LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **ALLIED**

FIRST SEMESTER – **NOVEMBER 2023**

UCA 1301 – MATHEMATICS FOR COMPUTER SCIENCE

Date: 09-11-2023 Dept. No. Max. : 100 Marks

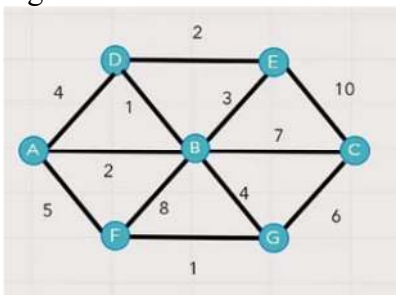
Time: 09:00 AM - 12:00 NOON

	SECTION A - K1 (CO1)	
	Answer ALL the Questions -	**(10 x 1 = 10)**
1.	**Answer the following**	
a)	Define the formula of the Hermitian matrix.	
b)	State about a sample.	
c)	Visualize pseudo graph.	
d)	Define spanning tree.	
e)	Identify 'h' in Simpson's rule.	
2.	**Fill in the blanks**	
a)	____ is the condition for the orthogonal matrix	
b)	____ is the mode of the consecutive days 11,13,13,17,12,23,25,13	
c)	A graph is a collection of ___	
d)	_____ of a connected graph is a set of branches, which cuts the given graph into two separate parts.	
e)	The Regula falsi method is also called as _____	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Match the following**	
a)	Symmetric Matrix (i) Newton Raphson	
b)	Sort the elements (ii) Tree	
c)	Walk (iii) Median	
d)	Acyclic graph (iv) A= A'	
e)	Find the root (v) Number of vertices	
4.	**True or False**	
a)	A= -A' condition holds true for a skew-symmetric matrix	
b)	Mode is the difference between the highest and lowest values from the observation	
c)	A graph with no edges is known as an empty graph	
d)	The weight of a spanning tree is the sum of all the weights assigned to each edge of the spanning tree.	
e)	Newton's Gregory Interpolation method is useful for interpolating the values of f(x) near the beginning set of values	
	SECTION B - K3 (CO2)	
Answer any TWO of the following		**(2 x 10 = 20)**
5.	Examine for consistency and solve the equations. 2x+y+z=5 x+y+z=4 x-y+2z=1	

6.	Calculate the mean, median, mode and range of this data set: 17,12,15,10,26,17,13,14,17
7.	Illustrate the operations of the graph with an example.
8.	Establish the root of an equation f(x) = $2x^3 - 2x - 5$ using the Regula-Falsi method

SECTION C – K4 (CO3)

Answer any TWO of the following **(2 x 10 = 20)**

9.	Calculate the standard deviation of the following data: 1,2,5,6,6.
10.	Estimate the minimum spanning tree for the given graph using the prim's algorithm and kruskal's algorithm. 
11.	Illustrate fundamental circuits and cutsets with suitable example.
12.	Evaluate f (2.8) using Newton's interpolation formula.

x	0	1	2	3
y	1	2	11	34

SECTION D – K5 (CO4)

Answer any ONE of the following **(1 x 20 = 20)**

13.	Test for Cayley- Hamilton theorem for the given matrix and hence find A^{-1} $\begin{bmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{bmatrix}$
14.	Evaluate $\int_1^7 \frac{1}{x}$ dx using Simpson's $1/3^{rd}$ rule and Simpson's $3/8^{th}$ rule, with n=5.

SECTION E – K6 (CO5)

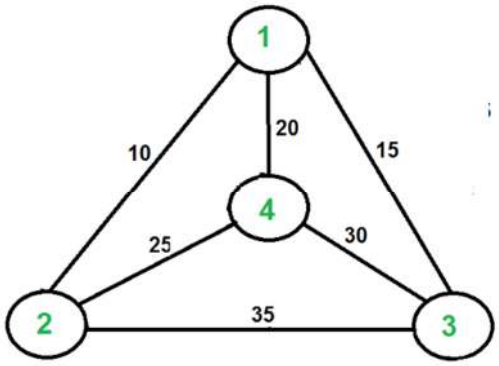
Answer any ONE of the following **(1 x 20 = 20)**

15. a. Construct the correlation coefficient of the following data. (12 Marks)

X	Y
0	15
1	15
3	20
4	25
4	30
6	35

b. Formulate f(3) using Newton's Forward Interpolation method. (8 Marks)

x	0	5	10	15	20
y=f(x)	1.0	1.6	3.8	8.12	15.4

16.	a. Invent the shortest distance using Travelling sales man problem for the following graph. (12 Marks)  b. Write the eigen values of the given matrix (8 Marks) $\begin{pmatrix} 2 & 2 & 0 \\ 2 & 1 & 1 \\ -7 & 2 & -3 \end{pmatrix}$

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