Computational Mathematics(22BS1MA02)

Python Lab Experiments Assignment Questions(AIML,AIDE and CS)

Exp-1:

1) Write a Python program to create the following sets:

   (i) A={1,2,3,4,5,6}, (ii) B={Hari, Prem, 102.55, 23, 12}.

2) Create the new frozen set in python which contains elements from set A and set B but not both, where A and B both are frozen sets.

3) Create the new python set which contains elements from set A but not from set B, where

$A = \{x: x \text{ is a prime number} < 15\}$ and $B = \{x: x \text{ is an odd number} < 15\}$.

4) Make use of python programming create a set 'A' that is a set of all even natural numbers less than 10. Create another set 'B' that is a set of all natural numbers less than 10 divisible by 3. Create and print a frozenset 'C' that has elements that are either in A or B but not both.

Exp-2:

1) Write the python code for the following compound proposition:

   (i) $p \wedge (\neg p \wedge q)$, (ii) $(p \vee q) \to r$.

2) Test whether following is a valid argument or not by using python code

   If I Study, then I do not fail in the exam

   If I do not fail in the exam, then my father gifts a car to me

   $\therefore$ If I study then my father gift me a car

Exp-3:

1) Compute the first order derivative for the following function by using python

   (i) $f(x,y) = x^5 + 3x^3y^2 + 3xy^4$, (ii) $f(x,y) = \sin\left(\frac{x}{1+y}\right)$.

2) Compute all first and second order derivative for the following by using python:

   (i) $f(x,y) = \ln(3x + 5y)$, (ii) $f(x,y) = \sqrt{(x^2 + y^2)}$.

Exp-4:

1) Find all the eigenvalues and the corresponding eigenvectors of the matrix by using python

$$\begin{bmatrix} 2 & 4 \\ 1 & -3 \end{bmatrix}.$$

2) Find all the eigenvalues and the corresponding eigenvectors of the matrix by using python

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}.$$

Exp-5:

1) Solve the following differential equation by using Python.

(i) $(D^3 - 5D^2 + 7D - 3)y = 0$, (ii) $(D^4 - 18D^2 + 18)y = 36e^x + 8^x$.

2) Solve the following IVP by using Python:

$(D^2 - D)y = x^2 - 2x - 32, \ y(0) = 1, y'(0) = -1.$