

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – COMPUTER SCIENCE

FIRST SEMESTER – NOVEMBER 2019

UCA 1301 – MATHEMATICS FOR COMPUTER SCIENCE

Date: 05-11-2019

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART-A

Answer all the questions: -

10X2=20

1. Define Symmetric of a matrix.

2. Obtain the Characteristic equation of $\begin{bmatrix} 1 & -2 \\ -5 & 4 \end{bmatrix}$

3. The average fuel efficiencies, in miles per gallon, of cars sold in the United States in the years 1999 to 2003 were 28.2, 28.3, 28.4, 28.5, 29.0 .Find the sample mean of this set of data.

4. What is Percentile?

5. Draw Petersen graph.

6. Define Pseudograph with example.

7. What is spanning tree.

8. What is cut set and cut vertices?

9. Write Newton's formula to find the cube root of N.

10. Find $\int_{-2}^2 x^4 dx$ by Simpson's rule taking $h = 1$

PART-B

5X8=40

Answer all the Questions:-

11.a) Test whether the following system of equation is consistent or not.

$$x+2y+z=3, 2x +3y+2z= 5, 3x-5y+5z=2, 3x+9y-z=4$$

Or

b) Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$

12.a).Find the sample quartiles for the following 18 data values, which represent the ordered values of a sample of scores from a league bowling tournament:

122, 126, 133, 140, 145, 145, 149, 150, 157, 162, 166, 175, 177, 177, 183, 188, 199, 212

Or

b) The following data give the yearly numbers of law enforcement officers killed in the United States over 10 years:

164, 165, 157, 164, 152, 147, 148, 131, 147, 155. Find the sample variance of the number killed in these years.

13. a) Explain Isomorphism graph and Bipartite graph with its condition.

Or

b) Explain the operations on Graph with suitable example.

14. a) Draw all trees with 4 and 5 vertices.

Or

b) Write short note on following.

- (i) Eulerian graph
- (ii) Königsberg bridge problem.
- (iii) Hamiltonian graph.

15. a) Using Newton's iterative method find the positive root between 0 and 1 of $x^3 = 6x - 4$ Correct to two decimal places.

Or

b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ with $h = \frac{1}{6}$ by Trapezoidal rule

PART-C

Answer Any TWO Questions

2X20=40

$$A = \begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$$

16 a) Verify Cayley Hamilton theorem $A = \begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$ Hence find its inverse.

b) Compute the sample correlation coefficient of the data of Table, which relates the number of cigarettes smoked to the number of free radicals found in a person's lungs.

Cigarette Smoking and Free Radicals

Person	Number of cigarettes smoked	Free radicals
1	18	202
2	32	644
3	25	411
4	60	755
5	12	144
6	25	302
7	50	512
8	15	223
9	22	183
10	30	375

17a) Solve the following travelling salesman problem

		To			
		A	B	C	D
From	A	-	46	16	40
	B	41	-	50	40
	C	82	32	-	60
	D	40	40	36	-

- b) (i) Define Tree
- (ii) Write the characteristics of trees.
- (iii) Prove that every connected graph has a spanning tree.

18 a) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using (i) Simpson's 1/3rd rule (ii) Simpson's 3/8th rule

b) If $y(10)=35.3, y(15)=32.4, y(20)=29.2, y(25)=26.1, y(30)=23.2, y(35)=20.5$ find $y(12)$ using (i) Newton's forward interpolation formula.

(ii) Newton's backward interpolation formula.

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