RAMAIAH
Institute of Technology

MOBILES ARE BANNED

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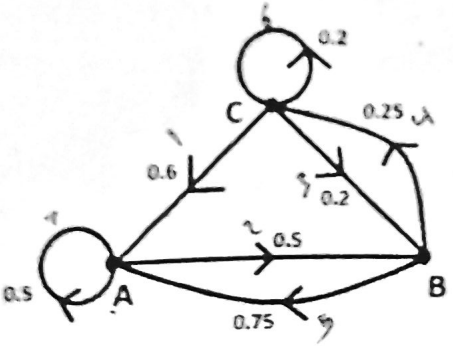
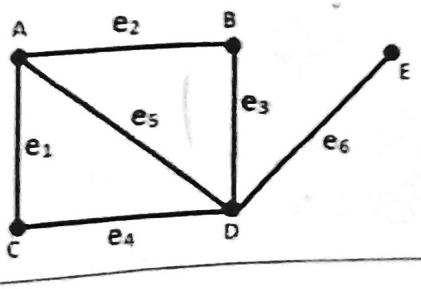
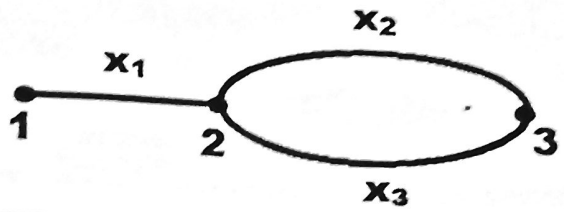
DEPARTMENT OF MATHEMATICS

Sub Code:	MAOE04	Sub:	Applied Graph Theory		Test:	02
Time :	3PM to 4PM	Term:	23.03.2022 to 06.07.2022 (extended till 22nd July 2022)		Marks:	30
Date:	27.01.2022	Semester:	V	Section:	Open elective	

Note: Answer any **TWO** full questions. Each main question carries 15 marks

Q.No.		Questions	Blooms Level	CO's	Marks
1.	(a)	Construct an optimal prefix code for the letters of the word **CUT SET**.	L3	CO5	5
	(b)	Define path matrix and list all the properties of a path matrix with an example.	L4	CO3	5
	(c)	Define each of the following with examples i) Strongly connected digraph ii) Condensation of a digraph iii) Circuit matrix of a digraph	L2	CO4	5
2.	(a)	A transition digraph of three state Markov process is given below.  Find the probability of traversing from C to A in all possible cases with the directed edge sequences of length two.	L3	CO5	5
	(b)	Find the fundamental cut-set matrix of the graph given below  	L4	CO3	5

	(c)	Prove that an arborescence is a tree in which every vertex other than the root has an in-degree of exactly one.	L2	CO4	5
3.	(a)	For the following contact network, show that the (1,2) minor of the primitive connection matrix is equal to the switch function F_{12}  	L3	CO5	5
	(b)	Define rank of incidence matrix, circuit matrix and cut-set matrix with an example.	L2	CO3	5
	(c)	Write a note on (i) Binary relations on graph (ii) Spanning Arborescence (iii) Tournament	L2	CO4	5