P. Pages: 3		GUG/W/16/6630
Time : Three Hours	* 4 7 0 2 *	Max. Marks : 80

Notes : 1. All questions carry equal marks.

- 2. Assume suitable data wherever necessary.
- 3. Illustrate your answers wherever necessary with the help of neat sketches.
- 4. Maximum marks are indicated on the right side.
- A client asks an agent to sell three properties A, B and C and agrees to pay 5% on each sale. 16 He specifies some conditions. The agent must sell property A first. When A is sold, the agent receives 5% on that sale. Now he can either backout or try to sell one of the two remaining properties within 60 days. If he sells it within the given period he is given an opportunity to sell the third property under same conditions. The following table summarises the prices, selling costs [Incurred by the agent whenever a sale is made] and the agent's estimated probability of making a sale

Property	Property Prices	Selling Costs	Probability of
	(Rs)	(Rs)	sale
А	12,000/-	400/-	0.70
В	25,000/-	225/-	0.60
С	50,000/-	450/-	0.50

i) Draw up an decision tree for the agent

ii) Suggest the best strategy under EMV approach.

OR

Mr. x has ₹ 10,000/- to invest in one of the three options A, B & C. The return on his investment depends whether the company experiences inflation, recession or no change at all. His possible returns under each economic condition are as under :

Strategy	Inflation	Recession	No. Change
	(₹)	(₹)	(₹)
А	2,000/-	1,200/-	1,500/-
В	3,000/-	800/-	1,000/-
С	2,500/-	1,000/-	1,800/-

Guide Mr. x in decision making using.

- a) Optimistic criterionb) Pessimistic criterionc) Equal likely criteriond) Regret criterion
- The manager of an oil refinery must decide on the optimal mix of two possible blending16processes of which the inputs and output per production run are as follows16

Process	INF	Y UT	OUTPUT	
(units)	Grade A Grade B		Gas x	Gas y
1	5	3	5	8
2	4	5	4	4

3.

The maximum amounts available for Grade A and Grade B are 120 units and 150 units respectively. Market requirement show that at least 100 units of gas x and 80 units of gas y must be produced.

The profit per production run for process 1 and process 2 are \gtrless 300/- and \gtrless 400 per unit respectively. Solve the LP problem by graphical method.

OR

4. Solve the LPP given below by simplex method.

 $\begin{array}{l} 2x_1 + x_2 \leq 6 \\ x_1 + 2x_2 \leq 5 \\ x_1 + x_2 \geq 3 \\ x_1, \, x_2 \geq 0 \end{array}$

5. A small project is composed of 7 activities, whose time estimates are listed in the table 16 below. Activities are identified by their beginning (i) and ending (j) node numbers.

Activity	Estimated Duration (weeks)			
(i - j)	Optimistic	Optimistic Most Likely		
1 - 2	1	1	7	
1 - 3	1	4	7	
1 - 4	2	2	8	
2 - 5	1	1	1	
3 - 5	2	5	14	
4 - 6	2	5	8	
5 - 6	3	6	15	

- a) Draw the network diagram of the activities in the project.
- b) Find the expected duration and variance for each activity.
- c) What is the expected project length.

OR

- How does dynamic programming differs from linear programming ? What is a stage ?
 Discuss in brief multistage decision process used in dynamic programming. Define state and state variables.
- A mining company wishes to determine the levels of stock it should carry. The demand is not certain and there is a lead time for stock replenishment. For the item A following information is obtained.

Demand units / day	3	4	5	6	7
Probability	0.10	0.20	0.30	0.30	0.10

Carrying cost (units / day) = $\gtrless 2/-$

Ordering cost (per order) ₹ 50/-

Lead time = 03 days

Stock on hand at the beginning of the simulation exercise = 20 units.

Carryout a simulation run over a period of 10 days with the objective of evaluating the inventory rule order 15 units when present inventory plus and outstanding order falls below is units.

Random Numbers : 0, 9, 1, 1, 5, 1, 8, 6, 3, 5, 7, 1, 2, 9

using the first no for day one, determine the total cost of inventory for 10 days.

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- 8. Why is inventory termed as necessary evil. Discuss in brief the ABC method of inventory 16 control along with its advantages and limitations.
- A company employs typists on hourly price-rate basis for their daily work. There are 05 typists and their charges and speeds are different only one job is given to one typist and the typist is paid for full hour, even if he worked for a fraction of an hour. Determine the least cost allocation for the following data :

Typist	Rate / hr	No. of pages
		typed /hr
A	5	12
В	6	14
С	3	8
D	4	10
Е	4	11

Job	No. of pages
Р	199
Q	175
R	145
S	298
Т	178

OR

10. A company has four manufacturing plants and five warehouses. Each plant manufactures the some product, which is sold at different prices in each warehouse area. Consider the data of manufacturing plants.

Item	Plant			
	1	2	3	4
Manufac. Cost ₹ / unit	12	10	8	8
Raw mat. Cost ₹ / unit	8	7	7	5
Capacity / unit time	100	200	120	80

The company has five warehouses. The sale prices, transportation costs and demands are given in table below.

Ware	Tran	Transportation cost (Rs. / unit)			
House	1	2	3	4	
А	4	7	4	3	
В	8	9	7	8	
С	2	7	6	10	
D	10	7	5	8	
Е	2	5	8	9	
Ware Hous	se Sal	Sale Price		per unit	
А		30	80		
В		32		0	
С		28		0	
D		34)	
E		30)	

Formulate the transportation problem and determine the optimal solutions.
