PAPER – 9–OPERATIONS MANAGEMENT & INFORMATION SYSTEMS

Paper – 9 – Operations Management & Information Systems

Full Marks: 100 **Time Allowed: 3 hours**

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.

Section A

I. Answer the following question which is compulsory:

1. Answer all the questions: [2 × 10 = 20]

a) What is processing time?
b) Define design for ergonomics?
c) What is capacity planning?
d) What is Linear Programming?
e) Define productivity?
f) Write Pareto principle?
g) Define entropy?
h) What is primary key?
i) Describe key pair?
j) What is iconic scale model?

2. Match List A with List B [5 × 1 = 5]

List A	List B
a) ISO	1) Machine Tool
b) WIP	2) A programming language
c) CNC	3) Standardization
d) Java	4) A networking peripheral
e) Router	5) Production control

Section B

II. Answer any three question [15 × 3 = 45]

1. (a) Machine A and B both are capable of manufacturing a product. The compression is as follows:

Particulars	Machine A	Machine B
Investment	` 50,000	`80,000
Interest on capital invested	15 %p.a	15%p.a
Hourly charges(Wages + Power)	` 10	` 8
No. of pieces produced per hour	5	8
Annual operating hours	2000	2000

- Which machine will have the lower cost per unit of output, if run for the whole year?
- If only 4,000 pieces are to be produced in a year, which machine would have the lower cost per piece?

- **Will your answer to first point vary, if you are informed that 12.5% of the output of the machine B gets rejected at the inspection stage. If so, what will be the new solution. 8**

(b) From the following time series data of sale project the sale for the next three years.

Year	2001	2002	2003	2004	2005	2006	2007
Sale ('000 units)	80	90	92	83	94	99	92

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2. (a) The cost conscious company requires for the next month 300, 260 and 180 tonnes of stone chips for its three constructions C1, C2 and C3 respectively. Stone chips are produced by the company at three mineral fields taken on short lease by the company. All the available boulders must be crushed into chips. Any excess chips over the demands at sites C1, C2 and C3 will be sold ex-fields.
The fields are M1, M2 and M3 which will yield 250,320 and 280 tones of stone chips respectively.
Transportation costs from mineral fields to construction sites vary according to distances, which are given below in monetary unit (MU).

	To	C1	C2	C3
From	M1	8	7	6
	M2	5	4	9
	M3	7	5	5

Determine the optimal economic transportation plan for the company and the overall transportation cost in MU. 8

(b) The following table gives the running cost per year and resale value of a certain equipment whose purchase price is `6,500. At what year is the replacement due optimality?

Year	1	2	3	4	5	6	7	8
Running Cost (`)	1,400	1,500	1,700	2,000	2,400	2,800	3,300	3,900
Resale Value (`)	4,000	3,000	2,200	1,700	1,300	1,000	1,000	1,000

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3. (a) An item is produced in a plant having a fixed cost of ` 6,000 per month, variable cost of ` 2 per unit and a selling price of `7 per unit. Determine:
- **The break - even volume.**
- **If 1000 units are produced and sold in a month, what would be the profit?**
- **How many units should be produced to earn a profit of ` 4,000 per month? 8**

(b) What are the main functions of production planning and control? 7

4. (a) Compare the characteristics of three process strategies? 8
(b) Explain the classifications of spares? 7

Section C

III. Answer any two questions [15 × 2 = 30]

1. (a) What is a flow chart? What are the merits and demerits of flow chart? 7
(b) Explain different types of changeover strategies? 8

2. (a) What is testing? Explain Black-box testing, White –box testing and Gray-box testing? 8

(b) Write the advantages of DBMS. 7

3. (a) List the major features of ERP? 7

(b) What is TPS? What are its characteristics? 8