Math.1101   **Engineering Mathematics I (3+0)**   Marks:50
                                                            Time: 2 hours

I   **Fill in the blanks**   (10x1=10)
1. Greens theorem is useful in evaluating ....
2. Volume of the sphere of radius a= ....
3. Curvature is the reciprocal of ....
4. Radius of a curvature of the curve y=f(x) is given by ....
5. A solution of a first order differential equation contains .... constants.
   State True or False
6. $\lim\limits_{\theta \to 0} \dfrac{\sin\theta}{\theta} = \propto$
7. 0x0 is an indeterminate form.
8. The function $f(x,y) = x^n + \left(\dfrac{y}{2}\right)$ is homogeneous of degree n.
9. Product of two odd function is odd.
10. Maclarin's series expansion of a function is obtained from its Taylor's expansion.

II   **Write short notes on ANY FIVE of the following**   (5x2=10)
1. Give Rodrigue's formula for $P_{n(x)}$.
2. Give an example of a second order differential operator.
3. What is the relation between beta function and gamma function?
4. Define surface integral.
5. What is the vector normal to the level surface $\emptyset$?
6. What is an exact differential equation?
7. Find the radius of curvature of $\sqrt{x}+\sqrt{y}=1$ at the point $\left(\dfrac{1}{4},\dfrac{1}{4}\right)$

III   **Answer ANY FIVE of the following**   (5x4=20)
1. Solve $x^2(y - px) = yp^2$
2. Solve $\dfrac{dx}{dt} = 5x+y$; $\dfrac{dy}{dt} = y-4x$
3. Change the order of integration and then evaluate $\int_0^1 \int_{x^2}^{2-x} xy \ dx \ dy$
4. Calculate the volume of the solid bounded by the planes x=0, y=0, z=0 and x+y+z=1.
5. What is the percentage error in the area of a circle if one percent error is made in measuring the radius?
6. Evaluate $\lim\limits_{x \to 0} (1+x)^{1/x}$
7. State Greens theorem.

IV   **Write an essay on ANY ONE of the following**   (1x10=10)
1. Verify Euler's theorem $f(x)= (x,y)= \dfrac{x^2+y^2}{x-y}$
2. Verify Stoke's theorem for $\bar{f} = yi + zj + xk$ where S is the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$ and C is its boundary.

****