



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc.DEGREE EXAMINATION – COMPUTER SCIENCE

FIRSTSEMESTER – APRIL 2018

17/16UCA1AL01- MATHEMATICS FOR COMPUTER SCIENCE

Date: 30-04-2018
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

PART-A

Answer **ALL** the questions

10X2=20

1. What is the difference between symmetric and skew symmetric of a matrix?
2. Write the Characteristic equation of $\begin{bmatrix} 1 & -2 \\ -5 & 4 \end{bmatrix}$
3. *Define* populations and samples.
4. Match each statement in the left-hand column with the correct data set from the right-hand column.
 - (i). Sample mode is 9 A: 5, 7, 8, 10, 13, 14
 - (ii). Sample mean is 9 B: 1, 2, 5, 9, 9, 15
 - (iii). Sample median is 9 C: 1, 2, 9, 12, 12, 18
5. What is complete graph.
6. Give an example for cut vertices?
7. What is Eulerian graph?
8. Define Hamiltonian cycle.
9. Write the formula for Newton- Rapson method to calculate root.
10. Write the Newton's forward difference formula.

PART-B

Answer **ALL** the questions

5X8=40

- 11a) Examine the following equations are consistent or not if so find any one value.
 $x+y+z=9$, $2x-y+z=4$, $3x-y+z=6$, $4x-y-2z=7$

OR

$$A = \begin{bmatrix} 1 & 1 & -3 & -1 \\ 4 & -2 & 6 & 8 \\ 15 & -3 & 9 & 21 \end{bmatrix}$$

- b) Find the rank of the matrix A=

- 12 a) Which data value is the sample 90th percentile when the sample size is (i) 8, (ii) 16, and (iii) 100?

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) Define the following with an example (i) Walk (ii) Path (iii) Trail (iv) Bridges

OR

- b)i) Prove the following statement. A closed walk of odd length contains a cycle.
ii) Prove the following statement. If G is not connected \bar{G} is connected.

14 a) What is Tree? Draw all trees with 4 and 5 vertices.

OR

b) i) Define planar and non-planar.

ii) Prove that K_5 and $K_{3,3}$ are non-planar.

15a) Find the first approximation of the real root of equation $x^3 - 3x + 1 = 0$ by regulaFalsi method correct to three places of decimal.

OR

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

PART-C

Answer any TWO

2X20=40

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

16 a) Verify Cayley Hamilton theorem $A =$ Hence find its inverse

b) Compute the sample correlation coefficient of the data of Table which relates a Person's resting pulse rate to the number of years of school completed.

Table Pulse Rate and Years of School Completed

	Person									
	1	2	3	4	5	6	7	8	9	10
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

17 a) Draw the following graphs.

(ii) Simple graph with 5 vertices. (ii) K_5 . (iii) Regular graph with 5 vertices.

(iv) Planar graph with 5 vertices. (v) Petersen graph

b) Let G be a (p,q) graph .prove that the following statements are equivalent.

(i) G is a tree

(ii) Every points of G are joined by a unique path.

(iii) G is connected and $p=q+1$

(iv) G is acyclic and $p=q+1$.

18. a) 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 Newton's forward interpolation formula and

$$\begin{bmatrix} 2 & 2 & 0 \\ 2 & 1 & 1 \\ -7 & 2 & -3 \end{bmatrix}$$

b) Find the Eigen values and Eigen vectors of
(ii) List some of the properties of the sample correlation coefficient.

\$\$\$\$\$\$\$\$\$\$