Total Pages—7

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(Set-L)

B.Tech-5th

Indust.Management. and Opera. Research

Full Marks : 70

Time : 3 hours

Answer **Q.No.1** which is compulsory and any **five** from the remaining seven questions.

The figures in the right-hand margin indicate marks

All parts of a question (a, b, etc) should be answered at one place.
Answer should be brief and to the point and be supplemented with neat sketches wherever necessary.
Any missing or wrong data may be assumed suitably giving proper justification.

1. Briefly answer *all* the following questions : 2×10

   (a) What are Hertzberg's two factor theory of motivation ?

   (b) What is system approach to management ?

   (c) What is matrix organization ?

(d) Give two examples each of boundaryless organization and virtual organization.

(e) How is travelling salesmen problem different from shortest route problem ?

(f) What is a basic solution ?

(g) What is lower value of a competitive game ?

(h) What is reneging in queuing theory ?

(i) Name all the human needs in the order proposed by Maslow.

(j) What are the assumptions made in EOQ model of inventory ?

2. (a) Management is an art as well as science. Discuss. 2

(b) Explain all the functions of management with reference to an automobile industry. 8

3. Explain its major features, advantages, disadvantages and applications of line and staff organization. Draw organization structure of any Indian public joint stock company following this type of organization. 10

4. Differentiate between : 2 × 5

(i) Line organization and functional organization

(ii) Theory X and Theory Y

(iii) Authority and responsibility

(iv) Lean and flat organization structure

(v) Assignment problem and transportation problem.

5. (a) A firm manufactures two products A and B. It earns profit of Rs. 10 and Rs. 20 on selling one unit each of A and B respectively. These products are required to be machined on two machines M and N. Product A takes 2 and 3

hours for machining on M and N respectively whereas product B takes 1 and 2 hours correspondingly. The maximum machine hours available per week are 100 and 150 hours from M and N respectively. The raw material requirement per unit of product A is twice that of product B. With the amount of raw material available, a maximum of 100 units can be made in a week if only product A is made. The number of A should not be produced more than that of B at any time. Formulate this manufacturing situation as linear programming problem so as to decide the weekly production volume of these two products. 4

(b) Solve the following LPP graphically :

Minimize $z = 10x_1 + 20x_2$

subject to $x_1 + 3x_2 \leq 30$

$2x_1 + x_2 \geq 20$

$3x_1 + 4x_2 \geq 60$

and $x_1, x_2 \geq 0$. 6

6. (a) Solve the following transportation problem using Vogel's approximation method : 4

C_{ij}		To D	To E	To F	Supply
From	A	6	8	3	14
	B	4	9	7	12
	C	1	2	5	4
Demand		5	10	15	

(b) Convert the following game into a LPP and solve it by simplex method : 6

		Player B	
		B_1	B_2
Player A	A_1	2	–2
	A_2	–2	2

7. There is only coordinate measuring machine (CMM) in a factory. Jobs arrive at this machine at random as per Poisson distribution at a rate of 4 per hour. The measurement time per unit is exponentially distributed with a mean time of 10 minutes. Find out the following : 10

(*i*) probability that machine will remain idle,

(*ii*) probability that there are 3 jobs in the queue,

(*iii*) average number of jobs waiting in the queue before this machine,

(*iv*) average time a job has to wait in the queue, and

(*v*) average number of jobs waiting in the queue if there were two such machines.

8. An item costs Rs. 80 per unit and its monthly requirement is 100 units. Each time when it is bought, the cost of ordering is Rs. 100. The storage cost of inventory is Rs. 1/unit/month. The annual rate of bank interest, tax and insurance

taken together is 10%. How much and how often the item should be ordered for the most economic condition if the supply of each lot of material is

(*i*) instantaneous, and

(*ii*) continuous at the rate of 200 units per month. 10