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BICE-007

B.Tech. – VIEP – Computer Science & Engg. (BTCSVI) / B. Tech. Electronics and Communication Engg. (BTECVI) / B.Tech. Electrical Engg. (BTELVI)

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Term-End Examination

June, 2015

BICE-007 : MATHEMATICS-III

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt only **two** parts from each question. All questions carry equal marks.*

1. (a) Define an analytic function and derive the necessary conditions for the analyticity of a function.

(b) State Cauchy's integral formula and hence evaluate

$$\int_c \frac{dz}{(z-1)(z-2)}, \quad c : |z| = \frac{3}{2}.$$

(c) Evaluate the following integral using contour integration :

$$\int_0^{2\pi} \frac{\sin\theta}{3+\cos\theta} d\theta$$

7+7

2. (a) Calculate the first four central moments of the following distribution about the mean :

x :	0	1	2	3	4	5	6	7	8
Frequency of x :	1	8	28	56	70	56	28	8	1

(b) Fit a straight line $y = a + bx$ to the following data :

x :	50	70	100	120
y :	12	15	21	25

(c) A five digit number is formed by using 0, 1, 2, 3, 4 without repetition. Find the probability that the number is divisible by 4. 7+7

3. (a) In 256 sets of 12 tosses of a coin, in how many ways can one expect 8 heads and 4 tails ?

(b) If the probability of a bad reaction from a certain injection is 0·001, find the chance that out of 2,000 individuals, more than two will get a bad reaction.

(c) If X is a normal variate with mean 30 and S.D. 5, find the probabilities that

(i) $26 \leq X \leq 40$

(ii) $| X - 30 | > 5$ 7+7

4. (a) Find a root of $xe^x - 1 = 0$, correct to three decimal places using Bisection method.

(b) Show that Newton-Raphson's method has quadratic convergence.

(c) Discuss the Lagrange's and Newton's divided difference formulae for unequal intervals. 7+7

5. (a) Apply Gauss-Seidel iteration method to solve the system of equations :

$4x + y + 2z = -1$, $x + 5y + z = 5$, $2x + y + 4z = 3$.

(b) Using Simpson's $3/8^{th}$ rule, evaluate the integral

$$\int_0^1 e^{x^2}\, dx.$$

(c) Find $y(2{\cdot}2)$ from

$$\frac{dy}{dx} = x(y - x),\ y(2) = 3$$

using Runge-Kutta's method of fourth order. (Take step size $h = 0{\cdot}1$). 7+7