Paper Code: AS-301	**Roll No.**									

B.Tech
THIRD SEMESTER EXAMINATION, 2016-17
MATHEMATICS-III

[Time: 3 hrs.] [Max. Marks: 100]

Note: Attempt ***ALL*** questions. Assume suitable data, if required. All question carry equal marks.

1. Attempt any *two* parts of the following: – $(\mathbf{10x2 = 20})$

(a) *Find the values of* A *and* B *such that the function* $f(z) = x^2 + Ay^2 - 2xy + i(Bx^2 - y^2 + 2xy)$ *, is analytic. Also find* $f'(z)$ *in term of* z.

(b) *Expand the function* $\sin^{-1} z$ *in powers of* z.

(c) *Evaluate* $\int_0^\infty \frac{\cos 2ax - \cos 2bx}{x^2}\, dx, a \geq b \geq 0,$ *by using contour integration.*

2. Attempt any *two* parts of the following: – $(\mathbf{10x2 = 20})$

(a) *Solve by Fourier transform method* $\int_0^\infty f(x) \cos \lambda x\, dx = e^{-\lambda}$

(b) *Find the Fourier cosine transform of* e^{-x^2}

(c) *Find the* $Z -$ *transform of* $c^k \cos(\alpha k)$ *,* $k \geq 0$

3. Attempt any *two* parts of the following: – $(\mathbf{10x2 = 20})$

(a) *Fit a straight line to the following data.*

x	71	68	73	69	67	65	66	67
y	69	72	70	70	68	67	68	64

(b) *The following data gives the marks of* 10 *students in the internal test and the university examination for the maximum of* 50 *each.*

Internal marks(x)	25	28	30	32	35	36	38	39	42	45
University Marks (y)	20	26	29	30	25	18	26	35	35	46

Find the (i)*two lines of regression* (ii)*the most likely internal mark for the university mark of* 25 (iii)*the most likely university mark for the internal mark of* 30.

(c)*If the mean of the Poisson distribution is* 2. *Find the probability for* $r = 1,2,3$ *from the recurrence relation. Given* $e^{-2} = 0.1353$

4. Attempt any *two* parts of the following: – **$(10x2 = 20)$**

(a)*Compute one root of* $e^x - 3x = 0$, *correct to two decimal places using bisection method.*

(b)*Find the value of* $\sin 52°$ *from the following table by Newton's forward formula.*

$\theta°$	45°	50°	55°	60°
$\sin\theta°$	0.7071	0.7660	0.8192	0.8660

(c)*Apply Lagrange's formula to find* $f(5)$*given that* $f(1) = 2, f(2) = 4, f(3) = 8, f(4) = 16, f(7) = 128$. *Explain why the result differs from* 2^5

5. Attempt any *two* parts of the following: – **$(10x2 = 20)$**

(a) *Solve the following system of linear equations by Gauss – Seidel method*:

$2x + 10y + z = 51 \qquad 10x + y + 2z = 44 \qquad x + 2y + 10z = 61$

(b)*Find the value of integral* $\int_{0.5}^{0.7} x^{1/2}\, e^x\, dx$ *by using Simpson's one – third rule taking* $n = 8$.

(c)*Using Runge – Kutta method of fourth order, solve* $\frac{dy}{dx} = x + y$ *with* $y(0) = 1$ *for* $x = 0.1$