June 5, 2024   10:30 am - 01:30 pm   1T00162 - M.C.A. (SEM-II) (Choice Based) (Two Year Course) (R-2020-21) / 70651 - Mathematical Foundation for Computer science II   QP CODE: 10056707

≤Duration: 3 Hrs   **Total Marks: 80**

Please check whether you have got the right question paper

N.B: (1) Question 1 is compulsory.
       (2) Attempt any three questions out of remaining five questions.
       (3) Assume any necessary data, if required, but justify the same.
       (4) Figures to the right indicate full marks for that question.
       (5) Use of Scientific calculator is allowed.

Q1   Each question carries 5 Marks.

A   Solve the following LPP graphically Max $Z = 14x + 9y$
     Subject to
     $x + y \leq 9$
     $3x + y \leq 15$
     $x, y \geq 0$

B   Find out the minimum cost solution for the following transportation problem, using Least Cost Cell Method.

Source		Destination					Supply
		D1	D2	D3	D4		
	O1	3	1	7	4		300
	O2	2	6	5	9		400
	O3	8	3	3	2		500
Demand			250	350	400	200	

C   Explain Monte Carlo Simulation. List Advantages and Limitations of Simulation.

D   Solve the payoff matrix and find Saddle point

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

Q2.   Each question carries 10 Marks.

A   Solve by Simplex method
     Max $Z = 3x + 2y$
     Subject to
     $2x + y \le 18$
     $2x + 3y \le 42$
     $3x + y \le 24$
     $x, y \ge 0$

B   Solve the following game by using the principle of dominance.

		B		
		5	20	-10
A		10	6	2
		20	15	18

Q3.
     Each question carries 10 Marks.

A   Solve the following assignment problem shown in Table using Hungarian method. The matrix
     entries are processing time of each man in hours.

C/P	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

X525Y02FC11X525Y02FC11X525Y02FC11X525Y02FC11

B

Solve the following LPP using penalty (Big - M) method;

Min Z $= 600x + 500y$

S.T.

$2x + y \geq 80$

$x + 2y \geq 60$

$x \geq 0, y \geq 0$

Q4   Each question carries 10 Marks

A   Find solution using Two-Phase method

Max Z $= 5x_1 + 8x_2$

Subject

to

$3x + 2y \geq 3$

$x + 4y \geq 4$

$x + y \leq 5$

and $x_1, x_2 \geq 0$

B   Under conditions of uncertainty, a farmer would know that the yield of
the crop may be high, moderate, or low but would not have enough
information to be able to use probabilities for the possible states that
Will occur. Further, these yields are dependent on the type of crops
Used by the farmer. Presently he has to decide amongst the three crops
(A, B, and C), he knows that the possible yield (High, Moderate and Low)
will yield the following payoff (profits in 1000's Rs) as shown in Table

Payoff matrix (profits in 1000's Rs)

Alternative Strategies		State of Nature		
		High	**Moderate**	**Low**
	A	Rs 60	Rs 42	Rs -10
Crops	B	Rs 85	Rs 60	Rs -20
	C	Rs 50	Rs 25	Rs -12.5

Find

1. The Maximax Criterion

2. The Maximin Criterion

3. The Minimax regret Criterion

4. Laplace's Criterion

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Q5 Each question carries 10 Marks

A A T.V repairman repair the sets in the order in which they arrive and expects that the time required to repair a set has an ED with mean 30mins. The sets arrive in a Poisson fashion at an average rate of 10/8 hrs. A day.
(a) What is the expected idle time / day for the repairman?
(b) How many TV sets will be there awaiting for the repair?

B The Cargo Honda Limited manufactures around 150 scooters. The daily production varies from 146 to 154 depending upon the availability of raw materials and other working conditions:

Production per day	Probability
146	.04
147	.09
148	.12
149	.14
150	.11
151	.10
152	.20
153	.12
154	.08

The finished scooters are transported in specially arranged lorry accommodating 150 scooters. Using following random numbers, 80, 81, 76, 75, 64, 43, 18, 26, 10, 12, 65, 68, 69, 61, 57, stimulate the process to find out
(i) What will be the average number of scooters waiting in the factory?
(ii) What will be the average number of empty space on the lorry?

Q6 Each question carries 10 Marks

A Find minimum cost of the given travelling sales man problem

Work\Job	1	2	3	4
1	x	4	9	5
2	6	x	4	8
3	9	4	x	9
4	5	8	9	x

X525Y02FC11X525Y02FC11X525Y02FC11X525Y02FC11

B   Find initial basic feasible solution using VAM Method and hence obtain optimal solution using MODI
method

		Departments				
		G	H	I	J	Supply
Departments	A	13	25	12	21	18
	B	18	23	14	9	27
	C	23	15	12	16	21
	Demand	14	12	23	17	

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