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Margao Goa

Preliminary Exam, December, 2025

Std: **XII Computer Technique** | Sub: **Mathematics(Voc)**

Maximum Marks : **50** | No. of Question : **22**

Date **16/12/2025** | Duration: **2 hours.**

Instructions :

i. All questions are compulsory

ii. There are four sections in this question paper(A,B,C&D)

iii. Section A contains 6 questions of 1 mark each.

iv. Section B contains 8 questions of 2 marks each.

v. Section C contains 4 questions of 3 marks each.

vi. Section D contains 4 question of 4 marks each.

vii. Write the number of each question clearly on the answer book.

Section A

Question numbers from 1 to 6 carry 1 mark each.

1. If $A=\begin{bmatrix}-3 & 5\\ 2 & 4\end{bmatrix}$, find $A' + 2I$, where A' is transpose of A.
2. Write the matrix $A=[a_{ij}]_{3x2}$ where $a_{ij} = i-2j$
3. Find derivative of $4^{\sin x}$
4. Evaluate $\int \cos(3x + 5)\ dx$
5. Evaluate $\int (e^{2x+3})\ dx$
6. $\int_0^2 (3x^2 + 1)\ dx$

Section B

Question numbers from 7 to 14 carry 2 marks each.

7. Construct a Backward difference table for the following data.

X	0	1	2	3	4
Y	2	4	7	9	12

And write the value of $\nabla^2 y_1$ and $\nabla^4 y_2$

8. If $A = \begin{bmatrix}3 & 2\\ 12 & 8\end{bmatrix}$ and $B = \begin{bmatrix}8 & 4\\ -12 & -6\end{bmatrix}$ verify that A.B = 0
9. A bag contain 7 white, 5 black and 4 red balls. If two balls are drawn at random find the probability that one is white and other is red.
10. Three coins are tossed , find the probability that at least two heads come up .

11. Differentiate $\cos x \; a^{3x}$ with respect to x.

12. If $xy + y^2 = x$, $find \frac{dy}{dx}$

13. Evaluate $\int \frac{sinx}{2+3cosx} \; dx$

14. Evaluate $\int_1^7 2x + 1 \cdot dx$ using Simpson's rule with 6 strips.

Section C

Question numbers from 15 to 18 carry 3 marks each.

15. Discuss the continuity of the function at x=4

If f(x) $= \frac{x^2-3x+2}{x-3}$ $0 \leq x < 4$

$= \frac{2x^2-8}{x-2}$ $4 \leq x \leq 6$

16. Differentiate the following w.r.t. x

$7^{5x} - (1+x)^x$

17. Integrate $x^2 e^{2x}$ w.r.t. x

18. Evaluate $\int_0^8 x + 3 \; dx$ using Trapezoidal rule when n = 8

Section D

Question numbers from 19 to 22 carry 4 marks each

19. Given that f(1)=3, f(3)=11, f(4)=18, find the value of f(2) using Lagrange's Interpolation formula.

20. Find the regression coefficient of y on x for the following data.

X	1	2	3	4
Y	2	5	10	17

Also find the value of y for x = 3.5

21. Solve the following L.P.P. by graphical method

Minimize z = 5x + 2y

Subject to 10x + 2y ≥ 20

5x + 5y ≥ 30

x ≥ 0, y ≥ 0

22. Write down the following equations in matrix form and solve them by matrix method

x + 3z = 5, 2x + 2y + z = 5, -4y -4z = -4