

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI - 600 086
(For candidates admitted from the academic year 2015-16 & thereafter)

SUBJECT CODE : 15MT/AC/MS45

B. C. A. DEGREE EXAMINATION, APRIL 2019
FOURTH SEMESTER

COURSE : ALLIED CORE
PAPER : MATHEMATICS FOR COMPUTER SCIENCE-II
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A

ANSWER ALL THE QUESTIONS: **(10×2=20)**

1. When you say that two graphs are isomorphic?
2. Define minimal spanning tree.
3. Find the first approximation of the root lying between 0 and 1 of the equation $x^3 + 3x - 1 = 0$ by Newton-Raphson formula.
4. State Newton's forward interpolation formula for equal intervals.
5. State Stirling's formula.
6. Write the Lagrange's interpolation formula.
7. Evaluate $\int_0^1 e^{-x^2} dx$ by dividing the range into 4 equal parts using Trapezoidal rule.
8. Find the first approximation for $\frac{dy}{dx} = 1 + xy$, $y(0) = 2$ by Picard's method.
9. What is correlation?
10. Mention any two properties of regression coefficients.

SECTION – B

ANSWER ANY FIVE QUESTIONS: **(5×8=40)**

11. Prove that a finite connected graph is Eulerian if and only if each vertex has even degree.
12. Let G be a connected planar graph with p vertices and q edges, where $p \geq 3$. Then prove that $q \geq 3p - 6$.
13. Solve the following system of equations using Gaussian elimination method
 $x + y + z = 9$; $2x - 3y + 4z = 13$; $3x + 4y + 5z = 40$.
14. Is the system of equations diagonally dominant? If not make it diagonally dominant.
 $3x + 9y - 2z = 10$; $4x + 2y + 13z = 19$; $4x - 2y + z = 3$.
15. Apply Gauss forward interpolation formula to find $y(25)$ for the following data:

x	20	24	28	32
y	2854	3162	3544	3992

16. For the given data

x	0	1	2	3	4
y(x)	1	1	15	40	85

find $y'(x)$ at $x = 0.5$

17. The following are the ranks obtained by 10 students in Statistics and Mathematics:

Statistics	1	2	3	4	5	6	7	8	9	10
Mathematics	1	4	2	5	3	9	7	10	6	8

To what extent is the knowledge of students in the two subjects related?

SECTION – C

ANSWER ANY TWO QUESTIONS:

(2×20=40)

18. (a) Prove that any planar graph is 5 colourable. (10 marks)
- (b) Find the positive real root of $x \log_{10} x = 1.2$ using bisection method in four iterations. (10 marks)

19. (a) Find the value of y from the following data at $x = 2.65$.

X	-1	0	1	2	3
y	-21	6	15	12	3

(b) Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using (i) Trapezoidal rule (ii) Simpson one third rule.

(12+8)

20. Find the equation of regression lines for the following data.

x	25	28	35	32	36	36	29	38	34	32
y	43	46	49	41	36	32	31	30	33	39

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