# Model Question Paper -1 with effect from 2020-21(CBCS Scheme)

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## Fifth Semester B.E. Degree Examination
### Operations Management

TIME: 03 Hours                                                    Max. Marks: 100

Note:    01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

| | | Module – 1 | |
|---|---|---|---|
| Q.1 | (a) | Define Operations Management? Give the classifications of production systems | 8 |
| | (b) | Explain in brief the functions of Operations Management | 6 |
| | (c) | Define productivity? List the factors affecting productivity | 6 |
| | | OR | |
| Q.2 | (a) | What is decision making? What are the steps involved in decision making | 8 |
| | (b) | Explain briefly the characteristics of operations decisions and the framework for decision | 6 |
| | (c) | What is break even analysis? Explain | 6 |
| | | Module – 2 | |
| Q.3 | (a) | Explain the moving average and simple exponential smoothing method of forecasting | 6 |
| | (b) | Explain linear regression method for trend analysis by least squares. Explain any simplification possible | 6 |
| | (c) | The data given below refers to past sales for last 11 years. Using the least squares, estimate sales forecast for the next 2 years. Also use moving average for 3 years and compare the forecast demand with the estimate made using least square method | 8 |

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales Rs x 100 | 35 | 50 | 48 | 47 | 50 | 55 | 65 | 77 | 92 | 86 | 100 |

| | | OR | |
|---|---|---|---|
| Q.4 | (a) | What is forecasting, list the steps involved in forecasting process | 6 |
| | (b) | List the elements of good forecasting technique | 6 |
| | (c) | A car manufacturing firm finds a relation of sales of car and index of demand for a car. Sales for the past five years are given in the table below. Find the relation between the demand index and the sale of the car by least square of linear regression. Further make a forecast  for the sixth year assuming the demand of index is 210. | 8 |

| Year | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Sales | 110 | 130 | 150 | 160 | 180 |

| | | Demand Index | 100 | 110 | 140 | 150 | 200 | |
|---|---|---|---|---|---|---|---|---|

## Module – 3

| Q.5 | (a) | Explain i) Design capacity  ii) System capacity | |
|---|---|---|---|
| | (b) | List the various factors influencing plant location | |
| | (c) | A film developing agency must determine how many photo enlarger cubicles are required to maintain an output of 200 prints per hour. The setup and exposure time can theoretically be done on 2 minutes/print, but operations are an average only 90 % efficient and in addition 5% of print scrapped and redone. Also the cubicles can be utilized for enlarging only 70% of the time. i) What is the required system capacity in printer/ hour ii) What average output per hour can be expected from each cubicles taking its use factor and efficiency into account iii) How many enlarger cubicles are required | |

### OR

| Q.6 | (a) | What is facility layout? What factors determines the type of layout used in an organisation | |
|---|---|---|---|
| | (b) | Sketch and explain any two types of layouts | |
| | (c) | How do you define capacity and how do you measure it. A factory wishes to acquire stamping machines to produce 30,000 T Shirts per month. They operate 200 hours per month but the machine will be used of 75% of the time only and the output is 5 % defective. A stamping operation takes one minute per T shirt. Assuming 95% efficiency, calculate how many machines are needed | |

## Module – 4

| Q.7 | (a) | What is aggregate planning? What are the objectives of aggregate planning | |
|---|---|---|---|
| | (b) | The supply, demand, cost and inventory data for a company which has constant workforce is given below | |

| Demand Period | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Forecast demand | 100 | 50 | 70 | 80 |

| Period | Supply capacity Units | | |
|---|---|---|---|
| | Regular time | Overtime | Sub Contract |
| 1 | 60 | 18 | 1000 |
| 2 | 50 | 15 | 1000 |
| 3 | 60 | 18 | 1000 |
| 4 | 65 | 20 | 1000 |

Initial inventory = 20, Final inventory = 25. Total cost / unit (regular time) = Rs 100, Overtime cost/unit = Rs 125, Subcontract cost per unit = Rs 130 , Carrying cost unit/period = Rs 52. Use transportation model format to allocate the production capacity to satisfy the demand at minimum cost

### OR

| Q.8 | (a) | List the common strategies used in aggregate planning? Explain any two |
|---|---|---|

| | (b) | What are the functions of master process for scheduling | |
|---|---|---|---|
| | (c) | A firm has developed the following demand forecast in units for an item which is influenced by seasonal factors. Suppose the firm estimates that it costs Rs 150 per unit to increase the production rate, Rs 200 per unit to decrease the production rate by changing work force and Rs 100 per unit if sub contracted. Compare the cost incurred if both pure strategies are followed | |

| Month | Jan | Feb | Mar | April | May | June | July | Aug |
|---|---|---|---|---|---|---|---|---|
| Forecast Demand | 270 | 220 | 470 | 670 | 450 | 270 | 220 | 370 |

## Module – 5

| | | | |
|---|---|---|---|
| Q.9 | (a) | Define Material Resources Planning (MRP) and with a block diagram, explain the various inputs to an MRP system | |
| | (b) | What is ERP ? Write the benefits and imitations of ERP | |
| | (c) | A work centre operates 6 days a week on two shifts per day basis ( 8 hrs /shift). It has four machines with the same capacity. If the machines are utiised 75% of the time at a system efficiency of 90%, what is the rated output in standard hours/ week. | |

| OR | | | |
|---|---|---|---|
| Q.10 | (a) | State the importance of purchasing and supply chain management | |
| | (b) | Write a note on make or buy decision | |
| | (c) | Explain stages of vendor development | |

| | | Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome | | |
|---|---|---|---|---|
| Question | | Bloom's Taxonomy Level attached | Course Outcome | Programme Outcome |
| Q.1 | (a) | L2 | CO 1 | |
| | (b) | L2 | CO 1 | |
| | (c) | L1 | CO 1 | |
| Q.2 | (a) | L2 | CO 2 | |
| | (b) | L2 | CO2 | |
| | (c) | L2 | CO2 | |
| Q.3 | (a) | L2 | CO3 | |
| | (b) | L2 | CO3 | |
| | (c) | L4 | CO5 | |
| Q.4 | (a) | L2 | CO3 | |
| | (b) | L1 | CO3 | |
| | (c) | L4 | CO5 | |
| Q.5 | (a) | L2 | CO3 | |
| | (b) | L2 | CO3 | |
| | (c) | L4 | CO5 | |
| Q.6 | (a) | L2 | CO4 | |
| | (b) | L3 | CO4 | |
| | (c) | L4 | CO5 | |
| Q.7 | (a) | L2 | CO4 | |
| | (b) | L4 | CO5 | |
| | (c) | -- | CO4 | |
| Q.8 | (a) | L1 | CO4 | |
| | (b) | L2 | CO4 | |
| | (c) | L4 | CO5 | |
| Q.9 | (a) | L2 | CO4 | |

| | | | | |
|---|---|---|---|---|
| | (b) | L2 | CO4 | |
| | (c) | L4 | CO5 | |
| Q.10 | (a) | L2 | CO4 | |
| | (b) | L2 | CO4 | |
| | (c) | L2 | CO4 | |

| Bloom's Taxonomy Levels | Lower order thinking skills | | |
|---|---|---|---|
| | Remembering( knowledge):$\square_1$ | Understanding Comprehension): $\square_2$ | Applying (Application): $\square_3$ |
| | Higher order thinking skills | | |
| | Analyzing (Analysis): $\square_4$ | Valuating (Evaluation): $\square_5$ | Creating (Synthesis): $\square_6$ |

# Model Question Paper –2 with effect from 2020-21(CBCS Scheme)

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# Fifth Semester B.E. Degree Examination
Operations Management

TIME: 03 Hours                                                                 Max.  Marks: 100

Note: 02. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

| | | Module – 1 | |
|---|---|---|---|
| Q.1 | (a) | Distinguish between manufacturing and service organisation | 5 |
| | (b) | Explain with schematic model the main functions of business organization and role of operations management | 5 |
| | (c) | The value of layoff table are as in table below. Determine the choice to make under maximin and laplace strategies | 10 |

| | New bridge | No new bridge |
|---|---|---|
| A | 1 | 14 |
| B | 2 | 10 |
| C | 4 | 6 |

| | | OR | |
|---|---|---|---|
| Q.2 | (a) | Briefly explain the various characteristics of decision making | 5 |
| | (b) | Give a brief account of historical evolution of operations management | 5 |
| | (c) | The following figures show the profits and sales of XYZ company. Calculate i) Fixed cost ii) BEP iii) P/V ratio iv) Sales to earn a profit of Rs 6000. | 10 |

| Year | Sales in Rs | Profit in Rs |
|---|---|---|
| 2017 | 25,000 | 3000 |
| 2018 | 35,000 | 4500 |

| Module – 2 | | | |
|---|---|---|---|
| Q.3 | (a) | State the various factors affecting forecasting | 6 |
| | (b) | State various time series method of forecasting. Explain i) Simple moving average method ii) Weighted moving average | 8 |
| | (c) | Why are forcasts important to an organization? What are features. | 6 |

| OR | | | |
|---|---|---|---|
| Q.4 | (a) | The table below gives a sales record of a car firm. Determine the regression line for the firm and find the forecast of the sales in the month of January next year | 8 |

| Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 90 | 111 | 99 | 89 | 87 | 84 | 104 | 102 | 95 | 114 | 103 | 113 |

| | (b) | Explain linear regression method for trend analysis by least squares. Explain any simplification possible | 6 |
|---|---|---|---|
| | (c) | Demand for Cars in Bangaluru was 400, 350 and 250 in first, second and third quarter. i) What is the forecast in 4th quarter by simple average method? ii) What is the forecast for 4th quarter by WMA given weightage for the most recent past period is double than the other two previous periods | 6 |

| Module – 3 | | | |
|---|---|---|---|
| Q.5 | (a) | Define capacity planning? Explain short term capacity strategies | 4 |

| | | | |
|---|---|---|---|
| | (b) | Explain long term capacity strategies | 6 |
| | (c) | An automobile component manufacturer has a plan of buying moulding machine which can manufacture 17000 parts per year. The moulding machine is a part of product line and its efficiency is 85 %. i) What is the required system capacity ii) Assume that 100 seconds time is required to mould each part and the pant operates for 2000 hours per annum. If the moulding machines are used for 60% of the time and are 90% efficient what is the output of moulding machines per hour. Iii) how many moulding machines would be required. | 10 |
| OR | | |
| Q.6 | (a) | What is the importance of capacity decisions for an organisation | 4 |
| | (b) | What is the general procedure for making location decisions for a plant | 4 |
| | (c) | ISRO is considering expansion of existing facility by adding 1 ton capacity of curing furnace for manufacturing solid propellant. Each batch on 1 ton propellant must undergo 30 minutes of furnace time, including loading and unloading operations. Due to power restrictions, the furnace is used only for 80% of the time. In a shift of 8 hours, the required output is to be 16 tonnes.If the plant system estimated is 40% of system capacity, determine the number of furnaces required | 12 |
| Module – 4 | | |
| Q.7 | (a) | Briefly explain the following with the help of flow chart i) Aggregate planning ii) Master scheduling | 6 |
| | (b) | What are the common strategies for aggregate planning? Explain any two | 6 |
| | (c) | A company produces PCs, that have seasonal demand factors. The available production capacity during regular time and overtime as well as cost data are shown in the table below. Initial inventory = 20, Final inventory = 25, Total cost /unit regular time (RT) = Rs 100, Overtime (OT) cost per unit is Rs 125, Subcontracting (SC) cost per unit is Rs 130, Carrying cost unit/period = Rs 2, Use transportation model | 8 |

| Period | Available capacity units | | | Demand Forecast Units |
|---|---|---|---|---|
| | RT | OT | SC | |
| 1 | 60 | 18 | 1000 | 100 |
| 2 | 50 | 15 | 1000 | 50 |
| 3 | 60 | 18 | 1000 | 70 |
| 4 | 65 | 20 | 1000 | 80 |

| | | | |
|---|---|---|---|
| OR | | |
| Q.8 | (a) | State the functions of master production scheduling | 6 |
| | (b) | A furniture company operates with a constant work force with which 3000 dining tables can be produced. The yearly demand is 12000 units and is dispersed seasonally with quarterly indices Q1 =0.8, Q2= 1.4, Q3=1 and Q4=0.8. Inventories are accumulated when demand is less than capacity and are used up in the periods of high demand. To satisfy the total demand i) How much tables must be accumulated each quarter, ii) what inventory must be in hand at the beginning of first quarter | 10 |
| | (c) | Mention the strategies for aggregate planning | 4 |

## Module – 5

| | | | |
|---|---|---|---|
| Q.9 | (a) | What is MRP and give the inputs required | 6 |
| | (b) | Discuss various input and outputs of MRP. What is ERP | 6 |
| | (c) | Complete the MRP for item X shown below. Note that this item has an independent demand which necessitates that a safety stock of 40 units be maintained. Ordered quantity = 70, lead time is 4 weeks, Safety stock = 40 units | 8 |

| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Projected requirements | 20 | 20 | 25 | 20 | 20 | 25 | 20 | 20 | 30 | 25 | 25 | 25 |
| Receipts | | 70 | | | | | | | | | | |
| On hand at the end of the period        65 | | | | | | | | | | | | |
| Panned Order release | | | | | | | | | | | | |

OR

| | | | |
|---|---|---|---|
| Q.10 | (a) | Explain the importance of supply management and purchase | 6 |
| | (b) | Explain the concept of tenders and logistics management | 6 |
| | (c) | XYZ company requires a new component for their laptop cleaning machines. The company has to decide whether to make or buy them. If it decides to make them should it use process A or process B ? Use a break even analysis to advise them. i) Should XYZ make using process A , B or buy. ii) At what annual volume should XYZ switch from Make/Buy decision to other | 8 |

| | Make A | Make B | Buy |
|---|---|---|---|
| Annual Volume | 10,000 | 10,000 | 10,000 |
| Fixed Cost/Unit | 1,50,000 | 2,00,000 | |
| Variable Cost/Unit | Rs 100 | Rs 50 | Rs 200 |

| Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome | | | |
|---|---|---|---|
| Question | Bloom's Taxonomy Level attached | Course Outcome | Programme Outcome |
| Q.1 | (a) | | |
| | (b) | | |
| | (c) | | |
| Q.2 | (a) | | |
| | (b) | | |
| | (c) | | |
| Q.3 | (a) | | |
| | (b) | | |
| | (c) | | |
| Q.4 | (a) | | |
| | (b) | | |
| | (c) | | |
| Q.5 | (a) | | |
| | (b) | | |
| | (c) | | |
| Q.6 | (a) | | |
| | (b) | | |
| | (c) | | |
| Q.7 | (a) | | |
| | (b) | | |
| | (c) | | |
| Q.8 | (a) | | |
| | (b) | | |
| | (c) | | |
| Q.9 | (a) | | |
| | (b | | |

| | ) | | | |
|---|---|---|---|---|
| | (c) | | | |
| Q.10 | (a) | | | |
| | (b) | | | |
| | (c) | | | |

| Bloom's Taxonomy Levels | Lower order thinking skills | | |
|---|---|---|---|
| | Remembering( knowledge):$L_1$ | Understanding Comprehension): $L_2$ | Applying (Application): $L_3$ |
| | Higher order thinking skills | | |
| | Analyzing (Analysis): $L_4$ | Valuating (Evaluation): $L_5$ | Creating (Synthesis): $L_6$ |