

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2182501

Date:15/05/2019

Subject Name:Production and Operations Management

Time:10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** The Good and Rich Candy Company makes a variety of candies in three factories worldwide. Its line of chocolate candies exhibits a highly seasonal demand pattern, with peaks during the winter months (for the holiday season and Valentine's Day) and valleys during the summer months (when chocolate tends to melt and customers are watching their weight). Given the following costs and quarterly sales forecasts, determine whether (a) level production, or (b) chase demand would more economically meet the demand for chocolate candies:

| Quarter        | Spring | Summer | Fall   | Winter |
|----------------|--------|--------|--------|--------|
| Sales Forecast | 80000  | 50000  | 120000 | 150000 |

Beginning workforce = 100 workers

Production per employee = 1000 pounds per quarter

Regular production cost per pound = Rs.2.00

Inventory carrying cost = Rs. 0.50 per pound per quarter

Firing cost = Rs. 500 per worker

Hiring cost = Rs. 100 per worker

- (b) Identify several industries that have highly variable demand patterns. Explore how they adjust capacity **04**
- (c) Describe the output of aggregate planning. **03**

- Q.2 (a)** List various objectives of Scheduling. **03**
- (b) The Clean-Car service has five cars waiting to be washed. The time required (in minutes) for washing is given below. **04**

| Car  | 1 | 2 | 3  | 4 | 5 |
|------|---|---|----|---|---|
| Wash | 5 | 7 | 10 | 8 | 3 |

In what order should the cars be processed to minimize average flow time?

- (c) Discuss the process of vendor rating. **07**

**OR**

- (c) Discuss scheduling approach for various types of manufacturing processes. **07**

- Q.3 (a)** List some of the operations and functions in a company that are dependent on a forecast for product demand. **03**
- (b) What is the difference between quantitative forecast methods and qualitative forecast methods? **04**
- (c) A computer software firm has experienced the following demand for its "Personal Finance" software package: **07**

A manufacturing company has monthly demand for one of its products as follows:

| Period | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|--------|----|----|----|----|----|----|----|----|
| Demand | 56 | 61 | 55 | 70 | 66 | 65 | 72 | 75 |

Develop an exponential smoothing forecast using  $\alpha = 0.40$  and an adjusted exponential smoothing forecast using  $\alpha = 0.40$  and  $\beta = 0.20$ . Compare the accuracy of the two forecasts using MAD.

- Q.3** (a) List various objectives of Process Panning. **03**
- (b) What are the major cost factors considered in process selection? How is breakeven analysis used for process selection? **04**
- (c) MSV Fashion, a shoe manufacturing company is trying to determine how best to produce its new line of shoes for expanded feet. Demand for its w-i-d-e products is uncertain. Given the alternative processes and costs below, determine at what level of demand you would choose each process. **07**

| Process       | A            | B            | C        |
|---------------|--------------|--------------|----------|
| Fixed Cost    | Rs. 20,000/- | Rs. 10,000/- | Rs. 0/-  |
| Variable Cost | Rs. 5/-      | Rs. 10/-     | Rs. 20/- |

- Q.4** (a) Best Vision is revamping its assembly lines to improve efficiency. As shown below, there are 10 steps to assembling a television set. **10**
- a. If Best needs to produce 120 televisions in a 40-hour work week, how should the line be balanced? Given that one worker is assigned to each workstation, how many workers are required to operate the line? What is the efficiency of the line?
- b. If demand for televisions is reduced to 100 sets per 40-hour week, how many workers will be needed to man the line? Re-balance the line and re-calculate its efficiency.

| Task | Task Time (min) | Task that must precede |
|------|-----------------|------------------------|
| A    | 8               | -                      |
| B    | 4               | A                      |
| C    | 7               | A                      |
| D    | 3               | A                      |
| E    | 7               | B                      |
| F    | 11              | C, E                   |
| G    | 2               | D                      |
| H    | 8               | G                      |
| I    | 5               | F, H                   |
| J    | 7               | I                      |

- (b) How do mixed-model assembly lines differ from traditional assembly lines? What additional decisions are required? **04**

OR

- Q.4** (a) Professional Image Briefcases is an exclusive producer of handcrafted, stylish cases. The company assembles each case with care and attention to detail. This laborious process requires the completion of the six primary work elements listed here. **10**

| Task | Task Time (Mins) | Task that must precede |
|------|------------------|------------------------|
| A    | 30               | -                      |
| B    | 15               | A                      |
| C    | 10               | B                      |
| D    | 5                | -                      |
| E    | 10               | C, D                   |
| F    | 10               | E                      |

- a. Construct a precedence diagram for the manufacturing of briefcases.
- b. Compute the flow time required for assembling one briefcase and the cycle time necessary to assemble 50 cases in a 40-hour week.
- c. Balance the line and compute its efficiency.
- d. How would you change the line to produce 80 cases per week?
- (b) Discuss the objectives of *Material Management* in an organization. **04**
- Q.5** (a) Which can be measured and controlled more easily, angular or rectangular relationships? Explain. **07**

(b) Why locators are generally arranged in a 3-2-1 pattern? **www.FirstRanker.com** 07

**OR**

**Q.5 (a)** How does the term Straightness apply to a cylinder? What problems arise in measuring straightness as it is defined? **07**

**(b)** Discuss the advantages and disadvantages of using part time workers, subcontracting work, and building up inventory as strategies for meeting demand. **07**

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