C = 2.

Subject: Math 207(CE) **Time: 1 hour** **FM = 20** **Test 1** Set A

All questions carry equal marks

1. Solve the differential equation

$$2(y+1)\frac{dy}{dx} - \frac{2}{x}(y+1)^2 = x^4, \quad y(1) = \sqrt{\frac{2}{3}}$$

2. Find the solution of current in RL-circuit given that

$$R = 40\Omega,\ L = 2H,\ E = 100\sin 10t\ V,\ I(0) = 0 \text{ ampere}$$

3. Solve the Euler equation

$$x^2y'' - 2xy' + 2y = x^3\cos x$$

using variation of parameters method.

$\int x^3\cos x$

$\int x^2\cos x$

4. Prove that $\frac{d}{dx}\left[x^\gamma J_\gamma(x)\right] = x^\gamma J_{\gamma-1}(x)$ where $J_\gamma(x)$ is the Bessel function of the first kind of order γ.