LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIRST SEMESTER – **NOVEMBER 2019**

16/17/18UCA1AL01 – 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 unitary matrix
2. Write the condition for skew symmetric matrix
3. Define Random sample.
4. What is Percentile?
5. Draw Petersen graph.
6. Give an example for K_5.
7. What is Eulerian graph?
8. Define Hamiltonian cycle.
9. Write the formula to find the root in regular-falsi method.
10. Calculate u value for Newton's forward and backward interpolation method.

PART-B

Answer **ALL** the questions **5X8=40**

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

OR

(b) Show that $1/3 \begin{bmatrix} 2 & 2 & 1 \\ -2 & 1 & 2 \\ 1 & -2 & 2 \end{bmatrix}$ is orthogonal.

12. (a) (i) Determine the sample median of the data set 14,22,8,19,15,7,8,13,20,22,24,25,11,9,14

(ii) Increase each value in (i) by 5, and find the new sample median

OR

(b) The following data give the yearly numbers of law enforcement officers killed in the U.S 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) (i) Prove that: The sum of the degrees of the points of a graph G is twice the number of lines.

(ii) Prove that $\delta \leq \frac{2q}{p} \leq \Delta$

OR

(b) (i) Draw any two simple graph G_1 and G_2 and find sum and product of them.

(ii)Define the following:

(a)Walk (b) trail (c) path (d) closed walk

14. (a) (i) Show that every connected graph has a spanning tree.

(ii) If G is tree then prove that every two points of G are joined by a unique path.

OR

(b) Define planar and non planar graph with suitable example.

15. (a) Find the smallest positive root of the equation $3x^3 - 9x^2 + 8 = 0$,correct to 4 places of decimals, using Newton –Rapson method

OR

(b) Using the data given below, find the value of $\int_1^9 y\,dx$ using trapezoidal rule.

x	1	2	3	4	5	6	7	8	9
Y	2.061	2.312	2.891	3.106	3.670	4.721	6.103	7.950	9.942

PART-C

Answer any **TWO** 2**X10=20**

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 a the number of cigarettes smoked to the number of free radicals found in a person's lungs

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
No.of cigarettes	18	32	25	60	12	25	50	15	22	30
Free radicals	202	644	411	755	144	302	512	223	183	375

17. a. Prove the following statement. The maximum number of lines among all p point graphs with no triangles.

[p^2/ **4**]

b. (i) Construct Eulerian graph and Hamiltonian graph with suitable example.

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

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

(i) Newton's forward interpolation formula and

(ii) Newton's backward interpolation formula

(b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ with n=5 using (i) Simpson's 1/3rd rule (ii) Simpson's 3/8th rule.

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