



Name :
Roll No. :
Invigilator's Signature :

CS/M.TECH (ME)/SEM-1/MMT-101/2011-12
2011
OPERATIONAL MANAGEMENT

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.

Answer any *five* the following questions. $5 \times 14 = 70$

1. Define Operations management. What are the inputs to the transformation process of the Operations Management ? Explain briefly the objectives of the Operations Management. What are the operation management decisions ? What do you mean by manufacturing organizations and service organization ?
1 + 2 + 5 + 4 + 2

2. a) What do you mean by Facility location ? Explain briefly the factors affecting the selection of a proper location for a Plant.
2 + 4

- b) A small scale industrial unit intends to select one of the three locations A, B and C. The data on both tangible



and intangible factors collected by the location analysts are given below :

Item	A	B	C
a) Total investment	2500	315000	250000
b) Total sales	3400	390000	350000
c) Expenses on raw materials	8500	100000	120000
d) Expenses on distribution	5000	50000	80000
e) Expenses on utilities	50000	40000	25000
f) Salary and wages	25000	30000	25000
g) Community facilities	Excellent	Good	Bad
h) Community attitudes	Good	Fair	Very good
i) Cost of living	Excellent low	Low	Normal
j) House facilities	Very good	Good	Fair

Suggest :

- i) Best location on the basis of tangible factors.
- ii) Best location on the basis of intangible factors.
- iii) Best location on overall basis.

8

3. What do you mean by Plant Layout ? What are the objectives of a good Plant Layout ? What are the factors to be considered in the time of good Plant Layout ? How they assist in the good Plant layout ?

2 + 4 + 3 + 5



4. a) What do you understand by production planning and control (PPC) ? What are the various objectives of PPC ?

2 + 4

- b) Six jobs go first on machine I & then over II. The order of the completion of the jobs has no significance. The following table gives the machine times in hours for six jobs and two machines.

Job No. i	1	2	3	4	5	6
Time of machine I (A_i)	5	9	4	7	8	6
Time of machine II (B_i)	7	4	8	3	9	5

Find the sequence of the jobs that minimizes the total elapsed time to complete the jobs. Find the minimum elapsed time by using Gantt's chart or by other method. 8

5. a) What is inventory ? Write factors affecting inventory. Explain the term economic order quantity 2 + 2 + 2
- b) The total annual demand for an inventory item is 2000 units. The inventory carrying cost per rupee purchase value of inventory per year is 10 paisa. The order cost per order is Rs. 5/-. The purchase price of the unit



consists of two elements Rs. 2/- per unit and Rs. 40/- as fixed charges per order.

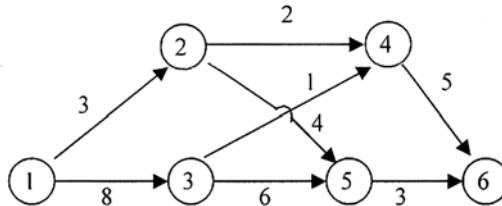
- i) Determine the economic order quantity and order quantity per year.
 - ii) If 100 more units are ordered over and above the economic order quantity per order, what is the difference in total annual cost ? 8
6. a) The following indicates the detail of the activities, i-j and their durations, d_{ij} in days.

i-j	1-2	2-3	2-4	3-5	3-6	4-6	4-7	5-8	6-8	7-8
d_{ij}	2	3	5	4	1	6	2	8	7	4

- i) What jobs are critical ?
- ii) How much slacks do jobs 2-5, 4-6, 7-8 have ?
- iii) Which jobs have free slacks and for how many days ?
- iv) If job 2-3 were to take 6 days instead of 3 how would project completion data be affected ?



b) The network for a project consisting of eight activities is given below, the activity durations in days are indicated on the branches.



- i) Determine Safety Floats for activities 1-2, 3-4
 - ii) Determine Free Floats for activities 2-4, 4-6.
 - iii) What are the activities with zero floats ?
 - iv) What is the total float for activity 2-5 ? 8 + 6
7. a) Define forecasting. What is the need of forecast in production and operations managements ? What are the elements of forecasting ? 1 + 3 + 3
- b) Lakeside hospital has used a 9- month moving average forecasting method to predict drug and surgical dressing inventory requirements. The actual demand for one item is as shown in table. Using the previous moving average data convert to an exponential smoothing forecast for the 33rd month.

Month	24	25	26	27	28	29	30	31	32
Demand	78	65	90	71	80	101	84	60	73

4

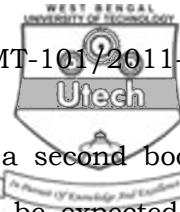


- c) The moving average forecast and actual demand for a hospital drug are as shown in table. Compute the tracking signal and comment on the forecast accuracy.

Month	27	28	29	30	31	32
Actual Demand	71	80	101	84	60	73
Forecast Demand	78	75	83	84	88	85

3

8. Arrivals at a telephone booth are considered as poisson with an average time between arrivals as 10 minutes. The mean time taken by persons for phone cell is 3 minutes.
- What is the probability that an arrival has to wait ?
 - What is the probability that an arrival has to wait more than 10 minutes before the phone is free ?
 - What is the expected time that an arrival has to wait before entering into the telephone booth ?
 - What is the expected time that an arrival completes the phone call ?



- e) The telephone company would install a second booth when convinced that an arrival would be expected to wait at least 3 minutes for the phone. How much should the flow of arrival be increased to justify the second booth ?

14

