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RamaerisnaMadevaSalgaocar Higher Secondary School
Margao Goa

Preliminary Exam, December, 2024

Std: XII Computer Technique

Sub: Mathematics(Voc)

Maximum Marks : 50

No. of Question : 22

Date 18/12/2024

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. Find matrix X such that $2X + \begin{bmatrix} 4 & 5 \\ 1 & -3 \end{bmatrix} = \begin{bmatrix} 7 & 11 \\ -8 & 9 \end{bmatrix}$
2. Write the matrix $A = [a_{ij}]_{3 \times 3}$ where $a_{ij} = 2i - j$
3. Find derivative of $\sqrt{\sin(2x)}$
4. Evaluate $\int \sqrt{2x+3} dx$
5. Evaluate $\int (7^{2x+3} + \sec^2 x) dx$
6. $\int_0^2 (2x^3 + 2) dx$

Section B

Question numbers from 7 to 14 carry 2 marks each.

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

X	2	4	6	8	10
Y	1	3	7	9	12

and write the value of $\Delta^3 y_6$ and $\Delta^4 y_2$

8. If $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & -7 \\ -2 & 3 \end{bmatrix}$ verify that $A \cdot B = I$
9. A bag contain 6 red, 5 white and 7 green balls. One ball is drawn at random find the probability that it not white.
10. Two dice are thrown find the probability that the sum of numbers on their upper faces is greater than 6.
11. Differentiate $a^{3x} x^5$ with respect to x.

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

13. Evaluate $\int \frac{e^x}{2+3e^x} dx$

14. Evaluate $\int_2^7 x + 2 dx$ using Simpson's rule with 5 strips.

Section C

Question numbers from 15 to 18 carry 3 marks each.

15. If f is continuous on $[0,8]$, where

$$f(x) = x^2 + ax + b \quad 0 \leq x < 2$$

$$= 3x + 2 \quad 2 \leq x < 4$$

$$= 2ax + 5b \quad 4 < x \leq 8$$

find a and b .

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

$$e^{5x} - (\sin x)^x$$

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

18. Evaluate $\int_3^9 x + 5 dx$ using Trapezoidal rule when $n = 6$

Section D

Question numbers from 19 to 22 carry 4 marks each

19. Given that $f(1)=3$, $f(2)=6$, $f(4)=18$, find the value of x when $f(x)=11$ using Lagrange's Inverse Interpolation formula

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

X	1	2	4	5
Y	-1	1	5	7

Also find the value of y for $x=3$.

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

$$\text{Minimize } P = 9x + 11y$$

$$\text{Subject to } 6x + 4y \geq 12$$

$$2x + 2y \leq 8$$

$$x \geq 0, y \geq 0$$

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

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