UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	: BME 3063
COURSE	: PRODUCTION PLANNING & CONTROL
SEMESTER/SESSION	: 2 - 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 6 PRINTED PAGES INCLUDING COVER PAGE

Answer all the questions. (**100 marks**)

QUESTION 1

a) The economic order quantity (EOQ) is a fundamental technique employed in inventory management. It involves determining the ideal quantity of inventory that a company should procure to efficiently meet its demand while simultaneously minimizing the costs associated with holding and storing inventory. **Evaluate** the importance of inventory management and the new technologies used in inventory management.

(10 marks)

b) Sunny Delights, a food company, uses an average of 40 bottles of vegetable oil per day. The franchise operates 250 days a year. Storage and handling costs for the vegetable oil are $6 a year per bottle, and it costs approximately $15 to order and receive a shipment of vegetable oil. **Calculate**:

i. Order size that would minimize the sum of annual ordering and carrying costs. (3 marks)

ii. The total annual cost using your order size from part (i). (3 marks)

iii. The approximate lenght of a production run in days. (2 marks)

iv. Except for rounding, are annual ordering and carrying costs always equal at EOQ? (2 marks)

v. The manager at Sunny Delights is currently using an order size of 250 bottles. The partners of the firm expect the office to be managed "in a cost-efficient manner." Would you recommend to the manager to use the optimal order size instead of 250 bottles? Justify your answer. (5 marks)

QUESTION 2

Planner Global Tech Solutions, has developed the forecast per shuttles as shown in Table 1. The figures are in hundreds of shuttles. The department has a normal capacity of 275(00) shuttles per month, except for the seventh month, when capacity will be 250(00) shuttles. Normal output has a cost of $35 per hundred shuttles. Workers can be assigned to other jobs if production is less than normal. The beginning inventory is zero shuttles.

Table 1: The data forecast for shuttles

Period	January	February	March	April	May	June	July	Total
Forecast	200	250	220	270	260	255	245	1700

Calculate an aggregate plan and compute its total cost for each of these alternatives:

a) Use a chase plan that matches the forecast and compute the total cost of your plan. Given overtime is $50 per hundred shuttles. (10 marks)

b) Would the total cost be less with regular production with no overtime, but using a subcontractor to handle the excess above normal capacity at a cost of $40 per hundred shuttles? Backlogs are not allowed. The inventory carrying cost is $2 per hundred bolts. (15 marks)

QUESTION 3

a) **Differentiate** between Material Requirements Planning (MRP) and Just-In-Time system (JIT). (5 Marks)

b) Green Glide Enterprises, specializing in electric golf carts, has recently received an order for 200 carts, required for delivery by the end of week 8. Information regarding the product's composition, lead times, and current inventory levels can be found in Table 2. Presently, there are no scheduled incoming shipments."

Table 2: Electric golf carts

Parts List for Electric Golf Cart	*Lead Time*	*Quantity on Hand*
(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)

QUESTION 4

a) **Analyse** an assignment plan that will minimize processing costs, based on given information in Table 3, and interpret your answer.

(10 marks)

Table 3: 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 research team writes project status reports. Alex and Bailey, the team leaders, forgot to check their calendar one month and realized the reports were due the following Monday. To catch up, they decided to come in on Saturday. Alex writes and edits the reports, while Bailey gathers data and makes graphs. Bailey starts her part as soon as Alex finishes each report. Times for the reports (in hours) are as follows:

Table 4: Times for the reports

Projects	Alex	Bailey
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 Alex idle? (2.5 marks)

iii. How many hours is Bailey idle? (2.5 marks)

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