KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food . Engg) Degree Programme 2012 and Previous Admission

II[nd] Semester Re-Examination- June – July 2016

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

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

I **Answer all the Questions** **10 x1 =10**

1. The geometric series a + ar +ar^2 +… to ∞ is ________ if r < 1.
2. For the series $u_1+u_2+\ldots+u_n+\ldots$, the condition $\underset{n\to\infty}{Lt}\, u_n = 0$ is a necessary and sufficient condition. (True/ false)
3. If $\underset{n\to\infty}{Lt}\frac{u_n}{v_n} = 0$ 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 Cliraut'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"- 4 y'+ 4y =0 is ____________

II **Write short notes on ANY TEN** **10 x 3 =30**

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
8. Solve (y- px) (p-1) = p
9. Find a complete integral of z = pq
10. Express 2-3x+4x^2 in terms of Legendre polynomial.
11. An rod 30 cm long has its ends A and B kept at 20^{0}C and 80^{0}C respectively until steady state conditions prevail. Find the steady state temperature in the rod..
12. Write any two solutions of the Laplace equation $u_{xx}+u_{yy}$ =0 involving exponential terms in x or y.

III

Write short essays on ANY SIX of the following **6 x 5 =30**

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 $\left(\frac{2^2}{1^2}-\frac{2}{1}\right)^{-1}+\left(\frac{3^3}{2^3}-\frac{3}{2}\right)^{-2}+\left(\frac{4^4}{3^4}-\frac{4}{3}\right)^{-3}+\ldots$
3. Solve $\left(ye^{xy}-2y^3\right)dx+\left(xe^{xy}-6xy^2-2y\right)dy=0$
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.
8. Solve $z(x-y)=x^2p-y^2q$ using method of multipliers

IV

Write essay on ANY ONE **1 x 10 =10**

1. Solve $y^1+y=\sin x$ 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 0^0C and the other two edges are kept at the constant temperature 100^0C.

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