KONERU LAKSHMAIAH EDUCATION FOUNDATION
(Deemed to be University, Estd. u/s. 3 of UGC Act 1956)

I/IV B. Tech. Even Semester :: A.Y. 2024-25

Linear Algebra & Calculus for Engineers (23MT1001)

CO-2 Home Assignment Problems

1. Compute the first and second order partial derivatives of $f(x,y)=\sin(xy)+x^2\log_e y$
2. Given $x=r\cos\theta, y=r\sin\theta$ Find the value of $\frac{\partial(x,y)}{\partial(r,\theta)}$.
3. Apply Taylor's series to expand f(x, y)=x^2 + xy + y^2 in powers of (x-1) and (y-2).
4. Determine the maxima and minima of $f(x,y)=2x+2y-2xy-2x^2-y^2$.
5. Given x + y + z = a find the maximum of $x^m y^n z^p$
6. Show that if the perimeter of a triangle is constant, the triangle has maximum area when it is equilateral.
7. Determine the solution of the initial value problem $(D^2-5D+6)y=e^{4x}$, given that y(0) = 0, $y'(0)=1$.
8. Determine charge q and current i in the LCR circuit with inductance 1H, resistance 12 ohms, capacitance (1/35)F, E(t) =0.
9. Determine the charge and current in an LCR series circuit when inductance 3 H, resistance 6 ohms capacitance 1/3 F, and E (t) =sin2t.
10. The motion of a mass spring system without damping is described by the initial value problem $\frac{d^2x}{dt^2}+8\frac{dx}{dt}+16x=\cos 3t, x(0)=0, x'(0)=1$ where x is the distance of the mass from the equilibrium position, downward being taken as positive direction. Calculate the displacement of the motion.