



# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

## B.Sc. DEGREE EXAMINATION – COMPUTER SCIENCE

FIRST SEMESTER – APRIL 2017

### 16UCA1A01- MATHEMATICS FOR COMPUTER SCIENCE

Date: 02-05-2017  
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

#### PART-A

Answer all the questions: -

10X2=20

1. Define Minor of a matrix.

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

3. The following are the sizes of the last 8 dresses sold at a women's boutique: 8, 10, 6, 4, 10, 12, 14, 10. What is the sample mode?

4. List the properties of the sample correlation coefficient.

5. Draw Petersen graph.

6. Define Isomorphism graph.

7. Draw a tree with 6 vertices.

8. Define Trail?

9. State the order of convergence of Newton Raphson method.

10. Write the formula for false position method.

#### PART-B

5X8=40

Answer all the Questions:-

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

$$x - y + z = -9, \quad 2x - y + z = 4, \quad 3x - y + z = 6, \quad 4x - y - 2z = 7$$

Or

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

12. Consider five numbers. Suppose the mean of the first four numbers is 14.

a) i) If the fifth number is 24, what is the mean of all five numbers?

ii) If the mean of all five numbers is 24, what is the fifth number?

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) Prove that any self-complementary graph has  $4n$  or  $4n+1$  points.

Or

b) Prove that i)  $\delta \leq \frac{2q}{p} \leq \Delta$

ii) Show that the partition  $P=(6,6,4,5,3,3,1)$  is not graphic.

14. a) Show that every non-trivial tree  $G$  has at least two vertices of degree 1

Or

b) Write short note on following.

- (i) Eulerian graph
- (ii) Konigsberg 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  $h=1$  by Trapezoidal rule

6

### PART-C

Answer Any TWO Questions

2X20=40

16 a) If  $A = \begin{pmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$  Find its inverse and  $A^4$  using Cayley Hamilton theorem.

c) 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) Prove the following statement. The maximum number of lines among all  $p$  point graphs with no triangles is  $\lfloor p^2/4 \rfloor$

d) (I) Define Tree

(ii) Write the characteristics of trees.

e) Prove that every connected graph has a spanning tree.

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

f) 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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