

**KERALA AGRICULTURAL UNIVERSITY**

B.Tech (Food.Engg) 2014 admission

II<sup>nd</sup> Semester Final Examination- June /July-2015

Cat. No: Basc.1205

Title: Engineering Mathematics II (3+0)

Marks: 50

Time: 2 hours

I Answer all Questions

(10 x 1=10)

I.a) Fill up the blanks for the following

1. Every sequence which is monotonic and bounded is .....
2. Geometric series  $1 + x + x^2 + x^3 + x^4 + \dots \infty$  converges in the interval .....
3. General solution of  $\frac{dy}{dx} = y$  is .....
1. Particular integral of  $(D^2 - 2D + 1)y = e^{2x}$  is .....

b) Match the following

A

B

5.  $x^2 y'' - xy' + y = \log x$

(I) .one dimensional heat equation

6.  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$

(II) . One dimensional wave equation

7.  $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$

(III) .Two dimensional heat equation

8.  $\frac{\partial y}{\partial t} = c^2 \frac{\partial^2 y}{\partial x^2}$

(IV).Cauchy's homogeneous linear equation

c) Write *True or False* for the following

9. The exponential series  $1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots \infty$  is absolutely convergent

10. The general solution of  $(D^2 - D - 2)y = 0$  is  $y = c_1 e^x + c_2 e^{-2x}$

**Answer any FIVE questions**

(5 x 2=10)

I. Explain the ratio test in the context of series convergence

2. Solve  $\frac{dy}{dx} = \frac{x}{y}$
3. Find the complementary function of  $(D^2 + 1)y = \sin 3x$
4. Write down the general form of Legendre's linear equation
5. Define the ordinary point of a general second order linear differential equation
6. Show that  $\frac{dy}{dx} = e^{x-y}$  is exact
7. Solve  $\frac{\partial^2 z}{\partial x \partial y} = xy$

III

Answer any FIVE questions

(5 x 4=20)

1. Discuss the convergence of the series  $\sum_{n=1}^{\infty} \frac{n^2}{3^n}$
2. Test for the convergence  $\sum (\log n)^{-2}$
3. Solve  $x \frac{dy}{dx} + y = x^3 y^6$
4. Solve  $ye^{-xy} dx + (xe^{-xy} + 2y) dy = 0$
5. Solve  $(D^2 - 4D + 4)y = \sin 4x + e^{3x}$
6. Solve  $\frac{d^2 y}{dx^2} = y$  by power series method
7. solve  $\frac{d^2 y}{dx^2} + y = \tan x$ , using method of variation of parameters

IV

Answer any ONE question

(1 x 10=10)

- IV. 1. Explain the Raabe's test. Test the convergence of the series  $\sum_{n=1}^{\infty} \frac{1.5.9 \dots (4n-3)}{2.6.10 \dots (4n-2)} x^n$
2. Derive one dimensional wave equation and find its general solution.