KIIT University , Bhubaneswar – 24

Mid Semester Examination – 2014

Mathematics – II , MA – 201

(Scheme – I)

Time : - 2hrs — Full Mark : 25

(***Answer any five including*** Q1. .)

Q1. a) Find convolution of t with e^t . [1 x 5]

b) Find inverse Laplace Transform of $\dfrac{2s+7\pi}{s^2-\pi^2}$.

c) Using Unit step function , find Laplace Transform of $f(t)=t,\ 1<t<2$ and 0 otherwise .

d) Find the radius of convergence and hence the interval of convergence for $\sum_{m=0}^{\infty}\dfrac{(-1)^m}{(m!)^2}x^{2m+10}$.

e) Find the power series solution to $(2+x)y'=y$.

Q2. Solve the system of differential equations by Laplace Transform [5]
$y_1'=y_1+2y_2,\ y_2'=2y_1-y_2$, $y_1(0)=0$ and $y_2(0)=1$.

Q3. Find inverse Laplace Transform of $\tan^{-1}\left(\dfrac{s}{\omega}\right)$. [5]

Q4. Find inverse Laplace Transform of $\dfrac{(s+6)e^{-2s}}{s^2+7s+10}$. [5]

Q5. Find the Laplace Transform of $f(t)=t^2e^{-2t}\sin t$. [5]

Q6. Find the power series solution to $(2x^2-3x+1)y''+2xy'-2y=0$. [5]

Q7. Show that the Legendre polynomial $P_n(x)=\dfrac{1}{2^n n!}\dfrac{d^n}{dx^n}\left[\left(x^2-1\right)^n\right]$. [5]