Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Regular and Supplementary Examination December 2023 (2019 Scheme)

Course Code: MET463

Course Name: OPERATIONS MANAGEMENT

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1		Why do companies need operations management? What does it do?	(3)
2		Select a company in your state and identify three factors that make it a good or poor location, in your opinion.	(3)
3		Narrate any two capacity expansion strategies.	(3)
4		Detail about CRAFT algorithm.	(3)
5		State the role of forecasting in operations management.	(3)
6		How does adjusted exponential smoothing differ from exponential smoothing?	(3)
7		Describe level production strategy and chase demand strategy in aggregate planning.	(3)
8		Discuss the EOQ method for lot sizing in MRP.	(3)
9		Explain any three performance measures of single machine scheduling problem.	(3)
10		State the conditions of flow shop scheduling problem.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	With the help of neat sketches, detail the relevance of different types of layout?	(8)
	b)	Differentiate between job shop production and batch production with examples.	(6)

OR

12		An organization is considering three potential locations with coordinates; location A (350, 300), location B (150, 250), and location C (250, 300) of its new distribution centre to serve five stores. The grid coordinates of stores and the annual truck shipments at each store are as follows;	(14)

Store	Coordinates		Annual truck shipments
	x	y	
1	100	300	30
2	210	180	25
3	250	400	15
4	300	150	20
5	400	200	18

Determine the best location using the load distance technique.

Module II

13 a) Distinguish between process and product layout. State the advantages and limitations of these layouts. (7)

b) "Cellular layouts attempt to combine the flexibility of a process layout with the efficiency of a product layout." Explain the statement with schematic diagram. (7)

OR

14 a) Consider the following assembly network relationships of a product. (14)

Operations Number	1	2	3	4	5	6
Immediate Precedence	-	1	1	2, 3	4	5
Duration (min)	8	4	6	9	9	12

The required production volume in 8-hour shift is 30 completed assemblies.

i. Construct the network and compute cycle time.

ii. Design assembly line using COMSOAL algorithm and compute balancing efficiency.

Module III

15 The average monthly price of a mutual fund for the past 10 months is given in the following table (14)

Month	1	2	3	4	5	6	7	8	9	10
Fund Price	60	61	63	65	66	64	69	70	69	71

i. Compute exponentially smoothed forecast with α=0.40.

ii. Compute linear regression forecast.

iii. Compare the accuracy of the two forecasts using cumulate error and indicate which forecast appears to be most accurate.

OR

16 The following table represents the sales data of milk (in litres) sold by a milk booth. (14)

Month	1	2	3	4	5	6	7	8	9	10
Sales	90	100	93	110	105	95	98	112	101	109

i. Compute a 3-month moving average forecast for months 4 through 11.

ii. Computer a weighted 3-month moving average forecast for months 4 through 11. Assign weights of 0.60, 0.30, and 0.10 to the months in sequence, starting with the most recent month.

iii. Compare the two forecasts using MAD. Which forecast appears to be more accurate?

Module IV

17 a) The master production schedule to manufacture a product A is shown below; (14)

Week	1	2	3	4	5	6	7	8
Demand	200	-	100	175	300	200	-	250

Each product A has a component B and a component C. Each component C has a subcomponent D and a subcomponent E. The details of Bill of Materials are shown in the following table.

Part	Order Quantity	Lead Time (Week)	Stock on Hand)
Product A	350	2	200
Component B	450	1	400
Component C	400	1	375
Subcomponent D	375	1	250
Subcomponent E	400	2	425

Complete material requirement plan for the product A, components B & C, and subcomponents D & E.

OR

18 The forecast for a group of products is given in the following table. (14)

Quarter	1	2	3	4	5	6	7	8
Demand	310	220	570	650	350	370	250	360

Suppose that the firm estimates that it costs Rs.100 per unit to increase the production rate, Rs.150 per unit to decrease the production rate and Rs.25 per unit

per quarter to carry the items on inventory. Compare the cost incurred if the following pure strategies are followed.

i. Varying the workforce size

ii. Changing the inventory level

Module V

19 Consider the following parallel identical machine problem. (14)

Job (j)	1	2	3	4	5	6	7	8
Processing time (t_j)	8	3	8	10	12	6	5	15
Weight (w_j)	1	3	2	2	1	3	2	4

Find the schedule which will minimize the weighted mean flow time, if the number of parallel identical machines is two.

OR

20 Consider the following flow shop scheduling problem. (14)

Job (j)	1	2	3	4	5
Machine 1	7	1	15	8	11
Machine 2	8	4	12	5	6

Find the optimal sequence which will minimize makespan using Johnson's algorithm. Also find idle time on machine 2.

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