

**Fourth Semester M.Tech. Degree Examination, June/July 2016**  
**Computer Aided Production & Operation Management**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. Solve the following LPP using simplex method:

$$\text{Maximize } z = 6x_1 - 3x_2 + 2x_3$$

Subject to constraints

$$2x_1 + x_2 + x_3 \leq 16 ; \quad 3x_1 + 2x_2 + x_3 \leq 18 ; \quad x_2 - 2x_3 \geq 8$$

$$x_1, x_2, x_3 \geq 0$$

(14 Marks)

- b. Differentiate between assignment problem and transportation problem. (06 Marks)
- 2 a. A company wants to purchase a machine to increase the output of its production centre. It has to choose from two feasible alternatives, machine A and Machine B, which have been identified to be suitable for the purpose. The relevant cash flow for each machine is given below. If the rate of interest is 10%, which machine will you prefer? (14 Marks)

| Item                        | Machine A | Machine B |
|-----------------------------|-----------|-----------|
| Purchase price (₹)          | 50,000    | 60,000    |
| Annual maintenance cost (₹) | 5000      | 2500      |
| Annual Revenue (₹)          | 20,000    | 20,000    |
| Useful life (yr.)           | 6         | 6         |
| Salvage value (₹)           | 0         | 0         |

- b. Write a note of measure of forecast error. (06 Marks)
- 3 a. An item for which the daily demand is 20 per day, is produced at the rate of 50 units per day. The set up cost is ₹ 100 per cycle and the inventory holding cost is Re. 0.02 per unit per day. Find (i) the economic lot size (ii) the cycle time and (iii) minimum cost per day. (08 Marks)
- b. Distinguish between static and dynamic inventory models. (06 Marks)
- c. The demand for a particular item is 10,000 units/yr. The ordering cost is ₹ 100/order. The carrying cost is ₹ 0.5/unit / year. Determine (i) EOQ (ii) No. of orders per year and (iii) Total cost when the unit cost is ₹ 2. (06 Marks)
- 4 An assembly line consists of 14 operations. The time required and the precedence requirements for each operation are given below:

| Operation | Time (min) | Preceding operation |
|-----------|------------|---------------------|
| 1         | 6          | -                   |
| 2         | 4          | 1                   |
| 3         | 7          | 1                   |
| 4         | 5          | 1                   |
| 5         | 10         | 2                   |
| 6         | 6          | 3, 4                |
| 7         | 3          | 4                   |
| 8         | 2          | 5                   |
| 9         | 4          | 5, 6, 7             |
| 10        | 4          | 7                   |
| 11        | 2          | 8, 9                |
| 12        | 1          | 9, 10               |
| 13        | 8          | 11, 12              |
| 14        | 4          | 13                  |

- (i) Draw the precedence diagram.
- (ii) The cycle time is 12 min, determine the assignment of operation of work station and also balance delay. (20 Marks)

- 5 a. What are the objectives of MRP system? (08 Marks)  
 b. There are five jobs, each of which can be processed through three machines A, B, C in the order ABC. Processing times in hours are:

| Job | A | B | C |
|-----|---|---|---|
| 1   | 3 | 4 | 7 |
| 2   | 8 | 5 | 9 |
| 3   | 8 | 1 | 5 |
| 4   | 5 | 2 | 6 |
| 5   | 4 | 3 | 8 |

How should the jobs be loaded in order to minimize the total elapsed time? (12 Marks)

- 6 a. A single sampling plan is designated by  $n = 80$ ,  $r = 3$ . Find the consumers and producers risk given that AQL is 2% and LTPD 10%. (14 Marks)  
 b. With the help of a diagram, explain PDCA cycle. (06 Marks)

- 7 a. Draw the network diagram for given project also shown critical path and calculate total duration time.

| Activity | $t_o$ | $t_p$ | $t_m$ |
|----------|-------|-------|-------|
| 1-2      | 1     | 7     | 1     |
| 1-3      | 1     | 7     | 4     |
| 1-4      | 2     | 8     | 2     |
| 2-5      | 1     | 1     | 1     |
| 3-5      | 2     | 14    | 5     |
| 4-6      | 2     | 8     | 5     |
| 5-6      | 3     | 15    | 6     |

- (i) What is the probability that the project will be completed in 14 days?  
 (ii) What is the probability that the project will be completed in 21 days? (16 Marks)  
 b. List the tools of TQM. (04 Marks)
- 8 a. What are the requirements of a factory of future? Explain. (10 Marks)  
 b. Discuss the following:  
 i) Supply chain management.  
 ii) System simulation. (10 Marks)

\*\*\*\*\*