[5165] -204
M.B.A. (Semester -II)
204: DECISION SCIENCE
(2013 Pattern)

Time : 2.5 Hours] *[Maximum 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 graph on answer paper.*

Q1) a) Solve following LPP by using Graphical method **[10]**

Maximize $P = 5x_1 + 7x_2$

Subject to

$x_1 + x_2 \leq 4$

$3x_1 + 8x_2 \leq 24$

$10x_1 + 7x_2 \leq 35$

$x_1, x_2 \geq 0$

OR

b) Solve following maximization assignment problem **[10]**

Jobs $\rightarrow$

Machines $\downarrow$	A	B	C	D	E
1	5	11	10	12	4
2	2	4	6	3	5
3	3	12	5	14	6
4	6	14	4	11	7
5	7	9	8	12	5

P.T.O

Q2) a) The tooth care hospital provides free dental service to the patients on every Saturday morning. Dentist takes on an average, 2.5 minutes for a patient to get treatment and the actual time taken is known to vary approximately exponentially around this average. The patients arrive according to Poisson distribution with an average of 20 per hour. The administrator officer of the hospital wants to investigate the following. **[10]**

   a) The fraction of the time at least dentist is idle
   b) Probability that a patient has to wait for the service
   c) Expected number of patients waiting in the system
   d) The average time that a patient spends at the hospital

<center>OR</center>

b) A market survey is made on three brands of breakfast foods X, Y and Z. Every time a customer purchases new package, he may buy the same brand or switch to another. The following estimates for the shifts in percent are obtained.

$$\text{Present} \begin{array}{c} \\ X \\ Y \\ Z \end{array} \begin{array}{c} \text{Next} \\ \begin{array}{ccc} X & Y & Z \end{array} \\ \begin{bmatrix} 70 & 20 & 10 \\ 30 & 50 & 20 \\ 30 & 30 & 40 \end{bmatrix} \end{array}$$

At this time it is estimated that 30% of the people buy brand X, 20% buy brand Y and 50% buy brand Z. What will be the distribution of the customers one and two time periods later? **[10]**

Q3) a) From the following pay off calculate **[10]**

State of nature	Strategy		
	S1	S2	S3
N1	4000	20000	20000
N2	-100	5000	15000
N3	6000	400	-2000
N4	18000	0	1000

   a) Maximin
   b) Maximax
   c) Equal Probability(Laplace)
   d) Minimax Regret
   State the optimal strategies under each criterion.

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OR

b) Determine optimal strategy and find value of game **[10]**

B's Strategy

		B1	B2	B3	B4
A's strategy	A1	35	65	25	5
	A2	30	20	15	0
	A3	40	50	0	10
	A4	55	60	10	15

Q4) a) Attempt the following. **[10]**

i) Distinguish between PERT and CPM

ii) Define EST, LST, EFT, LFT and Float

OR

b) Following are the activities of the project

Activity	Immediate Predecessor Activity	Most optimistic time (in weeks)	Most Likely time (in weeks)	Most Pessimistic time (in weeks)
A	None	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

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Calculate: [10]

i) Expected time of each activity

ii) Draw a network diagram and indicate expected time on each activity

iii) Compute Earliest state time and earliest finish time of each activity

iv) Identify critical path

Q5) a) Attempt the following

i) The probability that a person stopping at petrol pump will get his tyre checked 0.12, the probability that he will get his oil cheaked is 0.29 and probability that he will get both checked is 0.07. What is the probability that the person will have neither his tyre nor oil checked, find the probability that a person who has his oil checked will also have tyres checked, find the probability that a person checks tyres but not oil. **[5]**

ii) A candidate is selected for an interview for three posts. For the first post there are three candidates, for the second there are 4 and for the third there are 2. What is the probability that a candidate is selected for at least one post. **[5]**

OR

b) The incidence of certain disease is such that on average, 20% of workers suffer from it. If ten workers are selected at random, find the probability that **[10]**

i) Exactly two workers suffer from the disease

ii) Not more than two workers suffer from the disease

iii) At least nine workers suffer from the disease

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