

**I B. Tech., EVEN Semester, A. Y. 2024-25**  
**Linear Algebra & Calculus for Engineers (23MT1001)**

**Home Assignment-3 (CO3)**

- Find the values of  $\Gamma(15)$ ,  $\Gamma(21/2)$ ,  $\Gamma(-5/2)$  and  $\Gamma(-7/5)$ .
- Evaluate  $\int_0^1 \frac{x^2}{\sqrt{1-x^4}} dx$ , by using beta and Gamma function.
- Evaluate  $\int_0^3 \int_1^{4-y} (x+y) dx dy$
- Sketch the region of integration for  $\int_0^1 \int_0^{\sqrt{1-y^2}} f(x,y) dx dy$ .
- Evaluate  $\int_0^{\pi/2} \int_0^\infty \frac{r}{(r^2 + a^2)^2} dr d\theta$
- Identify the area of the region bounded by x-axis,  $x=2a$  and the curve  $x^2=4ay$ .
- Determine the area included between the circles  $r=2\cos\theta$  and  $r=4\cos\theta$ .
- Evaluate  $\int_0^2 \int_0^{\sqrt{2x-x^2}} (x^2 + y^2) dy dx$  by changing to polar co-ordinates
- Change the order of integration and hence evaluate  $\int_{-2}^2 \int_0^{\sqrt{4-x^2}} (x+y) dx dy$
- Change the order of integration and hence evaluate  $\int_0^1 \int_0^{2-y} xy dx dy$
- Change the order of integration and hence evaluate  $\int_0^3 \int_0^y (y^2 + x^2) dx dy$ .
- Evaluate the triple integral  $\int_1^e \int_1^{\log y} \int_1^{e^x} dz dx dy$ .
- Calculate the volume of the solid bounded by the planes  $x=0$ ,  $y=0$ ,  $z=0$  and  $x+y+z=8$ .
- Evaluate the volume of the tetrahedron bounded by the planes  $x=0$ ,  $y=0$ ,  $z=0$  and  $x+y+z=2$ .
- Evaluate the volume of the tetrahedron bounded by the planes  $x=0$ ,  $y=0$ ,  $z=0$ , and  $x+y+z=a$ .