

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1086

Unique Paper Code : 2922063603

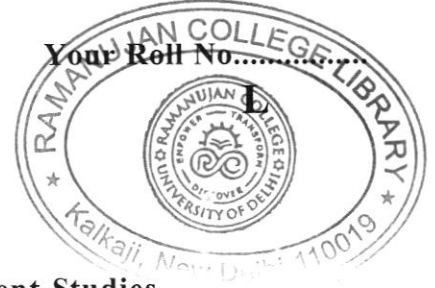
Name of the Paper : Operations Management

Name of the Course : Bachelor of Management Studies

Semester : VI

Duration : 3 Hours

Maximum Marks : 90



Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **ANY FIVE** questions.
3. **All** questions carry Equal marks.
4. Show your working clearly in your answer.
5. Use of simple calculator is allowed.

1. (a) A retail store selling smart home devices wants to forecast the monthly demand for one of its best-selling products to manage inventory efficiently. The demand (in units) for the past eight months is given below:

Month	1	2	3	4	5	6
Demand (Units)	520	580	550	600	630	690

- (i) Compute a three-month moving average forecast.
 - (ii) Compute the exponentially smoothed forecast using $\alpha = 0.25$. (Assume forecast for month 1 = actual demand of month 1)
 - (iii) Based on MAD which forecasting method is more reliable? Explain. (12)
- (b) A manufacturing company is facing problems such as excess inventory, delays in production, and unnecessary movement of materials. Discuss the lean tools that can help the company improve its operations. (6)
2. (a) A machine operator has to perform three operations viz., turning, threading and knurling on a number of different jobs. The time required to perform these operations (in minutes) for each job is known and is as follows :

P.T.O.

Job	Time for Turning (minutes)	Time for Threading (minutes)	Time for Knurling (minutes)
1	3	8	13
2	12	6	14
3	5	4	9
4	2	6	12
5	9	3	8
6	11	1	13

- (i) Determine the order in which the jobs should be processed in order to minimize the total time required to turn out all the jobs.
 - (ii) Calculate the total elapsed time.
 - (iii) What is the idle time on all three machines? Is there any job idle time. If yes, how much is it? (12)
- (b) A fast-food chain is setting up a new outlet where customer orders must be processed quickly with minimal waiting time. The management wants to design the kitchen layout in such a way that food preparation follows a fixed sequence of steps and ensures speed and consistency.
 - (i) Explain giving reasons, the most appropriate layout type for this outlet.
 - (ii) How will this layout help in improving operational efficiency and customer service. (6)
3. (a) Mike Morales is the supervisor of Legal Copy-Express, which provides copy services for downtown Los Angeles law firms. Five customers submitted their orders at the beginning of the week. Specific scheduling data are as follows :

Job (in order of arrival)	Processing Time (days)	Due Date (days hence)
A	3	5
B	4	6
C	2	7
D	6	9
E	1	2

All orders require the use of the only colour copy machine available; Morales must decide on the processing sequence for the five orders. Develop a schedule for these jobs based on the following rules: FCFS, SPT, LPT and EDD. For each priority rule, calculate the following measures:

- (i) Average completion time
- (ii) Average number of jobs in the system
- (iii) Average job lateness
- (iv) Utilization (12)
- (b) Explain how Operations Management contributes to organizational competitiveness. How does Operations Strategy strengthen this contribution? (6)
4. (a) The following table details the tasks required for Indore-based Pinaki Industries to manufacture a fully portable industrial vacuum cleaner. Demand forecasts indicate a need to operate with a cycle time of 6 minutes.
- | Task | A | B | C | D | E | F | G | H | I | J |
|------------------------|---|-----|---|---|---|------|---|---------|---|---|
| Task Time (in minutes) | 5 | 1.5 | 3 | 4 | 3 | 2 | 3 | 3.5 | 2 | 2 |
| Preceding Task | - | - | B | C | B | A, E | - | D, F, G | H | I |
- (i) Draw the Schematic diagram.
- (ii) Find the theoretical minimum number of workstations and assign tasks according to the LOT rule.
- (iii) Find the efficiency of the process and the idle time per cycle. (12)
- (b) A food processing company produces packaged snacks for a large national market. It currently uses a batch production system but is facing issues such as delays in meeting large orders and higher production costs. The demand for its products has become stable and high across the country.
- (i) Analyse whether the current batch process is appropriate for the company. Give reasons.
- (ii) Recommend a more suitable process type and explain how it would improve efficiency and cost effectiveness. (6)
5. (a) Riya, the owner of a startup, is planning to launch a new fitness tracker and must decide whether to introduce it on a large scale, a small scale, or to first conduct a market research study before making her decision. Conducting the research will cost her ₹4,000. Based on past experience, she believes

that there is a 60% probability that the research will indicate a favourable market and a 40% probability that it will indicate an unfavourable market. If the market turns out to be favourable, a large-scale launch would yield a profit of ₹20,000, while a small-scale launch would yield a profit of ₹8,000. However, if the market is unfavourable, a large-scale launch would result in a loss of ₹25,000, whereas a small-scale launch would result in a loss of ₹12,000. If Riya decides not to conduct the research, she estimates that the probability of a favourable market is 0.65. However, if she conducts the research and receives a favourable report, the probability of a favourable market increases to 0.85. On the other hand, if the report is unfavourable, the probability of a favourable market decreases to 0.30. Construct a decision tree for the given problem and calculate the Expected Monetary Value (EMV) for each possible course of action. Based on your analysis, advise Riya whether she should conduct the market research or proceed without it, and identify the most appropriate decision. (12)

- (b) Define the term 'capacity' in the context of operations management. Describe how capacity planning is strategically important to service oriented operations. (6)

6. (a) A manufacturing company requires 5,000 units of a component annually. The purchase price is ₹40 per unit. The ordering cost is ₹50 per order, and the carrying cost is ₹8 per unit per year. The company is considering producing the component internally. In that case: It saves 15% of the purchase price, the set-up cost is ₹400 per production run, the annual production rate is 10,000 units, the holding cost remains unchanged.

Calculate :

- (i) EOQ and number of orders per year
 - (ii) The optimal production lot size and maximum inventory level
 - (iii) Whether the company should manufacture or purchase the component, on the basis of cost comparison. (12)
- (b) 'Globalization of operations has a substantial bearing on the location decision that an operations manager is required to make.' Do you agree? Justify your answer with the help of appropriate examples. (6)