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Total No. of Pages : 02

Total No. of Questions : 09

B.Voc. (Solar System Technology) (Sem.–1) BASICS OF MATHEMATICS Subject Code : SST.101 M.Code : 91548 Date of Examination : 14-01-23

Time: 3 Hrs.

Max. Marks : 30

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.
- 2. SECTION-B contains FIVE questions carrying TWO & HALF marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying FIVE marks each and students have to attempt any TWO questions.

SECTION-A

- 1. Write briefly :
 - a) Find the value of x for which the functions, $f(x) = \sqrt{(x-1)(x-3)}$ not defined.
 - b) If $\begin{bmatrix} x+3 & 4 \\ y-4 & = y \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 3 & 9 \end{bmatrix}$ find the value of x and y.
 - c) Find the derivative of $(1 \sqrt{x}) (1 + \sqrt{x})$ w.r.t x
 - d) Evaluate $\int a^{2x-1} dx$.
 - e) Find the value of $\sqrt{3} \cos 20^\circ \sec 20^\circ$.
 - f) Find the value of tan 15°.
 - g) Examine the continuity of $f(x) = \begin{bmatrix} 1-x & x < 0 \\ 1+x & x \ge 0 \end{bmatrix}$ at x = 0
 - h) Find $\frac{dy}{dx}$ when $x^3y + xy^3 = a^4$.
 - i) Define the rank of a matrix
 - j) Define the differentiation of product of two functions by taking a suitable example.

SECTION-B

2. Prove that
$$\frac{\sec 8\theta - 1}{\sec 4\theta - 1} = \frac{\tan 8\theta}{\tan 2\theta}$$
.

3. If
$$A = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$$
 and $f(x) = x^2 - 4x + 2$, then find the value of $f(A)$.

4. Find the derivative of
$$y = 4e^{3x} + \log x + 8 + \frac{3}{x}$$

5. Evaluate
$$\int_0^2 \frac{x+1}{x^2} dx$$
.

6. Find the rank of matrix
$$A = \begin{bmatrix} 1 & 2 & 1 & 2 \\ 3 & 2 & 1 & 6 \\ 2 & 4 & 2 & 4 \end{bmatrix}$$
.

SECTION-C

7. Prove that
$$\tan 3x \tan 2x \tan x = \tan 3 - \tan 2x - \tan x$$
.

8. If
$$y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$$
 prove that $\frac{dy}{dx} = 1 - y^2$.

9. Evaluate
$$\int_{2}^{3} \frac{x^{2}+1}{(2x-1)(x+1)(x-1)} dx$$
.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.