SRM Institute of Science and Technology
Ramapuram Campus.

Department of Mathematics

ASSIGNMENT QUESTIONS

Sub. Code: 18MAB101T — Date: 22.01.2021
Sub. Title: Calculus and Linear Algebra — Max. Marks: 19
Year : I Year B. Tech. (Common to all Branches) — Semester : I

Unit – 4

Part – B (5 × 2 = 10 Marks)
(Solution with Full Explanation is Needed.)

1. The radius of curvature of the curve $y = 4 \sin x$ at $x = \frac{\pi}{2}$ is

(A) $\frac{1}{2}$ (B) $\frac{-1}{2}$ (C) $\frac{1}{4}$ (D) $\frac{3}{4}$

2. The radius of curvature of the curve $r = e^{\theta}$ at any point on it is

(A) $2\sqrt{2}$ (B) $\sqrt{2}\,r$ (C) 1 (D) 2

3. Envelope of the curve $y = mx + \frac{a}{m}$ (where m is the parameter) is

(A) $x^2 + a\,y = 0$ (B) $x + 4\,a\,y = 0$
(C) $y^2 - 4\,a\,x = 0$ (D) $y^2 + 4ax = 0$

4. The value of $\Gamma\left(-\frac{5}{2}\right)$ is _____.

(A) $\frac{15}{8}\sqrt{\pi}$ (B) $\frac{8}{15}\sqrt{\pi}$ (C) $\frac{15}{8}\pi$ (D) $\frac{-8}{15}\sqrt{\pi}$

5. The value of $B\left(\frac{5}{2},\frac{1}{2}\right)$ is _____.

(A) $\frac{3}{8}\pi$ (B) $\frac{5}{8}\pi$ (C) $\frac{5}{8}\sqrt{\pi}$ (D) $\frac{3}{8}\sqrt{\pi}$

Part – C (3 × 3 = 09 Marks)
(Solution with Full Explanation is Needed.)

1. Find the envelope of the family of straight lines represented by $x\cos\alpha + y\sin\alpha = a\sec\alpha$, where α is the parameter.

2. Evaluate $\int_0^1 x^6 (1-x)^9\,dx$ using Beta Gamma functions.

3. Evaluate $\int_0^{\pi/2} \sin^6\theta \cos^6\theta\,d\theta$ using Beta Gamma functions.

* * * * *