

SV - 87

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**T.E. (Mechanical) (Part - III) (Semester - VI) (Revised)**  
**Examination, May - 2018**  
**INDUSTRIAL MANAGEMENT & OPERATIONS**  
**RESEARCH**  
**Sub. Code: 66837**

Day and Date : Thursday, 03 - 05 - 2018  
 Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

- Instructions :
- 1) All questions are compulsory.
  - 2) Figures to the right indicate full marks.
  - 3) Assume suitable data, if necessary.
  - 4) All questions are to be solved on one answer book only.

Q1) Attempt any four:

[20]

- a) Explain in brief principle of organizing.
- b) What is the selection process followed in public sector undertakings?
- c) Prepare a suitable plan of training to fresh engineering graduates for a large scale manufacturing concern.
- d) Discuss the relationship between leadership, motivation & productivity.
- e) How does Herzberg's theory of motivation differs from Maslow's theory of motivation?

Q2) Attempt any two:

[12]

- a) What factors are studied in conducting feasibility report writing of any proposed business activity?
- b) How market assistance is rendered by government to small scale industries?
- c) Explain positive and negative impact of globalization on small scale industries in India.

P.T.O.

Q3) Write short notes on any three:

- Difference between Marketing & selling concept.
- Types of Advertising.
- Objectives of Purchasing.
- Evaluation of Purchase Performance.
- Cost control and Cost reduction.

Q4) Attempt any three:

- What is a Operations Research model? Discuss the advantages of limitation of good Operations Reseach model.
- Use Graphical method to solve the following:

$$\text{Maximize } Z = 9X_1 + 4X_2$$

Subjected to constraints,

$$7X_1 + 5X_2 \leq 70,$$

$$4X_1 + 6X_2 \leq 48$$

$$3X_1 + 6X_2 \leq 42$$

$$X_1, X_2 \geq 0$$

- A sheet metal operation company manufactures four models of tray. Each tray is first cut on cutting process in the trimming shop and next sent to the soldering shop where edges are joined. The average time in minutes for each job in theses shops is as follows:

Shop	Tray A	Tray B	Tray C	Tray D
Trimming shop	2	2	3	4
Soldering shop	4	6	7	8

Because of limitations in capacity of the plant, no more than 700 minutes/day of capacity is expected in Trimming shop and 1400/day minutes of capacity is expected in the soldering shop in the next six months. The contribution from sales for each tray is as given below: Tray A : Rs. 12/- per unit, Tray B : Rs. 12/- per unit, Tray C : Rs. 12/- per unit and Tray D : Rs. 12/- per unit. Formulate LPP. Suggest suitable method for solution to LPP.

- d) Use simplex to solve the following problem and obtain initial and second feasible solution (two simplex tables only)

$$\begin{aligned} \text{Minimise} \quad & Z = 6X_1 + 5X_2 + 4X_3 \\ \text{Subjected to constraints} \quad & 6X_1 + 5X_2 + 10X_3 \leq 76 \\ & 8X_1 + 3X_2 + 6X_3 \leq 50 \\ & X_1, X_2, X_3 \geq 0 \end{aligned}$$

Q5) Attempt any two:

[14]

- a) Indicate how you will test for optimality of initial feasible solution of a transportation problem.
- b) The unit transportation cost along with capacity and requirements from a factories to a warehouses is as given below:

Factory	Warehouse				Capacity
	1	2	3	4	
A	11	13	17	14	500
B	16	18	14	10	600
C	21	24	13	10	800
Requirements	400	450	550	600	

Obtain initial basic feasible solution by least cost method & VAM.

- c) A company has four workers and five jobs. Time taken by each worker to complete each job in minutes machine given in the matrix below. Solve the assignment problem & estimate the total time to complete all jobs.

Worker	Jobs				
	A	B	C	D	E
1	20	22	8	4	16
2	14	22	20	28	24
3	10	12	18	24	18
4	26	30	22	20	14

Q6) Write short notes on any three:

[18]

- a) Discuss the difference between decision under certainty, under uncertainty and under risk.

- b) The following matrix gives the payoff (in Rs.) of different strategies against events.

Strategies	Events		
	E <sub>1</sub>	E <sub>2</sub>	E <sub>3</sub>
S <sub>1</sub>	8000	70000	50000
S <sub>2</sub>	50000	45000	40000
S <sub>3</sub>	25000	10000	0

What will be your decision under the following approaches:

- i) Optimistic Criterion
  - ii) Pessimistic Criterion
  - iii) Laplace Criterion
  - iv) Hurwicz Criterion ( $\alpha = 0.4$ )
- c) Draw the project network for the following activities and determine critical path and project duration.

Activity	Preceding activity	Duration (days)
A	-	16
B	A	18
C	B	14
D	A	30
E	C,D	8
F	E	2
G	D	8
H	E, G	10
I	H,F	8

- d) Determine optimal sequence, elapsed time and idle time of the following eight jobs on the machine M1 and M2 used in the same sequence to process these jobs.

Machines	Jobs							
	J1	J2	J3	J4	J5	J6	J7	J8
M1	5	4	22	16	15	11	9	4
M2	6	10	12	8	20	7	2	21

