Vidya Vikas Mandal's
Ramacrisna Madeva Salgaocar Higher Secondary School
Margao Goa
Preliminary Exam, January, 2024

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

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

Date **20/01/2024** 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 contains6 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 $A=\begin{bmatrix}4 & 3\\ 2 & 1\end{bmatrix}$, $B=\begin{bmatrix}2 & -1\\ 3 & -2\end{bmatrix}$ find $|A-B|$
2. Write the matrix $A=[a_{ij}]_{2x3}$ where a_{ij} = i+jfor i = j
   = 2i+j fori< j
   = i+2j for i> j
3. Find derivative of e^{5x+2}
4. Evaluate $\int \sqrt{(2x+3)}\ dx$
5. Evaluate $\int (5x^4 + cosec^2 x)\ dx$
6. $\int_1^3 (3x^2+6)\ dx$

Section B

Question numbers from 7 to 14 carry 2 marks each.

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

X	1	2	3	4	5	6
Y	16	24	27	32	47	59

Hence identify $\nabla^2 y_3$, $\nabla^3 y_4$

8. If $A=\begin{bmatrix}2 & 4\\ 1 & 1\end{bmatrix}$, Show that matrix A satisfy the equation $A^2=3A+2I$
9. A box contains 7 red, 5 white and 8 green balls. A ball is taken at random find the probability that it is white.

10. Two cards are drawn from a pack of cards. Find the probability that both are spade.

11. Differentiate $5^x \cos x$ with respect to x.

12. If $y = x^{(2x+1)}$, $find\ \frac{dy}{dx}$

13. Evaluate $\int \frac{3cosx}{8+3sinx}\ dx$

14. Evaluate $\int_0^4 5x + 2\ \ dx$ using trapezoidal rule with 4 strips.

Section C

Question numbers from 15 to 18 carry 3 marks each.

15. Discuss the continuity of the function at x=3

$f(x) = \frac{x^2-9}{x^2+4x-21}$ $\quad 0 \le x < 3$

$= \frac{2x-6}{x-3}$ $\quad 3 \le x < 6$

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

xy = tan(x+y)

17. Integrate x cos x w.r.t. x

18. Evaluate $\int_1^6 3x\ dx$ using Simpson's rule when n = 5

Section D

Question numbers from 19 to 22 carry 4 marks each

19. For the following table

X	1	2	4
f(x)	5	7	11

Using Lagrange'sInterpolation formula, find f(3)

20. Find the coefficient of correlation for the following data.

X	1	3	5	7	9
Y	6	5	4	3	2

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

Minimize z= 2x + 4y

Subject to $3x + 2y \le 12$

$4x + y \ge 8$

$x \ge 0, y \ge 0$

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

x+y+z=6, 3x-y+3z=10, 5x+5y-4z=3