M-2 (NUMERICAL METHODS AND COMPLEX VARIABLES)

UNIT-1

1.Using Regula-Falsi Method, find the real root of, $X^3-X-4=0$
2.solve, $X^3-2X-5=0$ for a positive root by iteration method.
3. Find a real root of the equation $2x-\log x=7$ using iteration method

4. Using Regula-Falsi method, find the root of $x^3-x-2=0$ over (1, 2).

5. Find a positive root of the equation by iteration method $3x=\cos x+1$

6. Solve $x=1+\tan^{-1}x$ by iteration method.

7. Using Regula-Falsi Method, find the root of $xe^x-2=0$

UNIT – 2

1.Find f(22), from the following data using Newton's Backward formula.

X	20	25	30	35	40	45
Y	354	332	291	260	231	204

2.Given sin 45=0.7071,sin 50=0.7660,sin 55=0.8192 and sin 60=0.8660 find sin 52 using newton'sformula
3. The population of a town in the decimal census was given below.
Estimate the population for the year 1895

Year (x)	1891	1901	1911	1921	1931
Population (y)	46	66	81	93	101

4. Find y(25) given that y(20)=24, y(24)=32, y(28)=35, y(32)=40, using Gauss forward difference formula.
5.Find y(5) given that y(0)=1, y(1)=3, y(3)=13 and y(8) =123 using Lagrange's formula
6. Find y(10), given that y(5)=12, y(6)=13, y(9)=14, y(11)=16 using Lagrange's formula
7. A curve passes through the points (0, 18),(1,10), (3,-18) and (6,90).
Find the slope of the curve at x = 2.
8. By the method of least square, find the straight line that best fits the following data:

x	1	2	3	4	5
y	14	27	40	55	68

9. Fit a straight line y=a +bx from the following data:

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

UNIT – 3

1.Using Taylor's series method, find an approximate value of y at x=0.2 for the differential equation $y'-2y = 3e^x$ for y(0)=0.
2. Given
dx

dy=XY and y(0)=1. Find y(0.1) using Euler's method

3. Given y_1=4-2x, y(0)=2 then find y(0.5),y(1),y(1.5)using Euler's modified formula

4. Obtain the values y at x=0.1,0.2 using Runge Kutta method of second and fourth order for y_1+y=0,y(0)=1

5. Solve the boundary value problem y_{11}-2y(x)/x_2=-5/x,1<x<2,y(1)=1;y(2)=2;with h value of 0.5

6. How many number of subintervals are required to get accuracy, while evaluating a definite integral by trapezoidal rule?

UNIT – 4

1. if we know that f is entire and that | f (z) |≤| z |100, what can I say about this function
2. newton-Raphson method is to be used to find root of equation $3x-ex+\sin x=0$ If the initial trial value for the root is taken as 0.333, the next approximation for the root would be
3. Consider the following complex function:
   f(z)=9(z−1)(z+2)2
   Which of the following is one of the residues of the above function ?
4. Given $i=\sqrt{-1}$, the value of the definite integral, $I=\int 0\pi 2\cos x+i\sin x\cos x-i\sin x dx$ is :
5. $z=2-3i/-5+i$ can be expressed as
6. For an analytic function ,$f(x+iy)=u(x,y)+iv(x,y)$, u is given by $u=3x^2-3y^2$.find the expression for v, considering K to be a constant.
7. The analytic function $f(z)=z-1/z^2+1$ has singularities.

UNIT – 5

1. Evaluate $\int\infty 0\cos ax\cosh x dx$.
2. Calculate the following complex integral $\oint 0\ 2\pi\ 1/z\ dz$
3. Suppose α is real, show that $|e2\alpha\pi i-1|\leq 2\pi|\alpha|$.

4.evaluate the integral $\oint C\ 1/z-z0\ dz$,

5. Estimate an upper bound of the modulus of the integral $I=\int C\ \text{Logz}/z-4i\ dz$ where C is the circle |z|= 3.
6. Why does $\partial/\partial x\ O((1x)0)$ equal $O((1/x)0)$ in a series expansion?

UNIT – 6

1 . Expand f(z)=1 / 1−zin terms of negative powers of z which will be valid if |z|>1

2. Classify the singularities of the function $f(z)=2/z-1/z^2+1/(z^2+i)+3/(z-i)^4$

3. Expand f(z)=12−z in terms of negative powers of z to give a series which will be valid if |z|>2.

4. Identify the singularities of $f(z)=1/z^2+4$.

5. Identify the singularities of $f(z)=1\ z^2(z^2+9)$and find the residue at each of them

6. Let f(z) be the power series $\infty\sum n\text{-}0\ n^2 z^n$.