LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **COMPUTER SCIENCE**

FIRST SEMESTER – **NOVEMBER 2022**

UCA 1301 – MATHEMATICS FOR COMPUTER SCIENCE

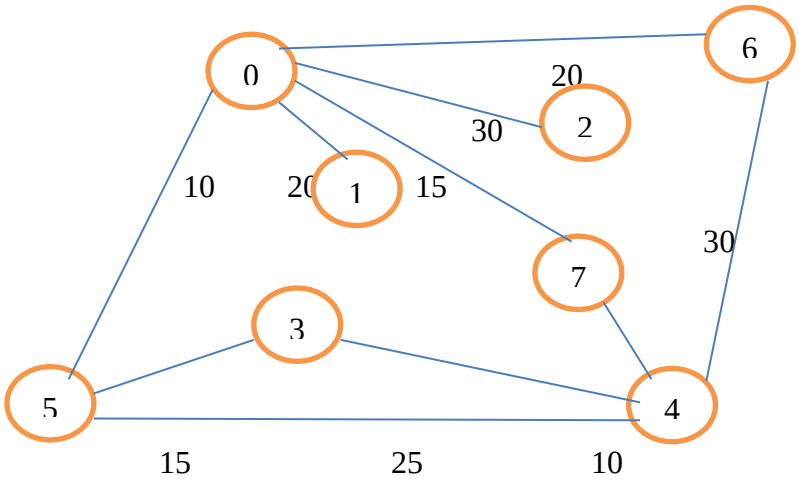
Date: 01-12-2022 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A			
Answer ALL the Questions			
1.	**Answer True or False**		**(5 x 1 = 5)**
a)	The product of two matrices A and B is defined if the number of columns of A is equal to the number of rows of B.	K1	CO1
b)	The median is the middle point in a dataset.	K1	CO1
c)	Any connected graph is called as Euler graph iff all its vertices are of odd degree.	K1	CO1
d)	If there are n nodes then there would be n -1edges.	K1	CO1
e)	Simpson's 1/3 rule is an extension of Trapezoidal rule	K1	CO1
2.	**Fill in the blanks**		**(5 x 1 = 5)**
a)	A square matrix is said to be _____ if $A^{e}A = A\,A^{e} = I$	K1	CO1
b)	Statistics is the art of _____.	K1	CO1
c)	A graph in which there are no edges between any of its vertices is____ graph.	K1	CO1
d)	_____ is a collection of disjoint trees.	K1	CO1
e)	For the given equation $f(x) = x^3 - x - 1$, the root lies between _____.	K1	CO1
3.	**Choose the best answer**		**(5 x 1 = 5)**
a)	A square matrix is said to be orthogonal if a. $A^TA=AA^T=I$ b. $A^{e}A = A\,A^{e} = I$ c. $A^{e=}A$ d. $A^{T=-}A$	K2	CO1
b)	Statistics is a scientific discipline concerned with _____ of data. a. collection b. analysis c. interpretation d. all	K2	CO1
c)	A graph G=(V,E) is said to be _____ if there are multiple edges between a pair of vertices in the graph. a. Connected graph b. Multi graph c. Trivial graph d. Infinite graph	K2	CO1
d)	The number of edges on the longest path between node and a leaf node represents _____ of a node. a. Path b. level c. Height d. None	K2	CO1
e)	The method used to find the root of the equation is ___ a. Regula- Falsi b. Trapezoidal c. Simpson's rule d. Interpolation	K2	CO1

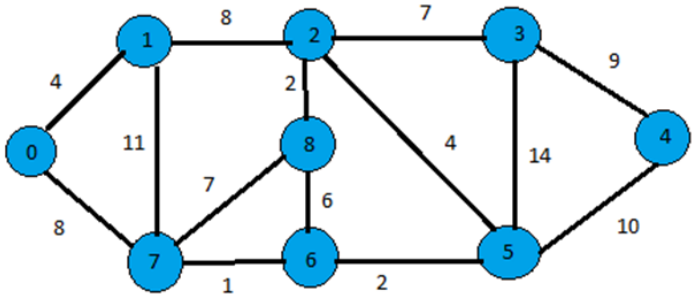
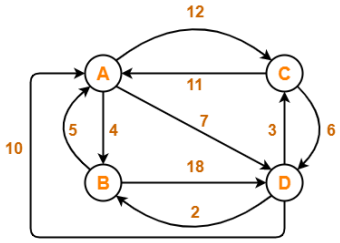
4.	**Answer the following**		**(5 x 1 = 5)**
a)	Express the condition for a square matrix to be identity matrix. Give example.	K2	CO1
b)	Interpret Mode.	K2	CO1
c)	Give an example for an Eulerian graph.	K2	CO1
d)	Indicate Cayley's formula.	K2	CO1
e)	Predict the use of Interpolation.	K2	CO1

SECTION B

Answer any TWO of the following in 100 words			**(2 x 10 = 20)**
5.	Calculate the Eigen values and Eigen vectors of the given matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$	K3	CO2
6.	Illustrate the operations on Graph.	K3	CO2
7.	Construct the spanning and minimum spanning tree of the following figure 	K3	CO2
8.	Calculate the root of the equation $2x^3 - 2x - 5$ using False position method.	K3	CO2

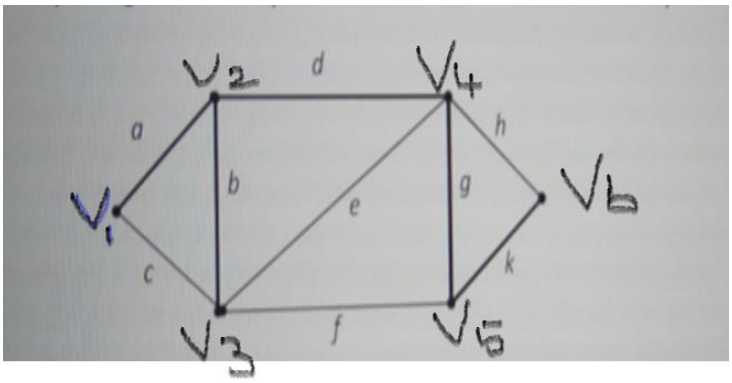
SECTION C

Answer any TWO of the following in 100 words			**(2 x 10 = 20)**
9.	Analyze A^{-1} using Caley Hamilton theorem for the given matrix $A = \begin{bmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{bmatrix}$	K4	CO3
10.	Explain the sample standard deviation of the following data 51, 38, 79, 46, 57	K4	CO3

11.	Distinguish the minimum spanning tree using prim's and kruskal's algorithm.  	K4	CO3
12.	Analyze the solution of the equation using Simpson's 1/3 and 3/8 rule. n=4 X 0.0 0.1 0.2 0.3 0.4 F(x) 1 0.9975 0.9900 0.9776 0.8604	K4	CO3
	SECTION D		
	Answer any ONE of the following in 250 words		**(1 x 20 = 20)**
13.	a. Evaluate the correlation coefficient of the given data 12 16 13 18 19 12 18 19 12 14 73 67 74 63 73 84 60 62 76 71 b. Summarize any ten types of graphs	K5	CO4
14.	a. i. Estimate the Travelling Salesman Problem. Starting node is D  ii. Summarize on Hamiltonian graph. c. Evaluate the area under the curve y = f(x) between x =-4 and x= 2 using Trapezoidal Rule with n = 6 subintervals. A function f(x) is given in the table of values.	K5	CO4

x	-4	-3	-2	-1	0	1	2
y	0	4	5	3	10	11	2

	SECTION E

Answer any ONE of the following in 250 words			**(1 x 20 = 20)**
15.	a. Hypothesize that the equations are consistent. Solve them using rank method. $X + Y + Z = 9$ $2X + 5Y + 7Z = 52$ $2X - Y - Z = 5$ b. Integrate the methods of storing a graph with example	K6	CO5
16.	a. Formulate the fundamental circuit and cutset.  b. Write the solution using Newton's interpolation. Find x = 1925 X 1891 1901 1911 1921 1931 F(x) 46 66 81 93 101	K6	CO5

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