Operation Management & Information System
Section –A
Syllabus - 2012

Question No. 1 is compulsory and any 4 from the rest

1. (a) State which is not affecting the Production Design
(i)Product Quality; (ii) Reliability; (iii) Process Capability; (iv) Cost/Price Ratio
(b) Which of the following is not a benefit of the Value Engineering?
(i) Cost Reduction (ii) Robust Design (iii) Improvement in functions of the product (iv) Design for quality.

(c) Machines A is capable of manufacturing a product

Particulars	Machine A
Investment (₹)	50,000
Hourly Charges (wages + power) (₹)	10
No. pieces produced per hour	5
Life of the operating hours	20,000

Calculate the cost per unit

(d) If a firm sells 8,000 units, its loss is ₹ 20,000. But if it sells 10,000 units, its profit is ₹ 20,000. Calculate Fixed Cost.
(i) 1,80,000 (ii) 1,60,000 ,(iii) 1,55,000 (iv) 1,75,000

(e) The time study of a machinery operation recorded cycle times of 9.0, 10.0, 11.0, 12.0 minutes. The analyst rated the observed worker as 90%. The firm uses a 0.15 allowance fraction. What is the Standard Time:
(i) 8.47 (ii) 11.12, (iii) 10.12 (iv) 9.00

(f) If the demand function is $X = \frac{20}{P+1}$, determined the price elasticity of demand if p=3

(g) A workshop operates on 2 shifts of 8 hours per day. It has 10 machines. It works for 5 days in a week. Machine utilization is 90% and the efficiency of the machines is 85%. Calculate the designed/rated capacity of the workshop in standard hours.

(h) Monthly demand for a component 1,000 units. Setting –up cost per batch ₹ 120. Cost of manufacture per unit ₹ 20. Rate of interest 10% P.a. Calculate the EBQ.

(i) A departmental store has one cashier. During the rush hours, customers arrive at a rate of 20 customers per hour. The average number of customers that can be handled by the cashier is 24 per hour. Assume the conditions for use of the single – channel queuing model. Find out average time a customer spends in the system.

(j) Given the following alternatives, Linear Programming is a technique used in:
(i)Plant Layout (ii) Production Programme (iii) Product Mix (iv) Manufacturing Sequence
(k) Mentioning the Five principles of TQM

(l) Write down the formula of "Maintenance Cost Index" in respect of Maintenance Effectiveness.

2 (a) Explain Capacity Requirement Plan

(b)A book store wishes to carry 'The Test of my Life' written by Yuvraj Singh, in stock. Demand is probabilistic and replenishment of stock takes 2 days (i.e. if an order is placed on March 1, it will be delivered at the end of the day on March 3). The probabilities of demand are given below:

Demand(daily)	0	1	2	3	4
Probability	0.05	0.10	0.30	0.45	0.10

Each time an order is placed, the store incurs an ordering cost of ₹ 10 per order. The store also incurs a carrying cost of Re 0.05 per book per day. The inventory carrying cost is calculated on the basis of stock at the end of each day.

The manager of the book store wishes to compare two options for his inventory decision.

A. Order 5 books when the inventory at the beginning of the day plus orders outstanding is less than 8 books.
B. Order 8 books when the inventory at the beginning of the day plus orders outstanding is less than 8.
Currently (beginning of 1st day) the store has a stock of 8 books plus 6 books ordered two days ago and expected to arrive next day.

Using Monte Carlo Simulation for 10 cycles, recommend which option the manager should choose.
The two digits random numbers are given below:
89, 34, 78, 63, 61, 81, 39, 16, 13, 73.

[3+9 = 12]

3 (a) Describe the objectives of scheduling.

(b) As a tool service centre the arrival rate is two per hour and the service potential is three per hour. Simple queue conditions exist.

The hourly wage paid to the attendant at the service centre is ₹1.50 per hour and the hourly cost of a machinist away from his work is ₹ 4.

Calculate:

(i) The average number of machinists being served or waiting to be served at any given time.
(ii) The average time a machinist spends waiting for service.
(iii)The total cost of operating the system for an eight – hour day.
(iv)The cost of the system if there were two attendants working together as a team, each paid ₹ 1.50 per hour and each able to service on average 2 per hour.

[2+10=12]

4 (a) "The concept of product failure is applicable both to new products and the existing ones. There may, however, be varying periods of life spans for each product: some falling immediately, other living for a longer period." – mentioning the different stages which is describe in the statement, give the strategic consideration.

(b) A company plans to assign 5 salesmen to 5 in which it operates. Estimates of sales revenue in thousands of rupees for each salesman in different districts are given the following table. In your opinion, what should be the placement of the salesmen if the objective is to maximize the expected sales revenue?

Salesman	District				
	D_1	D_2	D_3	D_4	D_5
S_1	40	46	48	36	48
S_2	48	32	36	29	44
S_3	49	35	41	38	45
S_4	30	46	49	44	44
S_5	37	41	48	43	47

(c) Formulate the Dual of the Primal Equation:

$$\text{Max } Z = 20x_1 + 50x_2$$

$$\text{Subject to,}$$

$$5x_1 + 3x_2 \leq 60$$

$$4x_1 + 2x_2 \leq 40$$

$$x_1, x_2 \geq 0$$

[5+5+2= 12]

5. (a) An engineering company produces two products A & B. The cost data are as under:

Particulars	A(₹)	B(₹)
Selling Price	175	220
Direct Material	40	80
Direct Labour	60	40
Variable Overheads	30	20

Each product undergoes an operation in the two departments' viz., cutting and finishing, before it emerges as a finished product. The unit time taken by the products and the maximum available hours in the cutting and finishing operations are given below:

Product	Cutting Hours	Finishing Hours
A	5	10
B	20	15
Maximum Hours Available	400	450

Formulate an LP Problem by using Simplex Method.

(b) Mention the characteristics of Just – in – Time system. [10+2= 12]

6. (a) Describe the role of factory Executives and Workers in raising productivity
(b) Definition of Quality circle. Explain the objectives quality circles? [4+ (3+5)]

Section B
Information System

Question no 7 is compulsory, answer any four from the rest

7. (a) What is Iconic scale Model?
   (b) What do you understand by Data Independence?
   (c) List the Pre – requisites of a Management Information System.
   (d) What is "Asymmetric Crypto System"? [2×4]

8. (a) State the objectives of The Information Technology Act,2000. [4]
   (b) What is Transaction Processing System? [2]
   (c) List the four parts of Decision Table? [2]

9. Discuss the activities involved in System Development Life Cycle.

   Or,

   State the tangible and intangible benefits of ERP [8]

10. (a) Define Data Flow Diagram

    Or,

    Define Electronic Data Interchange [2]

    (b) What is Graphical User Interfaces? [3]
    (c) Mention the responsibility of a database administrator? [3]

11. Describe Three–Schema Architecture. [8]

12. (a) Write a note on Management Information System (MIS)? [4]
    (b) What is On – line Analytical Processing (OLAP)? [4]