## Paper 9 - Operations Management & Information System

**Full Marks: 100**                                    **Time allowed-3hrs**

This paper contains 3 questions. All questions are compulsory, subject to instruction provided against each question. All workings must form part of your answer. Assumptions, if any, must be clearly indicted.

### Question No. 1 : Answer all questions. [20 marks]

1. (a) Define the term 'Specification.'                                    [2]
   (b) What is Operation Process Chart?                                    [2]
   (c) A steel plant has a design capacity of 25,000 tons of steel per day, effective capacity of 20,000 tons of steel per day and an actual output of 18,000 tons of steel per day. Compute the efficiency of the plant and its utilization.                                    [2]
   (d) Define Partial Productivity.                                    [2]
   (e) What do you mean by the term Reliability Improvement?                                    [2]
   (f) Define Expert System.                                    [2]
   (g) List the disadvantages of coding.                                    [2]
   (h) Name big five of ERP market.                                    [2]
   (i) Define Database Administrator (DBA).                                    [2]
   (j) Define the term Commerce Net.                                    [2]

### Operation Management

### Answer any three questions

2. (a) (i) A plant manager is considering replacement policy for a new machine. He estimates the following costs.                                    ( All costs in ₹ 000)

| Year | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Replacement cost at beginning of year | 100 | 110 | 125 | 140 | 160 | 190 |
| Salvage value at end of year | 60 | 50 | 40 | 25 | 10 | 0 |
| Operating costs | 25 | 30 | 40 | 50 | 65 | 80 |

Find an optimal replacement policy and corresponding minimum cost.                                    [6]

(ii) Define Degeneracy in a simplex LPP. How is it resolved?                                    [5]

(iii) Write a note on Concept Testing.                                    [5]

(b) (i) List the various steps in Work Measurement.                                    [6]

(ii) Contribution per unit (₹)

|  | WH 1 | WH 2 | WH 3 | WH 4 | Total supplies |
|---|---|---|---|---|---|
| Plant I | 48 | 60 | 56 | 58 | 14 |
| Plant 2 | 40 | 55 | 53 | 60 | 26 |
| Plant 3 | 50 | 100 | 60 | 62 | 36 |
| Total Demand | 20 | 32 | 25 | 21 |  |

Find the initial solution by North-West Corner method. Is the initial solution feasible? [10]

**(c) (i)** State Deming's 14 points for Quality Management. [7]

**(ii)** The ARB Company is planning to design, develop and market a new racing cycle. The project is composed of the following activities:

| Activity | Description | Predecessors | Time (weeks) |
|---|---|---|---|
| A | Design frame | - | 4 |
| B | Design wheels | - | 3 |
| C | Design gears | - | 3 |
| D | Design handle bars | C | 2 |
| E | Test steering | A,B,D | 1 |
| F | Test gears | A,B,D | 2 |
| G | Performance test | E,F | 3 |
| H | Manufacturing layout | A,B,D | 3 |
| I | Manufacturing demonstration | H | 5 |
| J | Preparing advertising | G | 2 |
| K | Preparing users manual | G | 4 |
| L | Distribute to dealers | I,J,K | 2 |

Draw the network; find critical path and total duration of project. [9]

**(d) (i)** After observing heavy congestion of customers over a period of time in a petrol station, Mr. Ustad has decided to set up a petrol pump facility on his own in his near by site. He has complied statistics relating to the potential customer arrival pattern and service pattern as given below. He has also decided to evaluate the operations by using the simulation technique.

| Arrivals | | Services | |
|---|---|---|---|
| Inter-arrival time (minutes) | Probability | Inter-arrival time (minutes) | Probability |
| 2 | 0.22 | 4 | 0.28 |
| 4 | 0.30 | 6 | 0.40 |
| 6 | 0.24 | 8 | 0.22 |
| 8 | 0.14 | 10 | 0.10 |
| 10 | 0.10 |  |  |

Assume:
(i)  The clock starts at 8.00 hours
(ii)  Only one pump is set-up
(iii) The following 12 Random Nos. are to be used to depict the customer arrival pattern

| 78 | 26 | 94 | 08 | 46 | 63 | 18 | 35 | 59 | 12 | 97 | 82 |
|----|----|----|----|----|----|----|----|----|----|----|----|

**(iv) The following 12 Random Nos. are to be used to depict the service pattern**

| 44 | 21 | 73 | 96 | 63 | 35 | 57 | 31 | 84 | 24 | 05 | 37 |
|----|----|----|----|----|----|----|----|----|----|----|----|

**You are required to find out the**
  (i)  Probability of the pump being idle
  (ii)  Average time spent by a customer waiting in queue.                                    **[12]**

  **(ii) Define "Plant Shut Down"? Under what situations will you advise to resort to plant shut down?**
                                                                                             **[4]**

**Information System**

**Answer any two questions.**

3.  (a) (i)  List the advantages of Prototyping Model.                                        **[6]**
       (ii) Write a note on case tools.                                                       **[5]**
       (iii) Define RDBMS and name two commonly used RDBMS.                                   **[5]**

    (b) (i)  List the critical factors for failure of Enterprise Resource Planning.           **[6]**
        (ii) State the effects of applying computer technology to Information System.          **[7]**
        (iii) Define Programmed decision making.                                              **[3]**

    (c) (i)  Discuss the components of Electronic Data Interchange (EDI).                      **[6]**
        (ii) Describe Digital Signature Certificate.                                          **[6]**
        (iii) Describe Section 7 of the Information Technology Act, 2008.                       **[4]**