

Reg. No. :

Question Paper Code : 10872

M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Elective

Computer Integrated Manufacturing

MF 4091 — MANUFACTURING MANAGEMENT

(Common to M.E. Manufacturing Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write down the importance of facility planning.
2. What are the methods for making decision on facility location planning?
3. What is understood by the term plant layout?
4. List out various advanced techniques for solving layout problem.
5. Write down the importance of forecasting.
6. Compare PERT and CPM techniques.
7. Write down the major elements of supply chain management.
8. How lead time affects material requirements planning?
9. List out the benefits of "SMED" approach.
10. Write down different types of maintenance strategies.

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail about various factors affecting plant location and their selection with an example.

Or

- (b) A medical facility is to be located in south India. The location factors, factor rating and scores for two potential locations are mentioned in table 11 (b) Which is the best location based on factor rating method?

Table 11(b) Site location and Their Rating

| SI. No. | Location factors | Rating | |
|---------|--|---------------|-----------------------|
| | | Factor rating | Location 1 Location 2 |
| 1 | Facility Utilization | 8 | 3 4 |
| 2 | Possible incoming patient | 5 | 4 3 |
| 3 | Average time taken for emergency patient to reach hospital | 6 | 4 4 |
| 4 | Construction cost | 5 | 2 2 |
| 5 | Employee willingness | 3 | 5 1 |

12. (a) Explain the characteristics and applications of different types of layout used in manufacturing industry with an example.

Or

- (b) How capacity planning is carryout and what are the steps involved in it? Explain with an example.

13. (a) A typical supply chain organization delivers office supplies to schools and agencies within a 50-km radius of its warehouse. The office supply business is competitive, and the ability to deliver orders promptly is a big factor in getting new customers and maintaining the existing customers. The manager wants to forecast the demand for deliveries of the coming month. From the records of previous orders, management has accumulated the following data for the past 10 months as shown in table 13 (a).

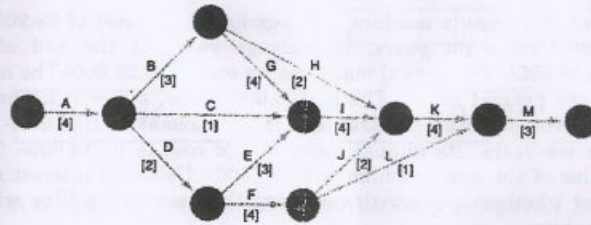
Table 13 (a) forecast details

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Order | 120 | 90 | 100 | 75 | 115 | 50 | 75 | 130 | 110 | 90 |

Compute the monthly demand forecast for June through November using a 5-month moving average method.

Or

- (b) A project manager faced with the activity network and estimated the activity times as shown in Figure 13 (b) for each activity, determine
- Earliest start time
 - Earliest finish time
 - Latest start time
 - Latest finish time
 - Slack in addition
 - Identify the critical path.



Network Flowchart

Figure - 13 (b)

14. (a) There are four models of a product A, B, C and D. The respective daily production rates and their demands are mentioned in table 14 (a) Calculate the aggregate requirements for the next month by using Product 'C' as the reference. Is there sufficient capacity to produce all the units, if the plant operates for 26 days during next month?

Table 14 (a) Demand and production details

| Product | Production rate/Day | Production requirements (No.) | Requirements (units) |
|---------|---------------------|-------------------------------|----------------------|
| A | 2500 | 8500 | |
| B | 1500 | 7000 | |
| C | 1000 | 12000 | |
| D | 2000 | 10500 | |

Or

- (b) Extrapolate the factors affecting the materials requirements planning in an industry with an example.
15. (a) The total requirements for a material from an materials requirements planning schedule are given in the following table 15 (a)

Table : 15 (a) week

| Total demand | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|
| | 200 | 400 | 900 | 500 | 200 | 200 | 500 | 400 |

The annual demand for this end item is estimated to be 25,000 units over a 50 week per year schedule, or an average of 500 units per week. It costs Rs.800/- to change over the machines in the final assembly department to this end item when a production lot is begun. It costs Rs.1.10/- per unit when one unit of this product must be carried in inventory from one week to another; therefore, when one unit of this product is in ending inventory, it must be carded over as beginning inventory in the next week and incurs the Rs.1.10/- per unit carrying cost.

Determine which of these lot sizing methods results in the least carrying and changeover (or order) costs for the eight week schedule:

- Lot for Lot (LFL),
- Economic Order Quantity (EOQ) or
- Period Order Quantity (POQ).

Or

- (b) Two years ago, a machine was purchased at a cost of Rs.200,000/- to be useful for eight years. Its salvage value at the end of its life is Rs.25,000/- The annual maintenance cost is Rs.25,000/-The market value of the present machine is Rs.120,000/- Now, a new machine to cater to the need of the present machine is available at Rs.1,50,000/- to be useful for six years. Its annual maintenance cost is Rs.14,000/- The salvage value of the new machine is Rs.20,000/- Using an interest rate of 12%, find whether it is worth replacing the present machine with the new machine.

PART C — (1 × 15 = 15 marks)

16. (a) The annual usage and their unit cost of an item used in processing industry is shown in table 16 (a) The company is interested in adopting ABC method of inventory analysis for their improvement. Hence carryout ABC analysis and justify the results.

Table 16 (a) item and their usage value

| Item | Annual usage (unit) | Unit cost (Rs.) | Annual usage (Rs.) | Ranking |
|------|---------------------|--------------------|-----------------------|---------|
| A | 30000 | 0.01 | 300 | 6 |
| B | 2800 | 1.5 | 4200 | 1 |
| C | 300 | 0.1 | 30 | 9 |
| D | 1100 | 0.5 | 550 | 4 |
| E | 400 | 0.05 | 20 | 10 |
| F | 2200 | 1.0 | 2200 | 2 |
| G | 1500 | 0.05 | 75 | 8 |
| H | 8000 | 0.05 | 400 | 5 |
| I | 3000 | 0.3 | 900 | 3 |
| J | 800 | 0.1 | 80 | 7 |

Or

- (b) A company is interested in the production of engine manifold as a lot for automobile applications. They need to perform decision making on plant selection, layout selection, allocation of resources, etc., As an Engineer perform the following decision making activities :
- Plant and layout selection with justification
 - Process plan report preparation with a flowchart.
 - Resource selection.