



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Industrial and Production Engineering

Semester End Examination; Dec - 2017/Jan - 2018

Operations Management

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. With a block diagram, explain the historical development of Operations Management. 10
- b. Briefly explain the various factors that affect productivity. 10
- 2 a. With a neat sketch, explain the frame work for decision making. 8
- b. A computer company is evaluating three cities for a new plant to manufacture hardware components which will sell at Rs. 170/- each. The economic portion of a plant location study shows the following cost and market data :

Cost data :

| | | | |
|--------------------------------|-----|-----|-----|
| Cities | A | B | C |
| Fixed Costs / year in 1000 Rs. | 300 | 200 | 150 |
| Variable Cost / Unit | 30 | 45 | 65 |

| | |
|--------|-------------|
| Volume | Probability |
| 4500 | 0.10 |
| 5500 | 0.30 |
| 6500 | 0.60 |

12

- i) On the basis of maximizing an economic expected value, graph the plant location curve (cost) using appropriate scale
- ii) From graph, which city should be selected on the basis of given volume estimate?
- iii) Estimate the break-even volume for the city selected.

UNIT - II

- 3 a. Define capacity planning. Explain the strategies of capacity planning. 10
- b. Explain the importance of forecasting with its long term and short term objectives. 10
- 4 a. A tyre manufacturing industry wishes to correlate its sale of tyres with total number of cars manufactured and marketed in the country in the past 10 years, the data is available for each year which are as follows :

| | | | | | | | | | | |
|-----------|---|---|---|----|---|----|----|----|----|----|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Car sold | 4 | 8 | 6 | 10 | 9 | 10 | 12 | 11 | 14 | 13 |
| Tyre sold | 1 | 3 | 2 | 4 | 3 | 3 | 5 | 3 | 6 | 6 |

12

Correlate the problem (X10⁶).

b. A firm uses simple exponential smoothing with $\alpha = 0.1$ to forecast demand. The forecast for the week of February 1 was 500 units. Whereas the actual demand turned out to be 450 unit.

i) Forecast the demand for the week of February

8

ii) Assume that actual demand during week of February 8 turned out to be 505 units. Forecast for the week of February 15 and continue till march 15 assuming the subsequent demands are actually 516, 488, 467, 554 and 510 units.

UNIT - III

5 a. Briefly explain the three pure planning strategies.

9

b. Explain the objectives of Aggregate planning.

6

c. Enumerate the objectives of scheduling.

5

6 a. Given the forecast requirements for end item Y, Complete MRP. (Note that a scheduled receipts of 60 units is due in period 2 and a safety stock of 25 is to be maintained) Lead time = 2 week and ordered quantity = 60 units.

| Weeks | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------------------|----|----|----|----|----|----|----|----|----|----|
| Gross required | 20 | 20 | 20 | 30 | 20 | 20 | 20 | 25 | 20 | 35 |
| Scheduled / planned receipts | | 60 | | | | | | | | |
| On hand / at the end period | | | | | | | | | | |
| Planned order Release | | | | | | | | | | |

12

b. A bill of material is desired for a bracket (Z100) that is made up of a base (A10), two springs (B11) and four clamps (C20). The base is assembled from one clamp (C20) and two housings (D21). Each clamp has one handle (E30) and each housing has two bearings (F31) one shaft (G32). Design a product structure tree that includes the level of coding information.

8

UNIT - IV

7 a. Explain the steps in capacity Management.

12

b. Differentiate between infinite loading and finite loading.

8

8 a. Briefly explain the objectives of PAC.

8

b. Explain forward and backward scheduling.

8

c. Explain the Gantt load chart.

4

UNIT - V

9 a. Find the sequence for the following eight jobs, that minimizes the total elapsed time for completion of all jobs, each job is processed in order CAB. Find the total elapsed time and idle time of each machine.

8

| | | | | | | | | | |
|----------|------|---|----|---|---|----|---|----|----|
| Machines | Jobs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | A | 4 | 6 | 7 | 4 | 5 | 3 | 6 | 2 |
| | B | 8 | 10 | 7 | 8 | 11 | 8 | 9 | 13 |
| | C | 5 | 6 | 2 | 3 | 4 | 9 | 15 | 17 |

- b. Use graphical method to minimize the time needed to process the following job on the machine shown for each machine. Find the job which should be scheduled first. Calculate the total elapsed time. Prepare make span table.

| Job 1 | | Job 2 | |
|----------|-------|----------|-------|
| Sequence | Hours | Sequence | Hours |
| A | 5 | B | 7 |
| B | 6 | C | 6 |
| C | 4 | A | 5 |
| D | 8 | D | 4 |
| E | 4 | E | 8 |

12

- 10 a. Explain the pull method of material flow, and also list its advantages.
- b. Explain the following lean tool:
- (i) Continuous improvement
 - (ii) Standardized components and work method.

10

10

* * *