(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3090 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. VI) EXAMINATION, 2008-09

INDUSTRIAL MANAGEMENT

Time : 3 Hours] *[Total Marks : 100*

Note : (1) Attempt **all** questions.
(2) All questions carry **equal** marks.

1 Attempt any **four** of the following : **5×4=20**

(a) "Mathematics of OR is mathematics of optimization." Discuss.

(b) What is simulation? Describe the simulation process. What are the reasons for using simulation?

(c) "Model building is the essence of OR approach." Discuss.

(d) A firm manufactures three products A, B and C. Time to manufacture product A is twice that for B and thrice that for C and if the entire labour is engaged in making product A, 1600 units of this product can be produced. These products are to be produced in the ratio 3:4:5. There is demand for atleast 300, 250 and 200 units of products A, B and C and profit earned per unit is Rs. 90, Rs. 40 and Rs. 30 respectively.

Raw Material	Requirement per unit of product (kg)			Total availability
	A	B	C	
P	6	5	2	5,000
Q	4	7	3	6,000

Formulate the problem as a linear programming problem.

(e) What is the difference between slack, surplus and artificial variables? Also explain their significance with examples.

(f) Discuss the steps involved in two-phase simplex method.

2 Answer any **four** of the following : **5×4=20**

(a) Determine an initial basic feasible solution to the following T.P. using Vogel's Approximation method :

		Destination					
		A_1	B_1	C_1	D_1	E_1	*Supply*
Origin	*A*	2	11	10	3	7	4
	B	1	4	7	2	1	8
	C	3	9	4	8	12	9
	Demand	3	3	4	5	6	

(b) Can degeneracy occur in transportation problem? Justify your answer.

(c) Solve the following problem by simplex method :

Maximize : $Z = 2x_1 + x_2$,

S.T. $x_1 + 2x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1 - 2x_2 \leq 1$

$x_1, x_2 \leq 0$

(d) Solve the following problem by simplex method :

Minimize $Z = x_2 - 3x_3 + 2x_5$,

S.T. $x_1 + 3x_2 - x_3 + 2x_5 = 7$

$-2x_2 + 4x_3 + x_4 = 12$,

$-4x_2 + 3x_3 + 8x_5 + x_6 = 10$

$x_1, x_2 \ldots\ldots, x_6 \geq 0$

(e) Discuss the similarities and differences of CPM and PERT. Write short note on assumptions of network techniques.

(f) Consider the project whose details are given below :

Activity:	1–2	2–3	2–4	3–4	3–5	3–6	4–5	4–6	5–6
Duration:	3	3	2	0	3	2	7	5	6
Resources:	5	7	3	0	2	1	2	5	6

Find duration of the project and make complete allocation table.

3 Answer any **two** of the following : **10×2=20**

(a) Discuss the basic concept of game theory giving examples. Explain: Minimax and maximin principles, pure and mixed strategies.

(b) Solve the following game using L.P. method :

		B		
		1	2	3
A	1	3	−4	2
	2	1	−3	−7
	3	−2	4	7

(c) Write short notes on deterministic queues and waiting line models. Discuss Monte Carlo technique applied to queuing problems.

4 Answer any **two** of the following : **10×2=20**

(a) "For managing today's modern technology, it is necessary to have a suitable organizational structure, wherein the people will be able to put in their best." Discuss.

(b) What are the conditions for the application of the optimality test in case of transportation problem ? Briefly explain as to why these conditions should be satisfied.

(c) (i) Explain historical developments of engineering management.

(ii) Briefly discuss important functions of technology management.

5 Write short notes on any **two**: **10×2=20**

(a) Process of planning

(b) Patents and IPR

(c) Project planning and acquisition

(d) Techniques of forecasting.
