Code No. 6204 / O

FACULTY OF ENGINEERING

B.E. 4/4 (M/P/AE) I – Semester (Old) Examination, November 2013

Subject : Operations Research

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1. Write a note on pure strategy.
2. What is unbalanced assignment problem?
3. Define : a) Feasible region b) Infinity solution
4. Distinguish between slack, surplus and artificial variable.
5. Explain dominance rules.
6. What are the limitations of LPP?
7. How do you convert the unbalanced transportation problem into a balance one?
8. Define two person zero sum game.
9. List the characteristics of a queuing system.
10. Differentiate between regular simplex method and dual simplex method.

PART – B (50 Marks)

11. Solve the following game. Find the value of game for player A.

Player A \ Player B	1	2	3	4	5
1	10	81	32	43	93
2	59	63	39	69	73
3	71	20	5	27	84
4	34	14	44	44	69

12. A manufacturing company purchases 9000 parts of a machine for its annual requirement, ordering one month usage at a time. Each part costs Rs.20. The ordering cost per order is Rs.15 and carrying charges are 15% of the average inventory per year. You have been assigned to suggest a more economical purchase policy for the company. What advice would you offer and how much would it save the company per year?

13. There are seven jobs, each of which has to go through the machines A and B in order AB. Processing time in hours is given as –

Job	1	2	3	4	5	6	7
Machine A	3	12	15	6	10	11	9
Machine B	8	10	10	6	12	1	3

Determine a sequence of these jobs that will minimize the total elapsed time T. Also find T and the idle time for machines A and B.

..2

14. A salesman wants to visit cities A, B, C, D and E. He does not want to visit any city twice before completing his tour of all the cities and wishes to return to the point of starting journey. Cost of going from one city to another in rupees is shown in table below. Find the least cost route.

	A	B	C	D	E
A	0	2	5	7	1
B	6	0	3	8	2
C	8	7	0	4	7
D	12	4	6	0	5
E	1	3	2	8	0

15. Solve the following problem graphically :

Maximize $Z = x, 4x_2$
Subject to $3x_1 + x_2 \leq 6$
$x_1 + 2x_2 \leq 4$
$x_2 \leq 3$

No lower bound constraint for x_1

16. A manufacturer is offered two machines A and B. A is priced at Rs.5000 and running cost are estimated at Rs.800 for each of the first five years, increasing by Rs.200 per year in the sixth and subsequent years. Machine B which has the same capacity as A, costs Rs.2500 box will have running cost of Rs.1200 per year for six years, increasing by Rs.200 per year thereafter. If money is worth 12% per year, which machine should be purchased? (Assume that the machines will eventually be sold for scrap at negligible price).

17. A company has four factories at four different locations which supply ware houses A, B, C, D and E. Monthly factory capacities are 200, 175, 150 and 325 units respectively. Monthly ware house requirements are 100, 90, 120, 230 and 160 units respectively. Unit shipping costs are given in table as follows. The costs are in rupees.

From To	A	B	C	D	E
1	13	---	31	8	20
2	14	9	17	6	10
3	25	11	12	17	15
4	10	21	13	----	17

Shipment from 1 to B and from 4 to D is not possible. Determine the optimum distribution to minimize shipping costs.

******