

Total No. of Questions : 5]

SEAT No. :

P3808

[5265]-204

[Total No. of Pages : 4

M.B.A.

DECISION SCIENCE

(2013 Pattern) (Semester - II)

Time : 2½ Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Attempt Five Questions.*
- 2) *Each question has an internal option.*
- 3) *Use of scientific calculator is not allowed.*
- 4) *Graph paper will not be provided, draw all graphs on answer paper.*

Q1) a) Solve the following LPP using graphical method.

[10]

Maximise $z = 4x_1 + 2x_2$

Subject to the constraints that

$$2x_1 + 3x_2 \geq 30$$

$$x_1 + x_2 \leq 14$$

$$x_1 + x_2 \leq 18$$

$$x_1 \text{ and } x_2 \geq 0.$$

OR

- b) The Marketing Director of a multi - unit company has a problem in assigning 5 senior manager to six zones. The efficiency of these managers in different zones is given in the matrix below. The remaining zone has to be assigned to a junior manager. Find out which one of these zones is to be assigned to junior manager because of non availability of senior manager?

[10]

Managers	Zones					
	I	II	III	IV	V	VI
A	73	91	87	82	78	80
B	81	85	69	76	74	85
C	75	72	83	84	78	91
D	93	96	86	91	83	82
E	90	91	79	89	69	76

P.T.O.

Q2) a) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Assuming that the inter arrival time follows Poisson exponential distribution and the service time distribution is exponential with an average of 36 minutes per train, calculate: **[10]**

- i) The average time the train spends in the yard
- ii) The mean queue size
- iii) Probability that the arriving train does not have to wait

OR

b) It was found in the survey that the mobility of the population in a state to the village, town and city is as follows. What will be the proportion of population in village, town and city after two years given that the present population is 0.7, 0.2 and 0.1 respectively. **[10]**

From	To		
	Village	Town	City
Village	50%	30%	20%
Town	10%	70%	20%
City	10%	40%	50%

Q3) a) Solve the following game by using the principle of dominance **[10]**

Player A	Player B					
	I	II	III	IV	V	VI
1	4	2	0	2	1	1
2	4	3	1	3	2	2
3	4	3	7	-5	1	2
4	4	3	4	-1	2	2
5	4	3	3	-2	2	2

OR

- b) Find the regret table from the following pay - off table: [10]

Events	Actions			
	A ₁	A ₂	A ₃	A ₄
E ₁	80	430	-20	30
E ₂	330	30	230	330
E ₃	-120	130	30	330
E ₄	80	30	130	30

Also find expected regret for each action if

$$P(E_1) = 0.15, P(E_2) = 0.45, P(E_3) = 0.25, P(E_4) = 0.15$$

- Q4) a)** Write short notes on any two of the following. [10]

- i) PERT
- ii) CPM
- iii) EST, LST, EFT, LFT

OR

- b) The activities involved in a PERT project are as follows: [10]

Job i-j	Duration (days)		
	a	m	b
1-2	3	6	15
2-3	6	12	30
3-5	5	11	17
7-8	4	19	28
5-8	1	4	7
6-7	3	9	27
4-5	3	6	15
1-6	2	5	14
2-4	2	5	8

- i) Draw a network diagram
- ii) Find the critical path

Q5) a) i) A committee of four, has to be formed among 3 economists, 4 engineers, 2 statisticians and 1 doctor. **[5]**

- 1) What is the probability that each of four professions is represented in the committee?
- 2) What is the probability that the committee consists of the doctor and at least one economist?

OR

a) ii) It has been found that 80% of the tourists who visit India visit Delhi, 70% of them visit Mumbai and 60% of them visit both. What is the probability that a tourist will visit at least one city? **[5]**

b) i) In an intelligence test administered to 1000 students, the average score was 42 and the standard deviation was 24 find the number of students lying between 30 and 54 marks. $(-0.5 \leq z \leq 0.5) = 0.383$ **[5]**

OR

b) ii) There are 50 applications for a job in a factory. Some of them are MBA's and some are not. Some of them have at least 2 years' experience and some have not with the following details. **[5]**

	MBA	Not MBA
At least 2 years' experience	11	6
Less than 2 years experience	19	14

Let M is an event that the first applicant interviewed is MBA and E is the event that first applicant interviewed is with at least 2 years' experience. Find $P(M)$, $P(E)$, $P(M \cap E)$.

