KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food.Engg) 2012 Admission

II^{nd} Semester One time Special Re-Examination-June -2016

Cat. No: Basc. 1205 **Marks: 80.00**

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

I. Fill up the blanks: (10X1=10)

1. Every sequence which is monotonic and bounded is --------------------------
2. The general solution of equation $\frac{dy}{dx} = \frac{x}{y}$ is -----------------
3. The particular integral of $\frac{1}{(D^4 + 2D^2 + 1)} \cos 2x$ is --------------------
4. The solution of p-q = 1 is---------------------------

b) Match the following

A	*B*
5. One dimensional wave equation	$(ax+b)^2 \frac{d^2y}{dx^2} + A(ax+b)\frac{dy}{dx} + By = f(x)$
6. One dimensional heat equation	$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$
7. Laplace equation	$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$
8. Legendre's equation	$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$

c) Write **True or False** for the following

9.The general solution of series $(D^2-5D+6)y = 0$ is $y=Ae^{2x}+Be^{3x}$

10. $z = px+qy+p^2+q^2$ is the solution of the partial differential equation $z=ax+by+a^2+b^2$

II Write short answers on <u>any ten</u> (10 X 3=30)

1.Explain Rabee's test in the context of convergence of series

2. Solve ydx-xdy = ay^2dx

3. Solve $(D^2+4)y= \sin 2x$

4. Solve $x\frac{dy}{dx}+y=xy^3$

5. Derive a partial differential equation $z=a^2x+b^2y+ab$ by eliminating arbitrary

Constants

6. Solve px+qy= 3z

7. Solve $p^2+q^2=x+y$

8. Test the convergence of the series $\frac{1}{1.2.3}+\frac{3}{2.3.4}+\frac{5}{3.4.5}+.....$

9. Test the convergence of $\sum_{n=1}^{\alpha}\frac{1}{\sqrt{n}+\sqrt{n+1}}$

10. Using the method of separation of variables solve $\frac{\partial u}{\partial x}=2\frac{\partial\ u}{\partial t}+u$

11. Find steady state temperature distribution in a rod of length 30 cm, if the ends of the rod are Kept at 20^0C and 80^0C

12. Write any two assumptions in deriving one dimensional wave equation

III Write short essays on any six (6 X 5=30)

1. Solve by method of variation of parameters $\frac{d^2y}{dx^2}+9y=\sec 3x$

2. Solve the equation $py = xp^2 + a$ where $p = \frac{dy}{dx}$

3. Solve $\frac{\partial^3 z}{\partial x^3} - 3\frac{\partial^3 z}{\partial x^2 \partial y} + 4\frac{\partial^3 z}{\partial y^3} = e^{x+2y}$

4. Form a partial differential equation by eliminating arbitrary constants $x^2+y^2+(z-c)^2=r^2$

5. Solve $\frac{d^2 y}{dx^2} + 4\frac{dy}{dx} + 4y = e^{3x}$

6. Show that $(2xy+y-\tan y)dx+(x^2-x\tan^2 y+\sec^2 y+2)dy = 0$ is exact and solve it

7. Test the absolute convergence of the series $1-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+.....$

8. Discuss the convergence of $\sum_{n=1}^{\alpha}\frac{n^2}{2^n}$

IV . Write essay on **any one** (10X1=10)

1. Derive one dimensional heat equation and solve it
2. Solve $(1-x)^2 \frac{d^2 y}{dx^2} - 7(1-x)\frac{dy}{dx} + 9y = \frac{2}{(1-x)^3}$
