Code No. 9085

FACULTY OF MANAGEMENT

M.B.A. II – Semester Examination, August / September 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) Nature and Scope of OR
   (b) What is Goal Programming?
   (c) Sensitivity analysis in LPP
   (d) Degeneracy in TP
   (e) What is unbalanced transportation problem?
   (f) What is restricted assignment problem?
   (g) Stack time, resource leveling and Dummy activity
   (h) Critical path
   (i) Describe the maximini principle of game theory
   (j) What are the types of simulation Models?

PART – B (5x12=60 Marks)

Answer all the questions using the internal choice .

2.(a) Describe the origin and development of operation research. What were the controlling factors giving birth to operation research?

OR

(b) Solve the following linear programming problem graphically

Minimsie $Z = -x_1 + 2x_2$

Subject to constraint : $-x_1 + 3x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

and $x_1 , x_2 \geq 0$

3.(a) ABC metal company produces two items P1 and P2. It uses sheet metal, equipment and labour. Input output relationship resources available as follows.

Input	Product requirement per unit		Availability
	P1	P2	
Sheet metal	1 sq. cm	1 sq. cm	50 sq. cm
Labour	1 man hour	2 man hour	80 man hours
Equipment	3 hours	2 hours	140 hours
Profit (Rs)	4 per unit	3 per unit	

How many units of P1 and P2 should be manufacture to maximised the profit of the company?

OR

(b) Solve the following problem by simplex method :

Max $Z = 4x_1 + 3x_2$

Subject to constraints : $2x_1 + x_2 \leq 1200$

$x_1 + x_2 \leq 700$

$3x_1 + 4x_2 \leq 2400$

and $x_1 , x_2 \geq 0$

..2

4.(a) Determine initial basic feasible solution to the following transportation problem using least cost method.

Sources	Destinations				Supply
	D_1	D_2	D_3	D_4	
S_1	21	16	15	3	11
S_2	17	18	14	13	13
S_3	32	27	18	41	19
Demand	6	10	12	15	

OR

(b) A sales man has to visit 5 cities ABCD & E. He wishes to start from a particular city, visit each city only once and then return to the starting city. The cost of traveling from, a city to another city is given. Determine the least cost route.

City (From) \ City (To)	A	B	C	D	E
A	0	12	15	17	11
B	16	0	13	18	12
C	18	17	0	14	17
D	21	14	18	0	16
E	11	13	12	18	0

5.(a) Draw the net work diagram, identify critical path and compute the total, free and independent floats for the following data.

Activity	Immediate predecessor activity	Duration
A	--	8
B	A	9
C	B	7
D	A	15
E	C,D	4
F	E	1
G	D	4
H	E,G	5
I	H, F	4

OR

(b) Draw PERT network diagram for the data given below:

Activity	Preceding Activity	Activity Time (weeks)		
		t_o	t_m	t_p
A	--	4	7	13
B	A	6	9	11
C	A	5	7	9
D	B	3	5	7
E	C	7	8	10
F	D	2	3	5
G	E	6	7	8
H	F,G	2	3	4

(i) Find the expected duration of the project.
(ii) Compute the probability of completing the project in 35 weeks or less.

6.(a) In a bank, cheques are cashed at a single 'teller' counter, customers arrive at the counter in a Poisson manner at an average rate of 30 customers per hour. The teller takes on an average a minute and a half to cash the cheque. The service time has been found to be exponentially distributed.
(i) Calculate the percentage of time the teller is busy.
(ii) Calculate the average time a customer is expected to wait.

OR

(b) Solve the following game using dominance method and find value of the game.

Player Q

Player P $\begin{bmatrix} 2 & 2 & 3 & 4 \\ 4 & 3 & 2 & 2 \end{bmatrix}$

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