Roll No._____ Total Printed Pages : 5

03BEE101

B.TECH (ELECRI. & ELECTO. ENGG.)

III-SEM Examination, Dec.-2016

SUB: MATHEMATICS-III

Time : 3 Hours] **[Total Marks 60**

Use of following supporting material is permitted during examination.

1._____Nil _____ . _____ Nil_____

Note: 1. Attempt any five questions selecting one question from each unit.

2. Each question carry equal marks.

UNIT-I

1. a) Find Laplace Transform of function.

i) $\frac{\cosh at}{\sqrt{t}}$

ii) $e^{-4t}\cosh 2t$

b) Find $L^{-1}\left[\frac{2S^2-4}{(S+1)(S-2)(S-3)}\right]$

OR

1. Solve $\left(D^3-D^2-D+1\right)y=8te^{-t}$, given that y(0) =0, y' (0) =1, y'' (0) =0.

UNIT-II

2. Find Fourier series of the function f(x)= x + x^2 in the interval $(-\pi,\pi)$.

OR

2. Using the Euler's equation find the externals for the following functional.

$$I[y(x)]=\int_{x_1}^{x_2}\frac{1+y^2}{y^{12}}dx$$

$$\int_c \frac{\sin\pi z^2+\cos\pi z^2}{(z-1)(z-2)}\,dx$$

where C is the circle |z| = 3

UNIT-V

5. Show that

$$\int_0^{2\pi}\frac{d\theta}{a+b\cos\theta}=\int_0^{2\pi}\frac{d\theta}{a+b\sin\theta}=\frac{2\pi}{\sqrt{a^2-b^2}},a>b>0$$

OR

5. Expand the following function in Laurent is series.

$\frac{1}{z(z-1(z-2)}$ for

a) |z-1|<1

b) |z|>2

c) |<|z|<2

c) V (x ,t) is bounded x > 0, t > 0

UNIT-IV

4. a) Examine the nature of the function.

$$f(z)=\frac{x^2y^5(x+jy)}{x^4+y^{10}},\quad z\neq 0\quad f(0)=0$$

in the region including the origin.

b) If f(z) is an analytic function of z, prove that

$$\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|\operatorname{Re} f(z)|^2=2|f'(z)|^2$$

OR

4. a) Evaluate $\int_{1-i}^{2+i}(2x+jy+1)dz$ along the path x = t + 1, y = $2t^2-1$

b) Using cauchy's integral formula evaluate the integral.

UNIT-III

3. a) Find the fourier sine transform of $\frac{e^{-ax}}{x}$.

b) Find f(x) if its cosine transform is

$$F_C(s)=\begin{cases}\frac{1}{\sqrt{2\pi}}\left(a-\frac{s}{2}\right), & if\quad S<2a\\ 0 & if\quad S\geq 2a\end{cases}$$

OR

3. Solve $\frac{\partial v}{\partial t}=\frac{\partial^2 v}{\partial x_2}\,x>0,t>0$

Subject to the condition

a) V = o when x = 0, t > 0

b) $V=\begin{cases}1 & 0<x<1\quad when\quad t=0\\ 0 & x\geq 1\end{cases}$