Roll No. $\square$ Total No. of Pages: 02
Total No. of Questions : 09
B.Tech.(3DAnimation \& Graphics) (2012 Onwards) B.Tech.(CSE/IT) (2012 Batch)
(Sem.-3)
MATHEMATICS - III
Subject Code : BTAM-302
Paper ID : [A2143]
Time : 3 Hrs.
Max. Marks : 60
INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## SECTION-A

1. Write briefly :
a) Find Laplace transform of $\sin h \frac{t}{2} \sin \frac{\sqrt{3} t}{2}$.
b) If $L^{-1}\{F(s)\}=f(t)$ then show that $L^{-1}\left\{\frac{1}{s} F(s)\right\}=\int_{0}^{t} f(x) d x$.
c) Form the partial differential equation by eliminating the functions from the relation $z=y f(x)+x g(y)$.
d) Solve the given linear PDE $\sqrt{p}+\sqrt{q}=x+y$.
e) State the necessary condition for a complex function to be analytic.
f) Determine $a, b c, d$ such that the function $f(z)=\left(x^{2}+a x y+b y^{2}\right)+i\left(c x^{2}+d x y+y^{2}\right)$ is analytic.
g) Define diagonally dominant system of linear equations with example.
h) For the given ODE $y^{\prime}=y-\frac{2 x}{y}, y(0)=1$ find $y(0.1)$ using Euler's method.
i) If the sum of mean and variance of a binomial distribution is 4.8 for five trails, find the distribution.
j) Show that in a Poisson distribution with unit mean, mean deviation about mean is $2 / e$ times the standard deviation.

## SECTION-B

2. Obtain Fourier series of the function $f(x)=x^{2},-\pi \leq x \leq \pi$ and hence show that $\frac{1}{1^{2}}+\frac{1}{2^{2}}+\frac{1}{3^{2}}+\frac{1}{4^{2}}+\ldots . .=\frac{\pi^{2}}{6}$.
3. Using Laplace transform evaluate $\int_{0}^{\infty} e^{-t} \frac{\sin ^{2} t}{t} d t$.
4. Solve the linear PDE $\left(x^{2}-y^{2}-z^{2}\right) p+2 x y q=2 x z$.
5. Prove that $u=x^{2}-y^{2}-2 x y-2 x+3 y$ is harmonic and find a function $v(x, y)$ such that the function $f(z)=u+i v$ is analytic.
6. Solve the given system of linear equations using Gauss-Seidal method

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2 x+17 y+4 z=35,28 x-4 y-z=32, x+3 y+10 z=24 .
$$

## SECTION-C

7. i) Let $f(t)$ be piecewise continuous on $[0, \infty)$, be of exponential order and periodic $T$. Then $L[f(t)]=\frac{1}{1-e^{-s T}} \int_{0}^{T} e^{-s t} f(t) d t, \mathrm{~s}>0$.
ii) Solve $\left(2 D^{2}-5 D D^{\prime}+2 \mathrm{D}^{\prime 2}\right) z=5 \sin (2 x+y)$
8. i) By using Power method calculate the dominant eigen values and corresponding Eigen value of $\left[\begin{array}{lll}2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2\end{array}\right]$.
ii) Given $y^{\prime}=y-x, y(0)=2$, find $y(0.1)$ and $y(0.2)$ using Runge-Kutta method of fourth order.
9. i) In a Normal distribution, $7 \%$ of the items are under 35 and $89 \%$ are under 63 . What are the mean and standard deviation of the distribution?
ii) A manufacturer claims that only $4 \%$ of his products supplied by him are defective. A random sample of 600 products contains 36 defectives. Test the claim of the manufacturer.
