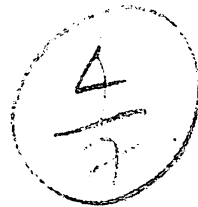


KERALA AGRICULTURAL UNIVERSITY

B.Tech. (Agrl. Engg.) -2014 Admission

1<sup>st</sup> Semester Final Examination- January-February 2015



Cat.No: Math.1101

Marks : 50

Title : Engineering Mathematics-I (3+0)

Time : 2 Hours

I Answer all the questions

(10 x 1=10)

1. Maclarin's series expansion of a function is obtained from its Taylor's expansion (T/F)
2.  $0 \times 0$  is an indeterminate form (T/F)
3. Product of two odd function is odd (T/F)
4. The value of  $\cos 2n\pi$  is  
a) 1 b) 0 c)  $(-1)^n$
5. The general solution of a homogeneous linear differential equation is  
a. Complementary Function b) Particular Integral c) CF + PI
6. A solution of a first order differential equation contains \_\_\_\_\_ constants
7. Curvature is the reciprocal of \_\_\_\_\_
8. A saddle point is \_\_\_\_\_
9. Integrating factor is \_\_\_\_\_
10. Greens theorem is useful in evaluating \_\_\_\_\_

II Write short notes on any FIVE

(5 x 2 = 10)

1. The value of  $\lim_{x \rightarrow 0} \left( \frac{\log \sin x}{\cot x} \right)$
2. Find the radius of curvature of  $\sqrt{x} + \sqrt{y} = 1$  at the point  $\left( \frac{1}{4}, \frac{1}{4} \right)$
3. Give the relation between Beta and Gamma function
4. What is the vector normal to the level surface  $\phi$
5. What is the volume of the region between the paraboloid  $z = 1 - x^2 - y^2$  and the XY plane
6. Give an example of a second order differential operator

7. If  $f$  and  $g$  are differentiable scalar point functions what is  $\nabla(fg)$ .

III Write short notes on any Five

(5 x 4 = 20)

1. If  $u$  and  $v$  are functions of  $r$  and  $s$  and  $r$  and  $s$  are functions of  $x$  and  $y$  what is the Jacobian  $J\left(\frac{u,v}{x,y}\right)$
2. What is the percentage error in the area of a circle if one percent error is made in measuring the radius
3. Evaluate  $\int_0^\pi \int_0^{1-\cos\theta} r \, dr \, d\theta$
4. Change the order of integration and then evaluate  $\int_0^1 \int_{x^2}^{2-x} xy \, dx \, dy$
5. State Greens theorem
6. Solve  $(y \log y) \, dx + (x - \log y) \, dy = 0$
7. Solve  $x^2(y - px) = yp^2$

IV Write essay on any ONE

(1x1=10)

1. Show that the vector field defined  $(y \sin z - \sin x)i + (x \sin y + 2yz)j + (x \cos z + y^2)k$  is irrotational and find its velocity potential
2. Verify Stoke's theorem for  $\vec{f} = yi + zj + xk$  where  $S$  is the upper half surface of the sphere  $x^2 + y^2 + z^2 = 1$  and  $C$  is its boundary

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