

**LIHMR UNIVERSITY**  
**School of Development Management**

**MBA Rural Management**  
**Batch-06 (2017-2019) – 2<sup>nd</sup> Year**

**Production and Operation Management**  
**Term Examination**

**Time - 3 Hour**

**MM-70**

The question paper contains 3 printed pages.

**Instructions**

1. The question paper contains 7 Questions. Candidates are required to answer any **five (5)** questions.
2. All questions carry equal marks.

- Q. 1.** What is Production and Operations Management ("POM")? Explain the techniques of POM which could be applied for improving organization's efficiency and effectiveness in delivering products and services in a rural development organization. **(14)**
- Q. 2.** The Southern Textile Company has decided to install a new computerized order processing system. In the past orders for the cloth the company produces were processed manually, which contributed to delays in delivering orders and resulted into lost sales. The company wants to know how long it will take to install the new system. The activities of the installation of new order processing system, their precedence, and their three time estimates (in weeks) for each activity are shown below:

| Activity | Description                                                                                                                            | Immediate predecessor | Time estimates (in weeks) |    |    |
|----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------|----|----|
|          |                                                                                                                                        |                       | a                         | m  | b  |
| A        | New computer equipment installed                                                                                                       | -                     | 6                         | 8  | 10 |
| B        | Computerized order processing system is developed                                                                                      | -                     | 3                         | 6  | 9  |
| C        | People are recruited to operate the system                                                                                             | -                     | 1                         | 3  | 5  |
| D        | Job training of the persons hired for the job                                                                                          | C                     | 3                         | 4  | 5  |
| E        | Company orientation of the other personnel in the company such as marketing, accounting and production personnel about the new system. | C                     | 2                         | 2  | 2  |
| F        | Testing of the new computerized system manually to make sure that it is logical.                                                       | B                     | 2                         | 3  | 4  |
| G        | Equipment testing and changes                                                                                                          | A                     | 2                         | 4  | 12 |
| H        | System training                                                                                                                        | A,F,D                 | 3                         | 7  | 11 |
| I        | System testing to check for errors                                                                                                     | A,F,D                 | 2                         | 4  | 6  |
| J        | Trial run and changeover to the system                                                                                                 | H,I,E                 | 1                         | 10 | 13 |
| K        | Final debugging of the computer system                                                                                                 | G                     | 1                         | 4  | 7  |

- (i) Find the expected project completion time. **(6)**
- (ii) Suppose the textile manager told customers that the new order processing system would be completely installed in 30 weeks. What is the probability that it will, in fact, be ready by that time? **(4)**
- (iii) One customer, frustrated with delayed orders, has told the textile company that if the new ordering system is not working within 22 weeks, she will trade elsewhere. Find

the probability that the project of new computerized order processing completed within 22 weeks. (4)

You can use the following extract of Table showing Area under the Normal Curve in answering the question:

|      |       |       |       |       |       |       |
|------|-------|-------|-------|-------|-------|-------|
| Z    | 1.10  | 1.12  | 1.14  | 1.7   | 1.9   | 2.0   |
| Area | .3643 | .3686 | .3729 | .4554 | .4713 | .4772 |

- Q. 3. The indirect costs for design and implementation of a new information system project in an agribusiness company are Rs. 8,000 per day. The project activities (A through I), their normal durations and compressed durations, and also the direct compression, or crashing, costs are shown in table below.

| Activity | Immediate predecessor | Normal time (days) | Compressed time (days) | Direct compression cost (Rs.) per day (in thousands) |
|----------|-----------------------|--------------------|------------------------|------------------------------------------------------|
| A        | -                     | 20                 | 19                     | 11                                                   |
| B        | A                     | 75                 | 74                     | 8                                                    |
| C        | B                     | 42                 | 40                     | 6                                                    |
| D        | B                     | 45                 | 44                     | 10                                                   |
| E        | B                     | 28                 | 26                     | 7                                                    |
| F        | C,D                   | 21                 | 18                     | 20                                                   |
| G        | E                     | 40                 | 40                     | 0                                                    |
| H        | F,G                   | 20                 | 19                     | 18                                                   |
| I        | H                     | 20                 | 19                     | 20                                                   |

Find the optimal earlier project completion time.

(14)

- Q. 4. An agribusiness company has identified two potential suppliers one in Germany another in France to supply a particular raw material. The German company quoted a price of Rs. 2000 per unit for quantities less than 500 units and Rs. 1800 per unit for orders of 500 or more while French company have quoted a price of Rs. 1900 per unit for any order. Management of the company estimates a constant demand of 500 units per year and the cost of holding a unit in stock for a year as to be 20% of its purchase cost. The cost of placing an order has been assessed as being Rs. 30,000 for either supplier. From which supplier should the raw material be ordered, and in what quantity? (14)

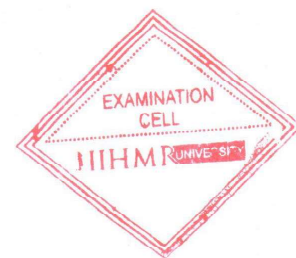
- Q. 5. (a) Explain the structure of transportation problem as a special class of the linear programming problem. (4)

(b) An organic food manufacturer wants optimize the distribution of food supplies to three regions from four warehouses. The warehouses have the following supplying capacity:

| Warehouses | Supply (no. of shipments) |
|------------|---------------------------|
| A          | 50                        |
| B          | 80                        |
| C          | 70                        |
| D          | 140                       |

The demand of the three regions are as follows:

| Regions  | Demand (no of Shipments) |
|----------|--------------------------|
| Region 1 | 180                      |
| Region 2 | 90                       |
| Region 3 | 70                       |



The supply chain manager has estimated the following distribution costs per shipment (in '00 Rs.):

| Warehouses | Regions        |                |                |
|------------|----------------|----------------|----------------|
|            | R <sub>1</sub> | R <sub>2</sub> | R <sub>3</sub> |
| A          | 40             | 70             | 20             |
| B          | 10             | 30             | 30             |
| C          | 70             | 40             | 50             |
| D          | 20             | 60             | 10             |

As an Operations Manager, find the optimum distribution schedule and total minimum transportation cost. (10)

- Q. 6. The staffing manager of a well-known NGO wishes to improve efficiency of the staffing process by reducing total time taken in 6 key tasks. He has to assign the tasks to five experienced employees for which he had computed the time to complete each task based of their effectiveness matrix.

| Employee Time for Different Stages |                       |    |    |    |    |    |
|------------------------------------|-----------------------|----|----|----|----|----|
| Employee                           | Tasks (Time in Hours) |    |    |    |    |    |
|                                    | A                     | B  | C  | D  | E  | F  |
| 1                                  | 12                    | 7  | 20 | 14 | 8  | 10 |
| 2                                  | 10                    | 14 | 13 | 20 | 9  | 11 |
| 3                                  | 5                     | 3  | 6  | 9  | 7  | 10 |
| 4                                  | 9                     | 11 | 7  | 16 | 9  | 10 |
| 5                                  | 10                    | 6  | 14 | 8  | 10 | 12 |

- (i) Determine the optimal assignment of employees to minimize total time taken for the staffing process. (10)
- (ii) Is there an alternative optimal assignment possible? What is the minimum possible time for the assignments? (2)
- (iii) The management discovers that due to union rules employee 2 cannot be assigned to task A and employee 5 cannot be assigned to task E. What, if any impact does this have on the optimal assignment? Are alternative assignments possible? (2)

- Q. 7. Write short notes on any two of the following :

(7 x 2)

- Inventory Management - EOQ & ABC Analysis.
- Resource Leveling & Resource Smoothing.
- Queuing and capacity planning.
- 7 QC tools for identifying quality problems and causes.

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