Paper 9 - Operations Management & Information Systems

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

Section –A (60 Marks)
(Operations Management)
Answer Question No. 1 (carrying 12 marks) which is compulsory and answer any four (carrying 12 marks each) from the rest in this Section.

Working Notes should form part of the answer.

1.(a) The demand for sewing machine was estimated as 1000 per month for 5 months. Later on the actual demand was found as 900, 1050, 1000, 1100 and 950 respectively. Workout Bias. [2]

(b) 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 rated capacity of the workshop in standard hours. [2]

(c) Define Critical Path. [2]

(d) What does the word KAIZEN mean? [2]

(e) When Corrective Maintenance occurs? [2]

(f) A manufacturing company has a product line consisting of four work stations in series. The individual workstation capacities are given. The actual output of the line is 500 units per shift.
Calculate Efficiency of the production line

Workstation No.	A	B	C	D
Capacity / Shift	600	650	650	550

[2]

2. (a) A manufacturing enterprise has introduced a bonus system of wage payment on a slab-rate based on cost of production towards labour and overheads.
The slab-rate being

Between 1% - 10%	Saving in production cost	5% of saving
Between 11% - 20%	Saving in production cost	15%
Between 21% - 40%	Saving in production cost	30%
Between 41% - 70%	Saving in production cost	40%
Above 70%	Saving in production cost	50%

The rate per hour for three workers A, B, C are ₹5 , ₹5.50 and ₹5.25 respectively. The overhead recovery rate is 500% of production wages and the material cost is ₹40 per unit. The standard cost of production per unit is determined at ₹160 per unit.
If the time taken by A,B,C to finish 10 units is 26 hours, 30 hours and 16 hours respectively, what is the amount of bonus earned by the individual workers and actual cost of production per unit? [6]

b) An industrial engineer deputed to conduct a time study for job,has after observation, divided the job into 5 elements. He had noted the timings for four cycles of the job as below:

	Time in minutes				
Element	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Performance rating (%)

1	1.246	1.328	1.298	1.306	90%
2	0.972	0.895	0.798	0.919	100%
3	0.914	1.875	1.964	1.972	100%
4	2.121	2.198	2.146	2.421	110%
5	1.253	1.175	1.413	2.218	100%

(i) Are there any outliers in the data i.e. probable errors in reading or recording data which should not be included in the analysis?

(ii) Compute the basic time for the job and the standard time if a relaxation allowance of 12%, a contingency allowance of 3% and an incentive of 20% are applicable for the job. [1+5]

3. (a) Write a short note on Value Engineering. [4]

(b) Details of four stores are given in the following table:

	Store 1	Store 2	Store 3	Store 4	Total Supplies
Source 1	48	60	56	58	14
Source 2	45	55	53	60	26
Source 3	50	65	60	62	36
Total Demand	20	32	25	21	

Find the initial solution by least cost method. Is the initial solution feasible? [8]

4. (a) What does sigma value indicates? [2]

(b) The Secretary of a school is taking bids on city's four school bus routes. Four companies have made the bids as detailed in the following table:

	Bids			
	Route 1	Route 2	Route 3	Route 4
Company 1	₹4000	₹5000		
Company 2		₹4000		₹4000
Company 3	₹3000		₹2000	
Company 4			₹4000	₹5000

Suppose each bidder can be assigned only one route. Use the assignment model to minimize the school's cost of running the four bus routes. [10]

5. (a) The output of production line is checked by an inspector for one or more of three different types of defects A, B, and C. If defect A occurs, the item is scrapped. If defect B or C occurs, the item must be reworked. The time required to rework a B defect is 15 minutes and the time required to rework a C defect is 30 minutes. The probabilities of an A, B and C defects are 0.15, 0.20 and 0.10 respectively. For ten items coming off the assembly line, determine the number of items without any defects, the number scrapped and total minutes of rework time. Use the following random numbers:

RN for defects A:

48	55	91	40	93	01	83	63	47	52

RN for defects B:

47	36	57	04	79	55	10	13	57	09

RN for defects C:

82	95	18	96	20	84	56	11	52	03

[3+3+3]

(b) What are the basic scheduling problems the production planner may face? [3]

6. (a) The data on the operating costs per year and resale prices of equipment A whose purchase price is ₹10,000 are given below:

Year	1	2	3	4	5	6	7
Operating Cost (₹)	1500	1900	2300	2900	3600	4500	5500
Resale Value (₹)	5000	2500	1250	600	400	400	400

(i) What is the optimum period for replacement?

(ii) When equipment A is 2 years old, equipment B, which is a new model for the same usage, is available. The optimum period for replacement is 4 years with an average cost of ₹3600. Should you change equipment A with that of B? If so, when? [5+3]

(b) What is TPM? What are the requirements for specific actions of TPM? [4]

Section B(40 Marks)
Information System

Answer Question No. 7 (carrying 8 marks) which is compulsory and answer any four (carrying 8 marks each) from the rest in this Section.

7. (a) Define the term Case Tools. [2]

(b) Section 66F of Information Technology Amendment Act 2008 deals with ..... [1]

(iii) ..... are the largest ERP Solution provider. [1]

(iv) Define the term Meta Data. [2]

(v) What is probabilistic system? [2]

8. (a) What is Integration Testing? How is it carried out? [3]

(b) What are the factors upon which the "Make or Buy" decision of an application software depends? [5]

9. (a) State when DBMS should not be used? [4]

(b) Explain the different types of Database backups. [4]

10. (a) What are the special features of an Executive Information System? [5]

(b) Discuss the various reporting tools available in Data Warehouse [3]

11. (a) Discuss the tangible and intangible benefits of ERP [3+3]

(b) Define the Master Data Management of an ERP System. [2]

12. (a) Describe the constitution and power of Cyber Appellate Tribunal. [2+3]

(b) Explain different dimensions of E-commerce security [3]