KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agrl. Engg) 2015 Admission
Ist Semester Final Examination-January -2016

Cat. No: Math.1101
Title: Engineering Mathematics I (3+0)

Marks: 50.00
Time: 2 hours

I State True or False **(10 x 1=10)**

1. The function f (x ,y) =x^n + ($\frac{y}{2}$) is homogeneous of degree n
2. $\lim_{\theta \to 0} \frac{\sin \theta}{\theta} = \alpha$
3. $0 \times \alpha$ is an indeterminate form

Fill up the blanks

4. Radius of a curvature of the curve y =f(x) is given by _____
5. The series solution of the differential equation $y'' + py' + qy = 0$ about origin is _____
6. $\int_1^2 \int_2^5 xy \, dx \, dy$ = _____
7. Volume of the sphere of radius a = _____
8. The Bessel's function $J_n(x)$= _____
9. Expansion of cos x is 1- $\frac{x^2}{2!} + \frac{x^4}{4!}$ _____
10. $\nabla . R$ = _____

II Write answers on any FIVE questions **(5 x 4=20)**

1. What is an exact differential equation
2. What is the relation between beta function and gamma function
3. Solve $(x^2 - y^2)$ dx =2xy dy
4. Show that div $(\bar{f} \times \bar{g})$ = $\bar{g}$ .curl $\bar{f}$ - $\bar{f}$ curl $\bar{g}$
5. Define surface integral
6. Give Rodrigue's formula for $p_{n\,(x)}$
7. What is a singular point for the differential equation y" + p(x) y ' + q(x) y =0

III Write answers on any FIVE questions **(5 x 4=20)**

1. Show that $\nabla . (\varphi f) = \nabla \varphi . \bar{f} + \varphi \nabla . f$
2. State Euler's theorem on homogeneous function

3. Find the percentage error in the area of an ellipse if one percent error is made in measuring the axes

4. Calculate the volume of the solid bounded by the planes x=0,y=0 z=0 and x+ y + z =1

5. Solve $\frac{dx}{dt}$ =5x+ y ; $\frac{dy}{dt}$ = y-4x

6. Evaluate $\lim_{x\to 0}(1+x)^{1/x}$

7. Change the order of integration and evaluate $\int_0^1 \int_{x^2}^{2-x} xy\, dx\, dy$

IV Write essay on any ONE **(1 x 10=10)**

1. Verify Euler's theorem f(x) = $(x, y) = \frac{x^2+y^2}{x-y}$

2. Verify Green's Theorem for $\int_c (x + y^2)dx + x^2\, dy$ where C is bounded by $y = x$ and $y = x^2$