

KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food . Engg) Degree Programme 2015 Admission

IInd Semester Final Examination- June – July 2016

Cat. No: Basc.1205

Marks: 50.00

Title: Engineering Mathematics II (3+0)

Time: 2 hours

I

Answer all the Questions

10 x 1 = 10

1. The geometric series $a + ar + ar^2 + \dots$ to ∞ is _____ if $r < 1$.
2. For the series $u_1 + u_2 + \dots + u_n + \dots$, the condition $\lim_{n \rightarrow \infty} u_n = 0$ is a necessary and sufficient condition. (True/ false)
3. If $\lim_{n \rightarrow \infty} \frac{u_n}{v_n} = 0$ and $\sum v_n$ is divergent, then $\sum u_n$ is also _____
4. The _____ of a differential equation is the order of the highest differential coefficient which occurs in it.
5. Given the differential equations $M(x,y) dx + N(x,y) dy = 0$. If $\frac{1}{N} \left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right)$ is a function of x , alone say $f(x)$, then _____ is an integrating factor.
6. The general solution of Clairaut's equation $y = cx + f(c)$ can be interpreted geometrically as family of _____, c being the parameter
7. Bessels function of order n of the second kind is also called the _____
8. An equation involving partial differential coefficients of a function of two or more variables is known as _____
9. One dimensional heat equation is _____
10. The complete solution of $y'' - 4y' + 4y = 0$ is _____

II

Answer the Following any FIVE

5 x 2 = 10

1. Define Divergence of series.
2. Define alternative series.
3. Define Cauchy's root test.
4. Define Raabe's test
5. Define Integrating factor.
6. Define Bernoulli's equation.
7. Define Bessel's function of the second kind of order n

III

Answer the Following any FIVE

5 x 4 = 20

1. Prove that the series $\sum_{n=0}^{\infty} \frac{n^3 + a}{2^n + a}$ is convergent by using D'Alembert's ratio test.
2. Test the convergence of the $\left(\frac{2^2}{1^2} - \frac{2}{1} \right)^{-1} + \left(\frac{3^3}{2^3} - \frac{3}{2} \right)^{-2} + \left(\frac{4^4}{3^4} - \frac{4}{3} \right)^{-3} + \dots$
3. Solve $(ye^{-xy} - 2y^3)dx + (xe^{-xy} - 6xy^2 - 2y)dy = 0$
4. Explain the rules for finding integrating factors.
5. Solve $p^3 + 2xp^2 - y^2p^2 - 2xy^2p = 0$.
6. Solve $\frac{dx}{dt} - \frac{dy}{dt} - y = -e^t$, $x + \frac{dy}{dt} - y = e^{2t}$
7. Obtain the solution of the wave equation using the method of separation of variables.

IV

Write essay on ANY ONE

1 x 10 = 10

1. Solve $y'' + y = \sin x$ using the method of variation of parameters.
2. Find the steady state temperature at any point of a square plate whose two adjacent edges are kept at 0°C and the other two edges are kept at the constant temperature 100°C .
