KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food.Engg) Programme

II[nd] Semester Final Examination (Re-Examination) - June /July-2015

Cat. No: Basc.1205 **Marks: 80**

Title: Engineering Mathematics II (3+0) **Time: 3 hours**

PART A

(Answer all questions, each carries 1 mark)

I.a) Fill up the blanks for the following

1. Every sequence which is monotonic and bounded is .....

2. Geometric series $1+x+x^2+x^3+x^4+.....\infty$ 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. $x^2y''-xy'+y=\log x$	(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 $1+\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+.....\infty$ is absolutely convergent

10. The general solution of $(D^2-D-2)y=0$ is $y=c_1e^t+c_2e^{-2t}$

(10 X 1 = 10)

PART B

(Answer any ten questions, each carries 3 marks)

II 1. Explain the ratio test in the context of series convergence

2. Write down the condition for the convergence and divergence of the p-series $\sum_{n=1}^{\infty}\frac{1}{n^p}$

3. Define absolute convergence

4. Show that the series $1+2+3+4+5+6+.....$ is divergent

5. Write the general form of CLAIRAUT'S equation

6. Solve $\frac{dy}{dx} = \frac{x}{y}$

7. Find the complementary function of $(D^2 + 1)y = \sin 3x$

8. Write down the general form of Legendre's linear equation

9. Define the ordinary point of a general second order linear differential equation

10. Show that $\frac{dy}{dx} = e^{x-y}$ is exact

11. Solve $\frac{\partial^2 z}{\partial x \partial y} = xy$

12. Write an example for Lagrange's linear differential equation

(10 X 3 = 30)

PART C

(Answer any six questions, each carries 5 marks)

III. 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 $\frac{d^2y}{dx^2} = y$ by power series method

7. solve $\frac{d^2y}{dx^2} + y = \tan x$, using method of variation of parameters

8. Form the partial differential equation from $Z = f(x^2 - y^2)$ by eliminating arbitrary function

(6 X 5 = 30)

PART D

(Answer any one question which carries 10 marks)

IV. 1. Explain the Raabe's test. Test the convergence of the series $\sum_{1}^{\infty} \frac{1.5.9....(4n-3)}{2.6.10.....(4n-2)} x^n$

2. Derive one dimensional wave equation and find its general solution.

(1 X 10 = 10)