

KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food. Engg.) 2016 Admission
II Semester Final Examination-July-2017

Cat. No: Basc.1205

Marks: 50

Title: Engineering Mathematics - II (3+0)

Time: 2 hours

I Fill up the blanks/Match the following/State True or False

(10x1=10)

a) Fill up the blanks

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

b) Match the following

A

B

- | | |
|--------------------------------------|--|
| 5. Bernoulli's differential equation | $x^2 \frac{d^2y}{dx^2} + Ax \frac{dy}{dx} + By = f(x)$ |
| 6. Cauchy's differential equation | $y = px + f(p)$ |
| 7. Legendre's linear equation | $\frac{dy}{dx} + P(x)y = Q(x)y^n$ |
| 8. Clairaut's equation | $(ax + b)^2 \frac{d^2y}{dx^2} + A(ax + b) \frac{dy}{dx} + By = f(x)$ |

c) State True or False

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 notes/answers on any FIVE of the following

(5x2=10)

1. Explain Cauchy's test in the context of convergence of series
2. Solve $ydx - xdy = ay^2 dx$
3. Solve $(D^2 + 4)y = \sin 2x$
4. Find steady state temperature distribution in a rod of length 20cm, if the ends of the rod are kept at 10^0C and 70^0C
5. Using the method of separation of variables solve $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$
6. Solve $px + qy = 3$
7. Test the convergence of $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n} + \sqrt{n+1}}$

III Write short answers on any FIVE

(5x4=20)

1. Solve by method of variation of parameters $\frac{d^2y}{dx^2} + 4y = \tan 2x$
2. Solve $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + y = \log x$
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. Show that $(2xy + y - \tan y)dx + (x^2 - x \tan^2 y + \sec^2 y + 2)dy = 0$ is exact and solve it
6. Test the convergence of the series $\frac{1}{3} + \frac{1.2}{3.5} + \frac{1.2.3}{3.5.7} + \dots$
7. Discuss the convergence of $\sum_{n=0}^{\infty} \frac{n^3+1}{5^{n+1}}$

IV Write essay on any ONE

(1x10=10)

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