

**Paper 9 - Operations Management & Information Systems**

Time allowed-3hrs

Full Marks: 100

**Section I: Operation Management**

**Answer Question No. 1 which is compulsory and any  
Two questions from the rest, under Section I.**

**Working Notes should form part of the answer.**

1. (a) Choose the most appropriate alternative: [8]
- (i) Deming Prize is one of the highest awards in the world associated with
    - (A) TQM
    - (B) TPM
    - (C) Quality Circle
    - (D) Workplace improvement.
  - (ii) Industrial Engineering is a
    - (A) Line Function
    - (B) Staff Function
    - (C) Both line and staff function
    - (D) Co-ordination function
  - (iii) PERT is:
    - (A) Activity oriented technique
    - (B) Event oriented technique
    - (C) Both (A) and (B)
    - (D) None of these
  - (iv) Most suitable layout for job production is:
    - (A) Line layout
    - (B) Matrix layout
    - (C) Process layout
    - (D) Product layout
  - (v) The card which shows the number of rejected products from total quantity produced is:
    - (A) Quality Control Card
    - (B) Inspection Card
    - (C) Rejection Card
    - (D) Job Card
  - (vi) In Job production system, we need:
    - (A) Unskilled labours
    - (B) Semi-skilled labours
    - (C) Skilled labours
    - (D) Both (B) and (C)
  - (vii) The starting point of production cycle is:
    - (A) Production Planning
    - (B) Product design
    - (C) Routing
    - (D) Market research
  - (viii) 'Z' chart is a chart used in:
    - (A) Programme Control
    - (B) Job Control
    - (C) Cost Control
    - (D) Quality Control

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- (b) Fill in the blanks given below : [6]
- (i) Manpower efficiency of an unit is measured by -----.
- (ii) In formulating the linear programming problem, the basic step is to set up some ----- model.
- (iii) Zero Date of a project means the effective ----- date of the project.
- (iv) Detailed project report is prepared after the -----.
- (v) Risk prone is the opposite of -----.
- (vi) ----- layout is used for mass production.

2. (a) 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]

- (b) 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]
3. (a) A shaft 2400 mm in length is being machined on a lathe. If the spindle rotates 1200 r.p.m. and the feed is 0.50 mm per revolution, how long will it take the cutter to pass down the entire length of the shaft? [3]
- (b) DTM Bearings Ltd. is committed to supply 48,000 bearings per annum to AD Machines on a steady daily basis. It is estimated that it costs ₹1.00 as inventory holding cost per bearing per month and that the setup cost per run of bearing manufacture is ₹6,480.
- (i) What is the optimum run size for bearing manufacture?
- (ii) What should be the interval between the consecutive optimum runs?
- (iii) What is the minimum inventory holding cost? [2+1+2]
- (c) Explain the term Value Engineering. [4]
- (d) A new project has been set up by A Ltd. The company plans to achieve 80% capacity in the third year of operation, when the expected sales will be 32,000 units and the selling price ₹30.00 per unit. The corresponding variable costs and fixed costs are estimated at ₹5,76,000 and ₹3,00,000 respectively.
- Calculate the following from the data given:
- (i) P/V Ratio
- (ii) Break-Even Point in terms of % Capacity
- (iii) Margin of Safety. [2+2+2]

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4. (a) 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:

Element	Time in minutes				Performance rating (%)
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	
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]
- (b) 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
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RN for defects B:

47	36	57	04	79	55	10	13	57	09
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RN for defects C:

82	95	18	96	20	84	56	11	52	03
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[3+3+3]

- (c) State the advantages of preventive maintenance? [3]

### Section II: Information Systems

Answer Question No. 5 which is compulsory and  
Any two questions from the rest.

5. (a) Fill in the blanks given below : [5]
1. ----- is a provision of secondary storage which acts as primary memory.
  2. A newer version of ASCII is the -----.
  3. ----- generally refers to an intelligent terminal in a networking environment.
  4. ----- is an object relational database management system.
  5. ----- contains the information which are of permanent in nature.
- (b) Explain the following terms with reference to Information Technology: [5]
- (i) DDL Compiler
  - (ii) Buffering
  - (iii) Index Field
  - (iv) Meta Data

(v) Transaction Log

- (c) State whether following statements are True or False: [4]  
(i) In LAN each computer can fulfill a function.  
(ii) CD-ROMs are produced on a mass scale.  
(iii) Only executable files can be infected by virus  
(iv) Processing is done in the primary storage unit.
6. (a) State the advantages of CBIS. [6]  
(b) Define closed system. [4]  
(c) Discuss the various reporting tools available in Data Warehouse. [4]  
(d) Explain the different types of Database backups. [4]
7. (a) Explain Integration testing. How is it carried out? [3]  
(b) Define the Master Data Management of an ERP System. [3]  
(c) Write a short note on tailor made software. [3]  
(d) Describe non-programmed decision making. [4]  
(e) State Virus Scanning and list its negative effects. [5]
8. (a) State the meaning of PKI. [4]  
(b) Explain different dimensions of E-commerce security. [5]  
(c) Explain Bootstrapping. [2]  
(d) State the advantages of Data Mining. [4]  
(e) Explain Business Engineering. [3]