RAIGANJ SURENDRANATH MAHAVIDYALAYA

UG (H) / SEM-V / CBCS / INTERNAL EXAMINATION 2022

MATHEMATICS

PAPER: MATH-H-DSE2(1)

TIME : 40 MINUTES FULL MARKS : 14

GROUP-A

ANSWER ALL THE QUESTIONS FROM THE FOLLOWINGS: (6×1=6)

1. Show that for a plane curve the torsion $\tau = 0$.
2. Write down the Frenet – Serret formulas for a space curve.
3. Define space curve with a suitable example.
4. What do you mean by osculating plane to a curve?
5. Define : (i) Covariant vector & (ii) Contravariant vector.
6. State Gauss-Bonnet theorem.

GROUP-B

ANSWER THE FOLLOWING QUESTIONS (2×4=8)

7. Given the space curve $x = t\,, y = t^2, z = \frac{2t^3}{3}$. Find: the curvature & the torsion.

8. Show that the Frenet – Serret formulas can be written in the form

$\frac{d\boldsymbol{T}}{ds} = \omega \times \boldsymbol{T}$, $\frac{d\boldsymbol{N}}{ds} = \omega \times \boldsymbol{N}$, $\frac{d\boldsymbol{B}}{ds} = \omega \times \boldsymbol{B}$. Also determine .