B TECH
(SEM III) THEORY EXAMINATION 2018-19
MATHEMATICS-III

Time: 3 Hours   *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 10 = 20**

a. State Sufficient Conditions for function f(z) to be analytic.
b. Define Harmonic and Conjugate Harmonic function.
c. The regression equations calculated from a given set of observation for two random variables are $x = -0.4y + 6.4\ and\ y = -0.6x + 4.6$ calculate $\bar{x}, \bar{y}$.
d. Differentiate between Binomial and Poisson distribution.
e. Prove that rate of convergence of Bisection method is 1.
f. State the formula of Lagrange's Interpolation.
g. Define Skewness and Kurtosis.
h. Write down the formula for Simpson's 1/3 and 3/8 rule.
i. Find the third divided difference with argument 2, 4,9,10 of the function f(x)=x³-2x.
j. Prove that E=1+Δ.

SECTION B

2.   **Attempt any *three* of the following:**   **10 x 3 = 30**

a.   Find Karl Pearson Coefficient of Skewness for the following:

Years:	10	20	30	40	50	60
No. of Person:	15	32	51	78	97	109

b.   Using Newton's Raphson Method solves the equation Cos$x$-xe^x=0 correct to four decimal places.

c.   Fit a second degree parabola to the following data:

x	1	2	3	4	5	6	7	8	9	10
y	124	129	140	159	228	289	315	302	263	210

d.   Find the Laurent series expansion for f(z) = $\dfrac{7z-2}{z^3 - z^2 - 2z}$ in the region given by :

(a) $0 < |z+1| < 1$ (b) $1 < |z+1| < 3$

e.   Given the initial value problem $y' = 1 + y^2, y(0) = 0$, find y (0.4) by Runge-Kutta fourth order method taking h=0.2.

1 | P a g e

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Fit a Poisson distribution of the following data:

Deaths	0	1	2	3	4
Frequencies	122	60	15	2	1

(b) In a blade manufacturing company, 1000 blades are examined daily. Following information shows number of defective blades obtained. Draw np- chart & give your findings.

Date	1	2	3	4	5	6	7	8	9	10
No. of defectives	9	10	12	8	7	15	10	12	10	8

4. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Find the real root of the equation $x4 - x - 9 = 0$ by Newton-Raphson Method, correct to three places of decimal.

(b) Using Lagranges Interpolation Formula, find y(10) from the following table:

      x: 5   6   9   11
      y: 12   13   14   16

5. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Evaluate $\int_C \dfrac{e^{2z}dz}{(z+1)^4}$ *where C is the circle* $|z| = 3$

(b) Evaluate $\int_0^{2\pi} \dfrac{\cos 2\Theta}{5+ 4 \cos\Theta}\, d\Theta$ by using contour integration.

6. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Apply the method of least squares to fit a parabola $y = a + bx + cx^2$ from the following data : (x,y) : (- 1,2), (0,0), (0,1), (1,2).

(b) Apply Newton's backward difference formula to the data below, to obtain a polynomial of degree 4 in x:

x	1	2	3	4	5
y	1	-1	1	-1	1

7. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Given that $\dfrac{dy}{dx} = 1 + xy$; $y(0) = 2$, Using Runge- Kutta Fouth order method, find y (0.1), y(0.2).

(b) The distance covered by an athlete for the 50 metre race is given in the following table:

Time(sec.) :	0	1	2	3	4	5	6
Distance(metre):	0	2.5	8.5	15.5	24.5	36.5	50

Determine the speed of the athlete at t=5 sec.