SN – 468

V Semester B.C.A. Degree Examination, November/December 2014
(Y2K7 Scheme)
COMPUTER SCIENCE
BCA – 505 : Operations Research

Time : 3 Hours Max. Marks : 80

Instructions : *1) Answer **all** Sections.*
*2) Use graph sheet **wherever** necessary.*

SECTION – A

Answer **any eight** questions of the following : **(8×3=24)**

1. Define OR and state the limitations of OR.
2. Define basic feasible solution, unbounded solution and optimal solution.
3. Define slack and surplus variable with an example.
4. Give the mathematical formulation of transportation problem.
5. Define total float, free float and independent float.
6. Write down the procedure to draw minimum number of lines of the reduced matrix.
7. What is pay-off matrix ? Give an example.
8. Write the dual form of the following primal problem :

   Maximize $Z = 3x_1 + 4x_2$

   Subject to $2x_1 + 6x_2 \leq 16$

   $5x_1 + 2x_2 \geq 20$

   where $x_1, x_2 \geq 0$
9. Explain North-West-corner method.
10. Solve the following by min-max principle method.

		Player-B			
		B_1	B_2	B_3	B_4
Player - A	A_1	1	7	3	4
	A_2	5	6	4	5
	A_3	7	2	0	3

P.T.O.

SECTION – B

Answer **any four** questions of the following : **(4×14=56)**

11. a) Solve the following LPP using graphical method :

Maximize $Z = 2x_1 + 3x_2$

Subject to

$2x_1 + x_2 \leq 12$

$x_1 + 3x_2 \leq 15$

and $x_1, x_2 \geq 0$ **6**

b) Solve the following LPP using Simplex method :

Maximize $Z = 2x_1 + 2x_2 + 4x_3$

Subject to $2x_1 + 3x_2 + x_3 \leq 240$

$x_1 + x_2 + 3x_3 \leq 300$

$x_1 + 3x_2 + x_3 \leq 300$

and $x_1, x_2, x_3 \geq 0$ **8**

12. a) Write the dual form of the following LPP :

Min. $Z = x_1 + 2x_2$

Subject to $2x_1 + 4x_2 \leq 160$

$x_1 - x_2 = 30$

$x_1 \geq 10$

and $x_1, x_2, x_3 \geq 0$ **6**

b) Solve the following LPP by Big-M method :

Min. $Z = 2x_1 + x_2$

Subject to $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 4$

and $x_1, x_2 \geq 0$ **8**

13. a) Explain the procedure of modified distribution (MODI) method to solve Transportation Problem (TP). **8**

b) Find Initial Basic Feasible Solution (IBFS) for the problem given below by using Least-Cost-Method (LCM) : **6**

Distribution Centres

Plant		D_1	D_2	D_3	D_4	Supply
	P_1	2	3	11	7	6
	P_2	1	0	6	1	1
	P_3	5	8	15	9	10
	Requirement	7	5	3	2	

14. a) Write an algorithm to solve an assignment problem. **6**

b) Solve the following assignment problem. **8**

Jobs

Machines	I	II	III	IV
A	42	35	28	21
B	30	25	20	15
C	30	25	20	15
D	24	20	16	12

15. a) Define the following terms : **4**

i) Optimistic Time (t_0)

ii) Pessimistic Time (t_p)

iii) Most Likely Time (t_m)

iv) Expected Time (t_e).

b) A project has following activities and duration :

Activity	Duration (Hours)
1 - 2	4
1 - 3	5
1 - 4	3
2 - 3	3
3 - 4	4
2 - 6	2
3 - 5	6
5 - 6	5
6 - 8	7
5 - 8	6
4 - 7	4
5 - 7	4
7 - 8	8

a) Draw a network diagram.

b) Determine the critical path.

c) Compute free float and total float of each activity. **10**

16. a) Explain Minimax-Maximin principle for mixed strategy games. **8**

b) Find the Saddle point and hence solve the following game : **6**

		Player B			
		B_1	B_2	B_3	B_4
Player A	A_1	1	7	3	4
	A_2	5	6	4	5
	A_3	7	2	0	3