* A B - 3 1 8 2 *

AB-3182

Third Year B.Sc. (Computer Science) (Sem. V) Examination

March/April – 2015

Paper : Generic Elective (IDS)

(Operation Research)

Time : **3** Hours] [Total Marks : **70**

Instruction :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **THIRD YEAR B.Sc. (COMPUTER SCIENCE) (SEM. V)**

Name of the Subject :

☛ **PAPER : GENERIC ELECTIVE (IDS)**

☛ Subject Code No. : **3 1 8 2** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) All questions carry 14 marks each.

(3) Non-programmable scientific calculator is allowed.

1 Answer as directed : **14**

(1) Find the saddle poing.

	B1	B2	B3	B4
A1	1	7	3	4
A2	5	6	4	5
A3	7	2	0	3

(2) Explain Maximin and Minmax principle.

(3) Define slack and surplus variables.

(4) What is an objective function?

(5) What is an unbalanced Transportation problem ?

(6) What do you mean by unbounded solution ?

(7) Find IBFS using VAM.

1.

	a	b	c	Capacity
A	50	30	220	1
B	90	45	170	3
C	250	200	50	4
Requirement	4	2	2	

2 Solve the following : **14**

(1) Solve the following LPP using Simplex Method.

Max $Z = 8X_1 + 19X_2 + 7X_3$

Subject to the constraints,

$3X_1 + 4X_2 + X_3 <= 25$

$X_1 + 3X_2 + 3X_3 <= 50$

and $X_1, X_2, X_3 >= 0$

(2) Solve the LPP using graphical Method

Max $Z = 5X_1 + 7X_2$

Subject to the constraints

$X_1 + X_2 <= 4$

$3X_1 + 8X_2 <= 24$

$10X_1 + 7X_2 <= 35$

And $X_1, X_2 >= 0$

OR

(2) In a chemical industry, two products A and B are made involving two operations. The production of B also results in a by-product C. A product A can be sold at Rs. 3 profit per unit and B at Rs. 8 profit per unit. The by-product C has a profit of Rs. 2 per unit, but it cannot be sold as the destruction cost is Re. 1 per unit. Forecasts show that up to 5 units of C can be sold. The company gets 3 units of C for each unit of A and B produced. Forecasts show that they can sell all units of A and B produced. The manufacturing times are 3 hours per unit for A on operation one and two respectively and 4 hours and 5 hours per unit B on operation one and two respectively. Because the product C results from producing B, no time is used in producing C. The available times are 18 and 21 hours of operation one and two respectively. The company's question : How much A and B should be produced keeping C in mind to make the highest profit. Formulate LP model for this problem.

3 Solve the following : **14**

(1) Solve the following LPP using Simplex method.

$\text{Max } Z = 2X_1 + 5X_2$

Subject to the constraints,

$X_1 + 3X_2 <= 3$

$3X_1 + 2X_2 <= 6$

$\text{and } X_1, X_2 >= 0$

(2) A firm manufactures two types of products A and B and sell them at profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines G and H. Type A requires one minute of processing time on G and two minutes on H, type B requires one minute on G and one minute on H. The machine G is available for not more than 6 hours 40 minutes while machine H is available for 10 hours during any working day. Formulate the problem as linear programming problem.

OR

(2) Five men are available to do five different jobs. From past records, the time (in hours) that each may take to do each job is known and given in the following table :

	I	II	III	IV	V
A	2	9	2	7	1
B	6	8	7	6	1
C	4	6	5	3	1
D	4	2	7	3	1
E	5	3	9	5	1

Find the assignment of men to jobs that will minimize the total time taken.

4 Solve the following. **14**

(1) Solve the following assignment problem optimally :

JOBS

Man	1	2	3	4
A	5	3	2	8
B	7	9	2	6
C	6	4	5	7
D	5	7	7	8

(2) Solve the following transportation problem optimaly :

		To						
		D1	D2	D3	D4	D5	D6	ai
	O1	1	2	1	4	5	2	30
From	O2	3	3	2	1	4	3	50
	O3	4	2	5	9	6	2	75
	O4	3	1	7	3	4	6	20
	bj	20	40	30	10	50	25	

OR

(2) Solve the following transportation problem and check this solution is optimal or not ?

		Depot				
		D1	D2	D3	D4	Available
	O1	1	2	-2	3	70
Car	O2	2	4	0	1	38
	O3	1	2	-2	5	32
	Required	40	28	30	32	

5 (a) Solve the following. **14**

(1) Obtain the optimal strategies for both person and the value of the game for zero-sum two-person game whose payoff matrix is given as follows :

Player A

Player B	1	3	-1	4	2	-5
	-3	5	6	1	2	0

(2) Explain the principle of dominance and solve the following.

B

	2	3	1 / 2
A	3 / 2	2	0
	1 / 2	1	1

OR

(2) Explain the principle of domiance and solve the following.

	Player B		
	I	II	II
Player A	6	8	6
	4	12	2