LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **ALLIED**

FIRST SEMESTER – **NOVEMBER 2024**

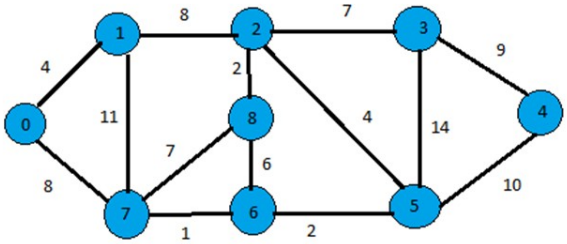
UCA 1301 – MATHEMATICS FOR COMPUTER SCIENCE

Date: 20-11-2024 Dept. No. Max. : 100 Marks

Time: 09:00 am-12:00 pm

	SECTION A - K1 (CO1)	
	Answer ALL the Questions -	**(10 x 1 = 10)**
1.	**Answer the following**	
a)	Define the formula of the skew-symmetric matrix	
b)	State about population.	
c)	Visualize pseudo graph	
d)	Define cut set	
e)	Identify 'h' in Simpson's rule.	
2.	**Fill in the blanks**	
a)	____ is the condition for the unitary matrix.	
b)	____ is the mean of 13,64,47,85,77,43,21.	
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)	(a) Matrix	(i) Newton Raphson
b)	(b) Average	(ii) Tree
c)	(c) Walk	(iii) Mean
d)	(d) Acyclic graph	(iv) Collection of elements
e)	(e) Find the root	(v) Number of vertices
4.	**True or False**	
a)	Every square matrix satisfies its own characteristic equation is cayley-hamilton theorem	
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)	In simpson's rule, 'h' is the interval of x 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 cut sets 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} $$\begin{bmatrix} 8 & -8 & 2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$$
14.	Calculate the root of an equation f(x) = $2x^3$-2x-5 using Regula-Falsi method

	SECTION E – K6 (CO5)
Answer any ONE of the following	**(1 x 20 = 20)**

15. a. Compute the sample correlation coefficient of the data from the given table which relates the person's resting pulse rate to the number of years of school completed.

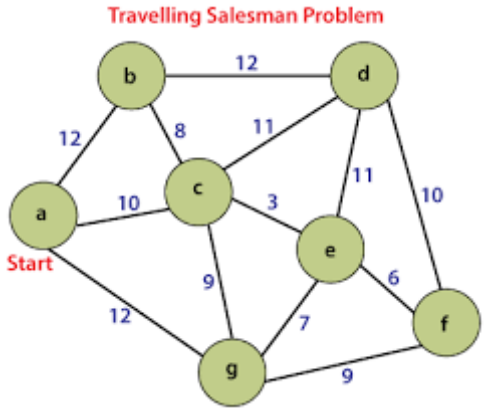
Table: Pulse Rate and Years of School Completed

Years of school	12	16	13	18	19	12	18	19	12	14
Pulse rate	73	67	74	63	73	84	60	62	76	71

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. 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)

$$A=\begin{bmatrix}3 & 1 & 4\\ 0 & 2 & 6\\ 0 & 0 & 5\end{bmatrix}$$
