



**Institute of Management  
JK Lakshmipat University  
Jaipur  
END TERM EXAMINATION 2016**

**BBA FT Sem-IV**  
**MM: 50 Marks**

**Course: Principles of Operations Management**  
**Time: 3 Hours**  
**Subject code: BBA 406**

**Instructions: Attempt any three questions from Section A. Section B is compulsory.**

**Section A**

1A. The Ritz Hotel has 240 rooms. The hotel's housekeeping department is responsible for maintaining the quality of the rooms' appearance and cleanliness. Each individual housekeeper is responsible for an area encompassing 20 rooms. Every room in use is thoroughly cleaned and its supplies, toiletries, and so on are restocked each day. Any defects that the housekeeping staff notice that are not part of the normal housekeeping service are supposed to be reported to hotel maintenance. Every room is briefly inspected each day by a housekeeping supervisor. However, hotel management also conducts inspection tours at random for a detailed, thorough inspection for quality-control purposes. The management inspectors not only check for normal housekeeping service defects like clean sheets, dust, room supplies room literature, or towels, but also for defects like an inoperative or missing TV remote, poor TV picture quality or reception, defective lamps, a malfunctioning clock, tears or stains in the bedcovers or curtains, or a malfunctioning curtain pull. An inspection sample includes 12 rooms, that is, one room selected at random from each of the twelve 20-room blocks serviced by a housekeeper. Following are the results from 15 inspection samples conducted at random during a one-month period:

| Sample            | 1  | 2 | 3  | 4  | 5  | 6  | 7 | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
|-------------------|----|---|----|----|----|----|---|----|----|----|----|----|----|----|----|
| Number of Defects | 12 | 8 | 16 | 14 | 10 | 11 | 9 | 14 | 13 | 15 | 12 | 10 | 14 | 17 | 25 |

The hotel believes that approximately 99% of the defects (3 sigma limits) are caused by natural, random variations in the housekeeping and room maintenance service with 1% caused by nonrandom variability. They want to construct a c-chart to monitor the housekeeping service.

(5 M)

**1B.** Twenty samples of  $n = 200$  were taken by an operator at a workstation in a production process. The number of defective items in each sample were recorded as follows.

|                      |    |    |    |    |    |    |    |    |    |    |
|----------------------|----|----|----|----|----|----|----|----|----|----|
| Sample               | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
| Number of Defectives | 12 | 18 | 10 | 14 | 16 | 19 | 17 | 12 | 11 | 14 |

Management wants to develop p-chart using 3-sigma limits. Set up the p-chart and determine if the process was out of control at any point. (5 M)

**2A.** As a manager, how would you deal with the possibility that customer satisfaction does not always lead to customer retention? (4 M)

**2B.** Use the dimensions of quality to describe typical characteristics of these products and services

- i. A television set. (1.5 M)
- ii. A restaurant meal (product). (1.5 M)
- iii. Painting a house. (1.5 M)
- iv. Surgery and post-surgery care (1.5 M)

**3.** On the basis of the table given below answer the questions following the table

| Component | Time Standard             |                     | Lot size<br>(units / lot) | Deamand Forecast |          |            |
|-----------|---------------------------|---------------------|---------------------------|------------------|----------|------------|
|           | Processing<br>(hr / unit) | Set up<br>(hr/ lot) |                           | Pessimistic      | Expected | Optimistic |
| A         | .05                       | 1.0                 | 60                        | 15,000           | 18,000   | 25,000     |
| B         | .20                       | 4.5                 | 80                        | 10,000           | 13,000   | 17,000     |
| C         | .05                       | 8.2                 | 120                       | 17,000           | 25,000   | 40,000     |

- i. How many machines are required to meet minimum (pessimistic) demand, expected demand, and maximum (optimistic) demand (4M)
- ii. How many machines are required if the operations manager decides to double the lot size? (3M)
- iii. If the operations manager has 3 machines believe that plant can reduce set up time by 20% through process improvement initiatives, does that plant have adequate capacity to meet all demand scenario without increasing lot size? (3M)

**4A.** Doctors' and dentists' offices frequently schedule patient visits at regularly spaced intervals. What problems can this create? Can you suggest an alternative approach to reduce these problems? Under what circumstances would regularly space appointments constitute a reasonable approach to patient scheduling? (4M)

- 4B.** Using the information presented in the following table, identify the processing sequence that would result using (1) FCFS, (2) SPT, (3) EDD. For each method, determine (1) average job flow time, (2) average job tardiness, and (3) average number of jobs in the system. Jobs are listed in order of arrival. (6M)

| Job | Processing Time per Unit | Units per Job | Setup Time | Due Date |
|-----|--------------------------|---------------|------------|----------|
| a   | .14                      | 45            | .7         | 4        |
| b   | .25                      | 14            | .5         | 10       |
| c   | .10                      | 18            | .2         | 12       |
| d   | .25                      | 40            | 1.0        | 20       |
| e   | .10                      | 75            | .5         | 15       |

- 5A.** Layout decisions affect a wide range of facilities, from factories, supermarkets, offices, department stores, and warehouses, to malls, parking lots and garages, and kitchens. Layout is also important in the design of some products such as the interiors of automobiles and the arrangement of components inside computers and other electronic devices. Select three different items from this list, or other similar items, and explain for each what the four or five key considerations for layout design are. (5 M)

- 5B.** Shyam musical instrument shop produces low cost, highly durable guitars for beginners. Typically out of 100 guitars produced each month, only 80% are good enough to sell. 20% are scrapped due to quality problems. Identify after the production process is complete. Each guitar sells for 250 Rs. Because some of the production process is automated each guitar only required 10 labour hours. Each employee worked on an average 160 hours per month. Labour is paid Rs. 10 per hour. Material cost is Rs. 40 per guitar and overhead is Rs. 4000.

- Calculate the labour and Multifactor productivity ratio
- After some study operation manager Ramlal recommends three operations to improve the company's multifactor productivity: (a) increase the sales price by 10% (b) improve quality so that only 10% are defective (iii) reduce labour, material and overhead cost by 10%. Which option has the greatest impact on multifactor productivity measures (5 M)



## Section B

**Q6. A** The times required to complete each of eight jobs in a two-machine flow shop are shown in the table that follows. Each job must follow the same sequence, beginning with machine A and moving to machine B.

- i. Construct a chart of the resulting sequence that will minimize makespan time and find machine B's idle time (4 M)
- ii. For the sequence determined in part a, how much would machine B's idle time be reduced by splitting the last two jobs in half? (4 M)

| Job       | a  | b  | c | d | e  | f  | g  | h  |
|-----------|----|----|---|---|----|----|----|----|
| Machine A | 16 | 3  | 9 | 8 | 2  | 12 | 18 | 20 |
| Machine B | 5  | 13 | 6 | 7 | 14 | 4  | 14 | 11 |

**Q6. B** Suppose you are going to have a prescription filled at a local pharmacy. Referring to the dimensions of service quality for each dimension, give an example of how you would judge the quality of the service. (4 M)

**Q6. C** A hospital has to pay nurses for 40 hours a week. One nurse is assigned to one patient. The cost per hour for each of the nurse is given below:

- i. Find the nurse – patient combination to minimize cost to hospital (2 M)
- ii. How much does each nurse earn per week? (2 M)

|         | Patient W | Patient X | Patient Y |
|---------|-----------|-----------|-----------|
| Nurse K | 10        | 10        | 30        |
| Nurse L | 30        | 10        | 20        |
| Nurse M | 20        | 30        | 20        |

Suppose that a new patient Z is admitted and that a new nurse N is appointed. The new patient is charged Rs. 40 per hour by each of the existing nurse. The new nurse charges Rs. 50 per hour irrespective of the patient.

- iii. What would be your revised calculations? (2 M)
- iv. Comment on the new solution (2 M)