

KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food.Engg) 2013 Admission
IInd Semester Final Examination- June -2014

Cat. No: Basc.1205

Title: Engineering Mathematics –II (3+0)

Marks: 50.00

Time: 2 hours

Part I

I Answer all the Questions

10 x1 =10

1. An infinite series of positive terms is said to be _____ convergent if its sum is a finite quantity.
2. For the series $u_1+u_2+\dots+u_n+\dots$, the condition $\lim_{n \rightarrow \infty} u_n = 0$ is a necessary condition. (True/ false)
3. If $\lim_{n \rightarrow \infty} \frac{u_n}{v_n} = 0$ and $\sum v_n$ is convergent, then $\sum u_n$ is also _____
4. Equations in which an unknown function, and its derivatives r differential is occur are called _____
5. Given the differential equations $M(x,y) dx + N(x,y) dy = 0$. When $Mx + Ny \neq 0$ and the equation is homogeneous one, _____ 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. Partial differential equation may be formed by eliminating of _____ from the given relation between the variable.
9. $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ is _____ in two dimensions
10. The state in which temperature does not vary with respect to time t is called _____

Part II

II Write short notes on any FIVE questions

(5x 2=10)

1. Define oscillatory series.
2. Explain the rules for solving $Mdx + Ndy = 0$ when it is exact.
3. Define Legendre's polynomial $P_n(x)$
4. Define Bessel's function of the first kind of order n
5. Explain the working rule while using Charpits method.
6. Solve $p^2 - 7p + 12 = 0$
7. Write any two solutions of the Laplace equation $u_{xx} + u_{yy} = 0$ involving exponential terms in x or y.

Part III

III Write short notes on any FIVE questions

(5x 4=20)

1. Examine the convergence of the series $\frac{1.2}{3^2.4^2} + \frac{3.4}{5^2.6^2} + \frac{5.6}{7^2.8^2} + \dots$
2. Test for the convergence the series whose general term is $\left(1 - \frac{1}{n}\right)^{n^2}$
3. Solve $\cos x \frac{dy}{dx} - y \sin x = y^3 \cos^2 x$

4. Explain the rules for finding integrating factors.
5. Solve $\frac{dx}{dt} - \frac{dy}{dt} - y = -e^t$, $x + \frac{dy}{dt} - y = e^{2t}$
6. Solve $p^2 + 2p \cot x = y^2$.
7. Obtain the solution of the two dimensional Laplace equation using the method of separation of variables.

Part IV

IV Write essay on ANY ONE

1 x 10 = 10

1. Explain the method of variation of parameters.
2. A square plate is bounded by the lines $x = 0$, $y = 0$, $x = 20$ and $y = 20$. Its faces are insulated. The temperature along the upper horizontal edge is given by $U(x, 20) = x(20 - x)$ when $0 < x < 20$ while the other three edges are kept at 0°C . Find the steady state temperature in the plate.
