (MRP) for K, G, and H using lot-for-lot ordering. (14 marks)

PRODUCTION PLANNING & CONTROL (BME 3063)

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**QUESTION 5**

Scheduling involves the timing and coordination of operations. Table 3 contains information concerning four jobs that are awaiting processing at a work center.

Table 3: Jobs at Work Center

Job	Job Time (days)	Due Date (days)
W	14	20
X	10	16
Y	7	15
Z	6	17

Sequence the jobs using (1) FCFS, (2) SPT, (3) EDD. Assume the list is by order of arrival. Analyse your answer accordingly. (12 marks)

----- End of Questions -----