



S.S. Divine School



Pre – Primary , Primary, Secondary & Higher Secondary
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Std: 12th (E.M)

Date: / /2022

Subject: MATHS (050)

Roll No:

Time: 1 hour

Max. Marks:25

PART -A

Answer the following questions. (one mark each)

(1)

If $f(x) = 2x^{10} + x + 1$ and $g(x) = 2x^5 = 32x + 1$, then $f \circ g(2) =$ _____
(A) 1 (B) 2 (C) 3 (D) 4

(2)

Domain of function \sin^{-1} is _____
(A) R (B) $R - (-1, 1)$ (C) $[0, 1]$ (D) $[-1, 1]$

(3)

If $AB = A$ and $BA = B$, then $A^2 + B^2 =$ _____
(A) $A + B$ (B) $-(A+B)$ (C) $2A+B$ (D) $A-2B$

(4)

If the matrix A both symmetric and skew - symmetric, then _____
(A) A is a diagonal matrix (B) A is a zero matrix
(C) A is a square matrix (D) None of these

(5)

Set $A = \{ 1, 2, 3\}$, The number of equivalence relation involving (1, 2) is _____
(A) 1 (B) 2 (C) 3 (D) 4

PART – B

Section-A

Answer the following questions in short. (two marks each)

(1)

Prove that $3 \sin^{-1} x = \sin^{-1} (3x - 4x^3)$; $x \in \left[-\frac{1}{2}, \frac{1}{2}\right]$

(2)

For $A = \begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}$, $B = [1 \ 3 \ -6]$ verify that $(AB)^t = B^t A^t$

(3)

$\tan^{-1} \left(\frac{\sqrt{1+x^2}-1}{x} \right)$ express in simple form.

Section-B

Answer the following questions in brief. (three marks each)

(1)

If $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$, Prove that $A^3 - 6A^2 + 7A + 2I = 0$

(2)

Prove that $\tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{8} + \frac{\pi}{4}$

(3)

If $f(x) = \frac{10^x - 10^{-x}}{10^x + 10^{-x}}$, then if possible. Find $f^{-1}(x)$

Section -C

Answer the following questions as directed. (four marks each)

(1)

By use of elementary operation find inverse of matrix $\begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{bmatrix}$

OR

Solve the equation $\sin^{-1}x + \cos^{-1}2x = \frac{\pi}{6}$