



KERALA AGRICULTURAL UNIVERSITY

B.Tech.(Agri. Engg) 2018 Admission

II Semester Final Examination- June 2019

Sacs.1206

Engineering Mathematics II (2+1)

Marks: 50

Time: 2 hours

(10x1=10)

I Fill in the blanks

- 1 If the series $\sum u_n$ is convergent then $\lim_{n \rightarrow \infty} u_n = \dots\dots\dots$
- 2 By Cauchy's Root Test the series $\sum u_n$ is convergent if $\dots\dots < 1$
- 3 The partial differential equation of $z = ax + by + ab$ is $\dots\dots\dots$
- 4 The singularity of $f(z) = \frac{z}{(z-1)}$ is $\dots\dots\dots$
- 5 One dimensional heat equation is $\dots\dots\dots$

State true /false

- 6 An absolutely convergent series is convergent
- 7 The function $f(x) = x \cos x$ is even in $-1 < x < 1$
- 8 The function $f(z) = z^2$ is no where analytic
- 9 The real and imaginary part of analytic function are harmonic
- 10 The function $u(x, y) = x^2 - y^2$ is not harmonic

II Write Short notes on any FIVE of the following

(5x2=10)

- 1 Test the convergence of the series $\sum_{n=1}^{\infty} (1 + \frac{1}{n})^{n^2}$
- 2 State Dirichlet's conditions
- 3 Find a_n if $f(x) = x$ represented as a Fourier series in the interval $0 < x < 2\pi$
- 4 Solve the partial differential equation $p^2 - q^2 = x - y$
- 5 Write all possible solutions of one dimensional wave equation
- 6 Find the sum of residues of $f(z) = \frac{z^2}{(z-1)(z-2)}$ at its poles
- 7 State Cauchy's theorem and Cauchy's integral formula

III Answer any FIVE of the following.

(5x4=20)

- 1 Test the convergence of the series whose n^{th} term is $\frac{n^2}{2^n}$
- 2 Find the half-range sine series of $f(x)=x, 0 < x < \pi$
- 3 Find the Fourier cosine transform of $f(x)=e^{-ax}, a > 0$
- 4 Solve the partial differential equation $\frac{\partial u}{\partial x} + u = \frac{\partial u}{\partial t}$ if $u = 4e^{-3x}, t = 0$ by method of separation of variables.
- 5 Find the analytic function whose real part is $e^x \cos y$
- 6 Expand $f(z) = \frac{z}{(z+1)(z+2)}$ about $z = -2$
- 7 State and prove Cauchy's Residue Theorem

IV Answer any ONE of the following

(1x10=10)

- 1 Derive one dimensional wave equation
- 2 Evaluate $\int_{-\infty}^{+\infty} \frac{x^2}{(x^2+a^2)(x^2+b^2)} dx, a > 0, b > 0$
