

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (R), DECEMBER 2023**MECHANICAL ENGINEERING****(2020 SCHEME)****Course Code : 20MET461****Course Name: Operations Management****Max. Marks : 100****Duration: 3 Hours****PART A*****(Answer all questions. Each question carries 3 marks)***

1. Why customer service is considered as one of the key objective of operations management?
2. How location factor rating is used for location analysis techniques?
3. What is the principle of Group technology (GT) layout?
4. Briefly explain COMSOAL?
5. Discuss the significance of random components in sales forecasting?
6. Explain the importance of sales forecasting.
7. List out information required in Bill of materials (BOM).
8. Why production planning is important for a successful business.
9. Explain the purpose of Gantt chart in project management.
10. Why it is desirable to optimize only positive lateness?

PART B***(Answer one full question from each module, each question carries 14 marks)*****MODULE I**

11. a) Explain in detail the controllable and uncontrollable factors considered in plant location selection. (6)
- b) Consider the following data on locating a new facility which has to serve 5 different existing facilities. Coordinates of the existing facilities are (30, 20), (40, 50), (30, 30), (15, 30) and (20, 40). Number of tons of material transported per year from new facility to each of the existing facilities is given below. Find the optimal X & Y coordinates of the new facility by center of gravity method and plot all the locations on a grid map. (8)

Existing facility					
	1	2	3	4	5
New facility	1000	980	1500	2000	1750

OR

12. a) Explain in detail about Business Process Reengineering (BPR), its need and challenges in reengineering efforts. (8)
- b) What activities are involved in the operations function? How do operations interact with other functional areas? (6)

MODULE II

13. Discuss facility layouts with examples. Mention the advantages and limitations of each layout type. (14)

OR

14. a) Illustrate the practical use of CRAFT, CORELAP and ALDEP in facility layout design highlighting examples where these methodologies are applied. (9)
- b) What layout is employed in aircraft production, and provide evidence to support your conclusion? (5)

MODULE III

15. Shipment of welded tube (in tons) by an aluminum producer are as shown below: (14)

Year	93	94	95	96	97	98	99	00	01	02	03
Demand (tons)	2	3	6	10	8	7	12	14	14	18	19

- (i) Compute 3 year & 5 year moving average. Use it to forecast the shipment in the year 2004.
- (ii) Use weight of 0.5 for the most recent data, 0.3 for the next & 0.2 for the oldest and forecast the shipment for 2004.
- (iii) Use linear regression method to develop a forecasting equation and use the equation to forecast tube shipment for the year 2004.

OR

16. a) Export of a company during 2013 and 2017 are given. (8)
 Compute exports during 2018 by the method of least squares

Year	2013	2014	2015	2016	2017
Exports (crore)	1.49	1.24	1.69	1.70	3.11

- b) Explain and plot the patterns of time series analysis. (6)

MODULE IV

17. a) Forecast for a group of items manufactured in a firm is given below (14)

Period	1	2	3	4	5	6	7	8
Demand	370	320	570	670	550	370	350	480

Firm estimates that it costs Rs 200 per unit to increase the production rate, Rs 250 per unit to decrease production rate, Rs 75 per unit per quarter to carry items on inventory and Rs 125 per unit if subcontracted. Compare the cost incurred if the following pure strategies are followed.

- (a) Varying work force (b) Subcontracting

OR

18. a) A company manufacture iron box. MPS of the final assembly is as shown in figure. Initial stock on hand is 35 units, carrying cost is Rs 10 per unit/day and lead time is 1 day. Ordering cost is Rs 100. Develop an EOQ model and calculate the cost. (10)

Period (Day)	1	2	3	4	5	6	7	8	9	10
Gross requirement	35	30	40	0	10	40	30	0	30	55

- b) Distinguish aggregate planning and MPS with an example (4)

MODULE V

19. a) Distinguish between Shortest Processing Time (SPT) and Weighted Shortest Processing Time (WSPT) in sequencing a Single machine scheduling problem. Illustrate with a numerical example. (8)

- b) Write McNaughton algorithm for scheduling n independent (6)
single operation jobs on m machines

OR

20. Given the following data of machining 6 jobs in 3 machines. The (14)
order of processing jobs on machine is A – C – B and sequence
suggested for jobs 5 – 3 – 6 – 2 – 1 – 4.

Job	1	2	3	4	5	6
Machine A	12	10	9	14	7	9
Machine B	7	6	6	5	4	4
Machine C	6	5	6	4	2	4

Based on this;

- (i) Determine total elapsed time for sequence suggested.
- (ii) Is the given sequence optimal?
- (iii) If your answer for (ii) is *No*, determine optimal sequence and total elapsed time associated with it.
