

**B.Tech. - VIEP - Computer Science & Engg.
(BTCSEVI) / B.Tech. Electronics and
Communication Engg. (BTECVI) / B.Tech.
Electrical Engg. (BTELVI)**

Term-End Examination

00106

June, 2016

BICE-007 : MATHEMATICS-III

Time : 3 hours

Maximum Marks : 70

Note : All questions are **compulsory**. Use of scientific calculator is permitted.

1. Answer any **two** of the following : 2×7=14

(a) Show that the function $u = e^{-2xy} \sin(x^2 - y^2)$ is harmonic. Find the conjugate function v as $z = u + iv$.

(b) Evaluate $\int_0^{1+i} (x^2 - iy) dz$ along the path

(i) $y = x$

(ii) $y = x^2$

(c) Evaluate $\int_C \frac{3z^2 + z + 1}{(z^2 - 1)(z + 3)} dz$, where

$C : |z| = 2$.

2. Answer any *two* of the following :

$2 \times 7 = 14$

- (a) The four moments about the working mean 28.5 of a distribution are 0.294, 7.144, 42.409 and 454.98. Calculate the mean. Also evaluate β_1 , β_2 and comment about the skewness and kurtosis of the distribution.
- (b) Find the regression coefficients of y on x and of x on y and the correlation coefficient between x and y on the basis of the following records :
 $\Sigma xy = 350$, $\bar{x} = 5$, $\Sigma x = 50$, $\bar{y} = 6$, $\Sigma y = 60$,
variance of $x = 4$ and variance of $y = 9$
- (c) The probability that a bomb dropped from a plane will hit the target is $1/5$. If 6 bombs are dropped, find the probability that
- exactly two will strike the target,
 - at least two will hit the target.

3. Answer any *two* of the following :

$2 \times 7 = 14$

- (a) A die is tossed thrice. Getting 5 or 6 on the die in a toss is success. Find the mean and variance of number of successes.
- (b) The distribution of the number of road accidents per day in a city is Poisson with mean 4. Find the number of days out of 100 days, when there will be
- no accident,
 - at least 2 accidents,
 - at most 3 accidents,
 - between 2 and 5 accidents.

- (c) In a normal distribution of marks, 31% are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution. It is given that, if

$$f(t) = \frac{1}{\sqrt{2\pi}} \int_0^t e^{-x^2/2} dx, \text{ then}$$

$$f(0.5) = 0.19 \text{ and } f(1.4) = 0.42.$$

4. Answer any *two* of the following : 2×7=14

- (a) Find a root of the following equation using the Bisection method, correct to three decimal places :

$$x^3 - 2x - 5$$

- (b) Using Regula-Falsi method, compute the real root of the equation $xe^x = 2$, correct to four decimal places.
- (c) Determine the root of the equation $\cos x - xe^x = 0$ using the method of Newton-Raphson.

5. Answer any *two* of the following : 2×7=14

- (a) Solve by Gauss-Jordan method, the equations $x + y + z = 9$, $2x - 3y + 4z = 13$, $3x + 4y + 5z = 40$.

- (b) A rocket is launched from the ground. Its acceleration 'f' is noted for the first 80 seconds as given in the following table :

t (sec)	f (cm/sec ²)
0	30
10	31.63
20	33.34
30	35.47
40	37.75
50	40.33
60	43.25
70	46.69
80	50.67

Estimate the velocity of the rocket at t = 80 sec employing Simpson's one-third rule.

- (c) Solve the equation $\frac{dy}{dx} = -y$, $y(0) = 1$ for values of y at $x = 0.1$ and $x = 0.2$, using Runge-Kutta method of order three.