

KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food.Engg) 2014 admission

IInd 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
4. 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 $y = c_1 e^x + c_2 e^{-2x}$

II

Answer any FIVE questions

(5 x 2 = 10)

1. 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)

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.