FACULTY OF MANAGEMENT
M.B.A. II – Semester Examination, December 2013

Course No. – 2.5 : Operations Research

Time : 3 Hours   Max. Marks: 80

Note : Answer **All** questions.

PART – A (10x2=20 Marks)
1.   Write short notes on the following:
      (a) Dynamic Programming
      (b) Formulation of LP model
      (c) Sensitivity analysis
      (d) Transportation model
      (e) Assignment problem
      (f) Crashing the project schedule
      (g) Total float and free float
      (h) Objectives of queuing model
      (i) Mixed and dominating strategy
      (j) Process of simulation

PART – B (5x12=60 Marks)
Answer all the questions using the internal choice .

2.(a)   What is a Linear programming? Discuss the scope and role of Linear programming in solving management problems.
OR
  (b)   A company manufactures two products p1 and p2. Each product uses Lathe and milling machine. The processing time per unit of p1 on the lathe is 5 hours and on the milling machine is 4 hours. The processing time per unit of p2 on the lathe is 10 hours and on the milling machine is 4 hours. The maximum number of hours available per week on the lathe and the milling machine are 60 hours and 40 hours respectively and profit per unit of selling p1 and p2 are Rs 6 and 8 respectively. Formulate LP model to maximise profit.

3.(a)   Solve graphically the following LPP:
        Minimise $Z = 6x_1 + 14x_2$
        Subject to : $5x_1 + 4x_2 \geq 60$
                     $3x_1 + 7x_2 \leq 84$
                     $x_1 + 2x_2 \geq 18$
                     $x_1 , x_2 \geq 0$
OR
  (b)   Solve the following LPP using simplex method.
        Maximize, $Z = 2x_1 + 4x_2$
        Subject to: $2x_1 + x_2 \leq 18$
                     $3x_1 + 3x_2 \geq 30$
                     $3x_1 + 6x_2 \leq 900$
                     $x_1 + x_2 \geq 0$

4.(a)   Write the following transportation problem in a balanced form and solve it.

To market / From plant	M_1	M_2	M_3	M_4	Supply
P_1	6	4	9	1	40
P_2	20	6	11	3	40
P_3	7	1	0	14	50
P_4	7	1	12	6	90
Demand	90	30	50	30	-

OR

(b) A company has to assign four workers A, B, C and D to four jobs W, X, Y and Z. The cost matrix is given below.

Job / Workers	W	X	Y	Z
A	1000	1200	400	900
B	600	500	300	800
C	200	300	400	500
D	600	700	300	1000

Suggest an optimal assignment schedule and the total cost.

5.(a) Draw a network diagram to the following information and show the critical path along with earliest starting time and latest finishing time.

Activity	1-2	1-3	2-6	3-4	3-5	4-6	5-6	5-7	6-7
Duration	4	6	8	7	4	6	5	19	10

OR

(b) The data for a project is

Activity	Immediate predecessor	Time(Days) Normal	Crash	Direct cost (Rs) Normal	Crash
A	-	3	2	18000	19000
B	-	8	6	600	1000
C	B	6	4	10000	12000
D	B	5	2	4000	10000
E	A	13	10	3000	9000
F	A	4	4	15000	15000
G	F	2	1	1200	1400
H	C,E,G	6	4	3500	4500
I	F	2	1	7000	8000

If a dead time of 17 weeks is imposed for completion of the project, what activities will be crashed?

6.(a) A departmental store has a single cashier. During the rush hours, customers arrive at the rate of 20 customers per hour. The average number of customers that can be processed by the cashier is 24 per hour. What is the
(i) Probability that the cashier is idle?
(ii) Average number of customers in the queuing system?
(iii) Average time a customer spends in the system?
(iv) Average number of customers in the queues ?
(v) Average time a customers spends in the queue waiting for service?

OR

(b) From the following information, find the optimal strategies for A and B and obtain the value of queue.

A's Strategy	B's strategy b1	b2
a1	8	-7
a2	-6	4

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