D1BCA2503

Name: .....

Reg. No.: .....

FIRST SEMESTER FYUGP EXAMINATIONS NOVEMBER 2025

(Regular/Improvement/Supplementary)

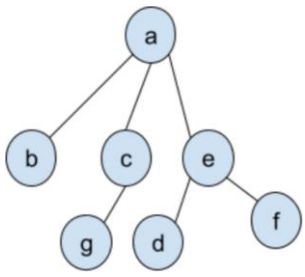
BCA

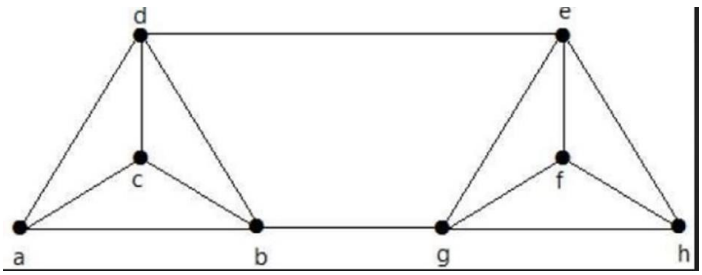
MAJOR

BCA1CJ103: DISCRETE STRUCTURES FOR COMPUTER APPLICATIONS

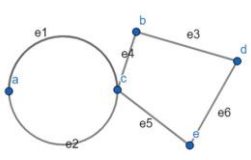
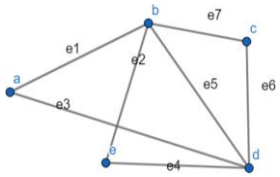
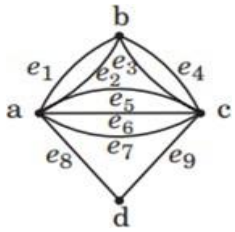
Time: 2 Hrs. M: Mark BL: Bloom's Taxonomy Level (1 to 6) CO: Course Outcome **Maximum Marks: 70**

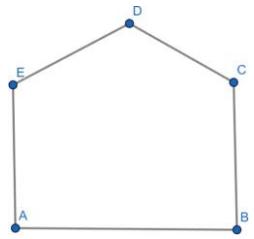
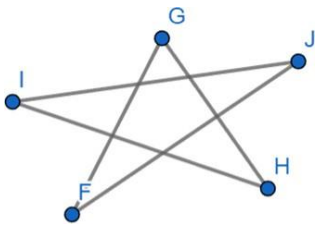
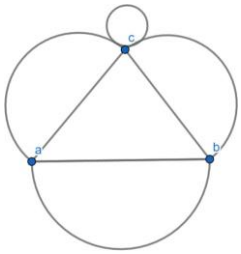
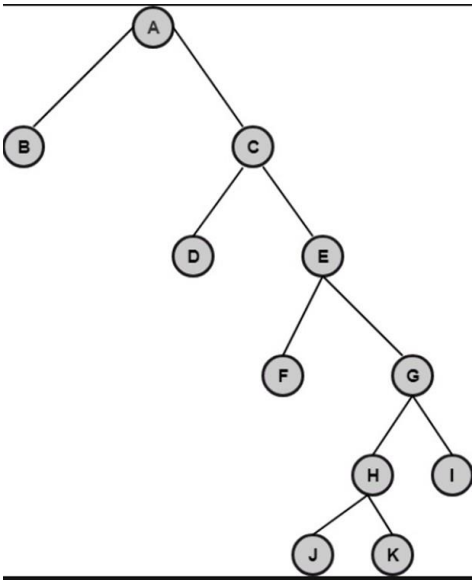
Section A: Answer all questions. Each carries 3 marks.
Ceiling: 24 Marks

No.	Question	M	BL	CO
1.	Write the converse, inverse and contrapositive of the implication "if the calculator is working, then the battery is good".	3	6	CO1
2.	Define composition of relations. Let A= {1,2,3,4}; B= {a,b,c,d}, C={x,y,z} and R be a relation from A to B given by R= {(1,a),(2,d),(3,a),(3,b),(3,d)}. Let S be a relation from B to C defined by S={(b,x), (b,z), (c,y), (d,z)}. Find RoS.	3	3	CO2
3.	In a group of 50 people, 28 have traveled to Europe, 31 have traveled to Asia, and 10 have traveled to both continents. How many people have not travelled to either continent?	3	5	CO2
4.	Write the domain and range of 1. signum function 2. modulus fuction 3. greatest integer function	3	3	CO2
5.	Evaluate the domain and range of the following fuctions, 1. f(x)= |x| 2. f(x)=$\sqrt{9-x^2}$	3	5	CO2
6.	Name and draw Kuratowski's two graph.	3	2	CO3
7.	Draw a 2-regular graph with three vertices.	3	5	CO3
8.	Define Pendent vertex in a graph. Give an example.	3	2	CO5
9.	Write the adjacency matrix of the given tree.  **(PTO)**	3	6	CO5

10.	Find the edge connectivity and vertex connectivity of the following graph. 	3	5	CO5

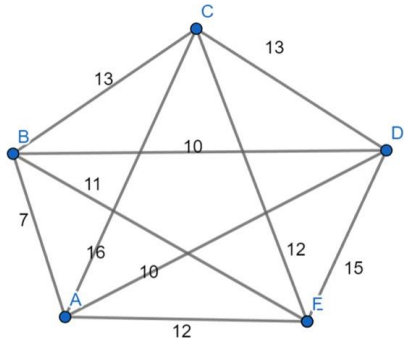
Section B: Answer all questions. Each carries 6 marks.
Ceiling: 36 Marks

No.	Question	M	BL	CO
11.	Determine the truth value of each proposition where UD consists of the numbers -2,-1,0,1,2 1. $\forall x(x^2=4)$ 2. $(\exists x)(x^3+2x^2=x+2)$ 3. $(\forall x)(x^5+4x=5x^3)$ 4. $(\forall y)(y^4+3y^2=2)$ 5. $\neg((\forall x)(x^3=x)$	6	2	CO 1
12.	Check the validity of the following argument. If the computer was down Saturday afternoon, Mary went to a matinee. Either Mary went to a matinee or took a nap Saturday afternoon. Mary did not take a nap that afternoon ∴The computer was down Saturday afternoon.	6	5	CO 1
13.	1. Define complement of a set. Draw Venn diagram. 2. Let U ={1,2,3,...,20}, A= {2,3,7,8,12,16,19}, B={3,6,8,10,14,,16,18} find A' (A complement) and B'(B complement), A'∪B'.	6	2	CO 2
14.	Define a bijective function. Verify whether the function f: $\boldsymbol{R}\rightarrow\boldsymbol{R}$ defined by $f(x)= x^2$ is bijective or not. If not justify.	6	4	CO 2
15.	Construct an Eulerian circuit for each Eulerian graph. a)  b)  c) 	6	3	CO 4

16.	Verify whether the graphs G1=(V1, E1) and G2=(V2,E2) are isomorphic.  G1  G2	6	5	CO 3
17.	Define adjacent vertices in a graph. Find the adjacency matrix of the graph.  	6	3	CO 3
18.	Define the terms level of a vertex and height of a tree. Find the level of each vertices in a tree. Also find its height.  	6	4	CO 5

Section C: Answer any one question. Each carries 10 marks. (1 x 10 = 10 Marks)

No.	Question	M	BL	CO
19.	1. Determine whether $(\neg p \wedge (p \rightarrow q)) \rightarrow \neg q$ is a tautology 2. Show that $p \leftrightarrow q$ and $\neg p \leftrightarrow \neg q$ are logically equivalent. **(PTO)**	10	2	CO1

20.	Explain Prim's Algorithm. Using prim's algorithm fin the minimal spanning tree for thegiven weighted graph.  	10	3	CO4