No. of Printed Pages : **3** **BICE-007**

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(BTCSVI / BTECVI / BTELVI) B.Tech. (Degree)

Term-End Examination

June, 2013

BICE-007 : MATHEMATICS-III

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any seven** questions. All questions carry **equal** marks . All the question are to be answered in english only.*

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1. (a) Given that $f(x)=x+x^2$ for $-\pi<x<\pi$, find the fourier expression of $f(x)$. 5

   (b) Obtain the half-range sine series for the function $f(x)=x^2$ in the interval $0<x<3$. 5

2. Find the fourier sine transform of $l^{-|x|}$ hence show **10**

   that $\displaystyle\int_0^\infty \frac{x \sin mx}{1+x^2}dx = \frac{\pi l^{-m}}{2}, \; m>0$

3. (a) Solve $(x^2-yz)p+(y^2-zx)q=z^2-xy$. 5

   (b) Using method of separation of variables solve. 5

   $$\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u, \text{ where } u(x,0)=6e^{-3x}.$$

4. A tightly stretched string with fixed end points $x=0$ and $x=l$ is initially in a position given by $y = y_0 \sin^3\left(\frac{\pi x}{l}\right)$. If it is released from rest from this position, find displacement $y(x,t)$. **10**

5. (a) Find the inverse z transform **5**

of $\frac{2z^2+3z}{(z+2)(z-4)}$

(b) Find the z transform of n sinnθ. **5**

6. Using z transform solve. **10**

$u_{n+2} + 4u_{n+1} + 3u_n = (3)^n$

with $u_0 = 0$, $u_1 = 1$.

7. Find the externals of the functional $\int_{x_0}^{x_1} \left[\frac{y'^2}{x^2}\right] dx$. **10**

8. (a) Using Newton Raphson method find the real roots of the equation $3x = \cos x + 1$ between 0 and 1 correct up to two decimal places. **5**

(b) Find the cubic polynomial. Which takes the following values. **5**

x	0	1	2	3
$f(x)$	1	2	1	10

9. Solve by Gauss-seidal iteration method 10

$20x + y - 2z = 17$

$3x + 20y - z = -18$ upto 3 iteration.

$2x - 3y + 20z = 25$

10. Evaluate. $\int_0^6 \frac{dx}{1 + x^2}$ by using.

(a) Trapezoidal rule. 5

(b) Simpson's $\frac{1}{3}$ rule 5
