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BICE-007

01422

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

Term-End Examination

December, 2011

BICE-007 : MATHEMATICS-III

Time : 3 hours *Maximum Marks : 70*

Note : *There are **seven** questions. Attempt **any five** questions and all questions **carry equal** marks. Use of scientific and non-programmable calculator is **allowed.***

1. (a) If $u+v=\frac{2\sin 2x}{e^{2y}+e^{-2y}-2\cos 2x}$ and $f(z)=u+iv$ **7**

is an analytic function of $z=x+iy$, find $f(z)$ in terms of z.

(b) Find the Taylor's or Laurent's series which represent the function $\frac{1}{(1+z^2)(z+2)}$ when **7**

(i) $|z|<1$

(ii) $1<|z|<2$

(iii) $|z|>2$

2. (a) Use Contour integration method to evaluate the following integral : 7

$$\int_0^{\pi} \frac{a d\theta}{a^2 + \sin^2\theta}, \ (a > 0)$$

(b) Compute the first four moments about the mean from the following table : 7

Mid values of the variance	5	10	15	20	25	30	35
Frequency	8	15	20	32	23	17	5

3. (a) Find the co-efficient of correlation from the following data : 7

x	21	23	30	54	57	58	72	78	87	90
y	60	71	72	83	110	84	100	92	113	135

(b) Find the coefficient of correlation when the two regression equations are. 7

$x = -0.2y + 4.2$ and $y = -0.8x + 8.4$

4. (a) The mean yield per plot of a crop is 17kg and standard deviation is 3kg. If distribution of yield per plot is normal, find the percentage of plots giving yields : 7

(i) Between 15.5 kg and 20 kg ; and

(ii) More than 20 kg.

(b) Fit a Poisson distribution to the following data and test for its goodness of fit at level of significance 0.05. 7

x	0	1	2	3	4
y	419	352	154	56	19

5. (a) Find a positive value of $(17)^{1/3}$ correct to four decimal places by Newton-Raphson method. 7

(b) Using Newton's divided formula, find a polynomial function satisfying the following data : 7

x	-4	-1	0	2	5
$f(x)$	1245	33	5	9	1335

Hence find $f(1)$.

6. (a) Evaluate the integral $\int_0^1 \frac{1}{1+x^2} dx$ by using Simpson's $\frac{3}{8}$ rule with ten subintervals. 7

(b) Solve the equation by Picards method $y^1 = x + y^2$ with $y_0 = 1$ when $x = 0$. 7

7. Atempt *any two* parts : **2x7=14**

(a) State and prove the Cauchy's Integral Theorem.

(b) Establish the formula:
$\sigma^2_{x-y} = \sigma_x^2 + \sigma_y^2 - 2\sigma_{xy}\,\sigma_x\,\sigma_y$

(c) Find the Rate of convergence of Regula-Falsi method.

(d) Explain the forecasting and forecasting models with examples.