Roll.No. | 24UCAAT2002

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.C.A.- END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - II
24UCAAT2002 - Mathematics Foundations to Computer Science - II

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Define a semigroup, Show that (N, $+$) is a semigroup.
2. Find a real root of the equation $x^3 - x - 11 = 0$ by using bisection method.
3. Evaluate $\sqrt{12}$ to 4 places of decimals by Newton – Raphson method.
4. Construct Newton's forward interpolation polynomial for the following data. Use it to find the value of y for x $= 5$

X	4	6	8	10
y	1	3	8	16

5. A firm manufactures two types of products A and B and sells them at a profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines M1 and M2. Type A requires 1 minute of processing time on M1 and 2 minutes on M2. Type B requires 1 minute on M1 and 1 minute on M2. Machine M1 is available for not more than 6 hours 40 minutes while machine M2 is available for 10 hours during any working day. Formulate the problem as a LPP to maximize the profit.
6. Express the following LPP in standard form Minimize $Z = 5X_1 + 7X_2$
   Subject to $X_1 + X_2 \leq 8$,
   $3X_1 + 4X_2 \geq 3$,
   $6X_1 + 7X_2 \leq 5$and $X1, X2 \geq 0$.
7. Find the starting solution of the following transportation model

	D1	D2	D3	Supply
F1	1	2	6	7
F2	0	4	2	12
F3	3	1	5	11
Demand	10	10	10	

   Using i) North west corner rule ii) least cost method iii) Vogel's approximation method.

Contd...

8. Find the initial basic feasible solution to a transportation problem using VAM.

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Requirement	200	225	275	250	

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Prove (Z, $+$) is an abelian group
10. Solve the following system of equation by Gauss Jordan method x+y+z = 9; 2x – 3y + 4z = 13; 3x + 4y + 5z = 40
11. Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using i)Trapezoidal rule ii) Simpson's 1/3rd rule
12. Use simplex method to solve the LPP
    Max Z $= 4X_1 + 10X_2$
    Subject to, $2X_1 + X_2 \leq 50$,
    $2X_1 + 5X_2 \leq 100$,
    $2X1 + 3X2 \leq 90$,
    $X1, X2 \geq 0$.
13. Solve the Transportation problem.

	1	2	3	4	Supply
A	21	16	25	13	11
B	17	18	14	23	13
C	32	27	18	41	19
Demand	6	10	12	15	

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