Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-1

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Use Python code to evaluate each of the following expression.
   a. 20 modulus 2 + 7 - (3 +7) × 20 ÷ 2
   b. 30 × 10 floor division 3 + 10 modulus 3
   c. 2^5 - 2^4 + 4 floor division 4
2. Write Python code to repeat the following string 9 times using the string operator '*'.
   a. Python
   b. Mathematics
3. Write Python program to generate the square of numbers from 1 to 10.

Q.2. Attempt any two of the following. **[10]**

1. Using Python code construct the following matrices.
   1. An identity matrix of order 10 × 10.
   2. Zero matrix of order 7 × 3.
   3. Ones matrix of order 5 × 4.
2. Write Python program to find the 10 term of the sequence of function $f(x) = x^2+x$.
3. Generate all the prime numbers between 1 to 100 using Python code.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^\pi sin(x)dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=6).
2. Write Python program to evaluate interpolate value $f(3)$ of the given data by Laganges method.

x	0	1	2	5
Y=f(x)	5	13	22	129

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 4x - 9 = 0$ by using Regula-falsi method.

2. Write Python program to estimate the value of the integral $\int_2^{10} \frac{1}{(1+x)} dx$ using Trapezoidal rule (n=8).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-2

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write Python code to calculate the volume of a sphere with radius $r = 7$ ($V = \frac{4}{3}\pi r^3$).
2. Use Python code to construct string operation '+' below string.
   a. string1 = Hello, string2 = World!
   b. string1 = Good, string2 = Morning
3. Write Python code to generate the square of numbers from 20 to 30.

Q.2. Attempt any two of the following. **[10]**

1. Use python code find value of $f(-2), f(0), f(2)$ where $f(x) = x^2$–$5x + 6$.
2. Write Python program to find the 10 term of the sequence of function $f(x) = x^3$+$5x$.
3. Using sympy module of python, find the eigenvalues and corresponding eigenvectors of the matrix $A = \begin{bmatrix} 4 & 2 & 2 \\ 2 & 4 & 2 \\ 2 & 2 & 4 \end{bmatrix}$.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^1 \frac{1}{(1+x^2)} dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=4).
2. Write Python program to obtained a real root of $f(x) = x^3 - 8x - 4 = 0$ by using Newton–Raphson method.

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real roots of $x^3 - 2x - 5 = 0$ in [2,3] using Regula-falsi method.

2. Write Python program to evaluate interpolate value $f(3.5)$ of the given data by Lagranges method.

x	0	1	2	5
Y=f(x)	2	3	12	147

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-3

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write python code to test whether given number is divisible by 2 or 3 or 5.
2. Repeat the following string 11 times using the string operator '*' on Python.
   a. LATEX
   b. MATLAB
3. Use Python code to find sum of first thirty natural numbers.

Q.2. Attempt any two of the following. **[10]**

1. Using Python construct the following matrices.
   1. An identity matrix of order 10×10.
   2. Zero matrix of order 7×3.
   3. Ones matrix of order 5×4.
2. Using python, find the eigenvalues and corresponding eigenvectors of the matrix
$$\begin{bmatrix} 3 & -2 \\ 6 & -4 \end{bmatrix}.$$
3. Generate all the prime numbers between 1 to 100 using Python code.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^{\pi} sin(x)dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=6).
2. Write Python program to evaluate third order forward difference of the given data.

x	0	1	2	3
Y=f(x)	1	0	1	10

b. Attempt any one of the following. **[8]**

1. Write Python program to evaluate f(3.5) of the given data.

x	1	2	3	4	5
Y=f(x)	30	50	55	40	11

2. Write Python program to estimate the value of the integral $\int_2^{10} \frac{1}{(1+x)} dx$ using Trapezoidal rule (n=5).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-4

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using python code sort the tuple in ascending and descending order 5, -3, 0, 1, 6, -6, 2.

2. Write python program which deals with concatenation and repetition of lists.
   List1 = [15, 20, 25, 30, 35, 40]
   List2 = [7, 14, 21, 28, 35, 42]

   (a) Find List1 + List2

   (b) Find 9*List1

   (c) Find 7*List2

3. Write Python code to find the square of odd numbers from 1 to 20 using while loop.

Q.2. Attempt any two of the following. **[10]**

1. Using Python construct the following matrices.

   1. An identity matrix of order 10×10.
   2. Zero matrix of order 7×3.
   3. Ones matrix of order 5×4.

2. Find the data type of the following data by using Python code.

   a. number

   b. 31.25

   c. 8 + 4j

   d. Mathematics

   e. 49

3. Write Python program to find the determinant of matrices

$$A = \begin{bmatrix} 1 & 0 & 5 \\ 2 & 1 & 6 \\ 3 & 4 & 0 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 5 \\ -1 & 4 \end{bmatrix}.$$

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^{\pi} xsin(x)dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=6).

2. Write Python program to estimate a root of an equation $f(x) = 3x - cos(x) - 1$ using Newton–Raphson method correct up to four decimal places.

b. Attempt any one of the following. **[8]**

1. Write Python program to find all positive prime numbers less then given number n.

2. Write Python program to evaluate f(2.5) by forward difference formula of the given data.

x	0	1	2	3
Y=f(x)	2	1	2	10

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-5

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using sympy module of python find the following for the matrices

$$A = \begin{bmatrix} -1 & 1 & 0 \\ 8 & 5 & 2 \\ 2 & -6 & 2 \end{bmatrix} \text{ and } B = \begin{bmatrix} 9 & 0 & 3 \\ 1 & 4 & 1 \\ 1 & 0 & -1 \end{bmatrix}.$$

   (a) 2A + B.

   (b) 3A – 5B.

   (c) A^{-1}.

   (d) B^3.

   (e) $A^T + B^T$.

2. Evaluate following expression on Python.

   (a) M =[1,2,3,4], Find length M.

   (b) L="XYZ"+"pqr", Find L.

   (c) s='Make In India', Find (s[:7]) & (s[:9]).

3. Use Python code to generate the square root of numbers from 21 to 49.

Q.2. Attempt any two of the following. **[10]**

1. Using Python construct the following matrices.

   1. An identity matrix of order 10 × 10.
   2. Zero matrix of order 7 × 3.
   3. Ones matrix of order 5 × 4.

2. Using linsolve command in python, solve the following system of linear equations.

$$\begin{aligned} x - 2y + 3z &= 7 \\ 2x + y + z &= 4 \\ -3x + 2y - 2z &= -10 \end{aligned}$$

3. Generate all relatively prime numbers to 111 which are less than 150 using Python code.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python code to find eigenvalues and corresponding eigenvectors of the matrix

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 2 & 2 & 3 \\ 4 & 2 & 1 \end{bmatrix}$$

and hence find matrix P with diagonalize to A.

2. Write Python program to estimate a root of an equation $f(x) = 3x^2 + 4x - 10$ using Newton–Raphson method correct up to four decimal places.

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 4x - 9 = 0$ by using Regula-falsi method.

2. Write Python program to evaluate f(3.5) by forward difference formula of the given data.

x	1	2	3	4	5
Y=f(x)	41	62	65	50	17

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-6

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using Python evaluate each of the following expression.
   a. 23 modulus 2 + 9 - (3 +7) × 10 ÷ 2
   b. 35 × 10 floor division 3 + 15 modulus 3
   c. $3^5 - 2^5 + 4$ floor division 7
2. Write Python code to list name and roll number of 5 students in B.Sc. (Computer science).
3. Write Python code to find maximum and minimum element in the given list. $[7, 8, 71, 32, 49, -5, 7, 7, 0, 1, 6]$

Q.2. Attempt any two of the following. **[10]**

1. Using Python code construct identity matrix of order 10 and hence find determinant, trace and transpose of it.
2. Write Python code to find the value of function $f(x, y) = x^2 - 2xy + 4$ at the points (2,0) (1,-1).
3. Find number between 1 to 200 which are divisible by 7 using Python code.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^{\pi}(x - sin(x))dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=5).
2. Write Python code to diagonalize matrix

$$A = \begin{bmatrix} 3 & -2 \\ 6 & -4 \end{bmatrix}$$

and find matrix P with diagonalize of A and diagonal matrix D.

b. Attempt any one of the following. **[8]**

1. Write a Python program to obtained the approximate real root of $x^3 - 2x - 5 = 0$ in [2,3] using Regula-falsi method.

2. Write a Python program to estimate the value of the integral $\int_1^5 \frac{1}{(1+x)} dx$ using Trapezoidal rule (n=10).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-7

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using Python, evaluate the following expression of two complex number $z_1 = 5+3j$ and $z_2 = -5+7j$
   a. $z_1 + z_2$
   b. $z_1 - z_2$
   c. $z_1 * z_2$
2. Repeat the following string 7 times using the string operator '*' on Python.
   a. Complex Number
   b. Real Number
3. Write Python code to generate cube of numbers from 1 to 50.

Q.2. Attempt any two of the following. **[10]**

1. Using Python code construct 0nes matrix of order 10×10 and hence find determinant, trace and transpose of it.
2. Write Python code to obtained $f(-1), f(0), f(1)$ of the $f(x) = x^3 - 4x - 9$.
3. Generate all the prime numbers between 500 to 1000 using Python program.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_1^5 x^3 dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=6).
2. Write Python program to evaluate interpolate value $f(3)$ of the given data.

x	0	1	2	5
Y=f(x)	2	3	12	147

b. Attempt any one of the following. **[8]**

1. Write Python program to estimate the value of the integral $\int_2^{10} \frac{1}{(1+x)} dx$ using Trapezoidal rule (n=8).

2. Write Python program to evaluate f(2.8) using backward difference formula of the given data.

x	0	1	2	3
Y=f(x)	1	0	1	10

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-8

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Use Python code to find $a + c, ab, c^d, a/b$ and $a(b + c)$, where $a = 5, b = 7, c = 9, d = 11$.
2. The following two statements using the '+'string operation on Python.
   a. string1 = India Won, string2 = World Cup
   b. string1 = God, string2 = is Great
3. Write Python code to find area and circumference of circle with radius 14.

Q.2. Attempt any two of the following. **[10]**

1. Using Python code logically verify associativity of matrices with respective to matrix addition (use proper matrices).
2. Write Python code to generate 10 terms of Fibonacci Sequence using loop.
3. Using Python code, find determinant and inverse of the matrix if exist.

$$A = \begin{bmatrix} 4 & 2 & 2 \\ 2 & 4 & 2 \\ 2 & 2 & 4 \end{bmatrix}$$

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^1 \frac{1}{(1+x^2)} dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=6).
2. Write Python program to evaluate fourth order forward difference of the given data.

x	1	2	3	4	5
Y=f(x)	41	62	65	50	17

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 2x - 5 = 0$ in [2,3] using Regula-falsi method.

2. Write Python program to estimate the value of the integral $\int_2^4 (2x^2 - 4x + 1)dx$ using Trapezoidal rule (n=5).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-9

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using Python evaluate each of the following expression.
   a. 30 modulus 2 + 7 - (3 +9) × 20 ÷ 5
   b. 30 × 10 floor division 3 + 30 modulus 3
   c. 5^5 - 5^3 + 7 floor division 7
2. Use print command on Python to find
   (a) sin30
   (b) pi
   (c) e
   (d) cos30
3. Write Python code to generate modulus value of -10 ,10, -1,1,0.

Q.2. Attempt any two of the following. **[10]**

1. Use Python code to generate second, fifth, eight characters from string 'MATHEMATICS '
2. Using python find the eigenvalues and corresponding eigenvectors of the matrix $\begin{bmatrix} 3 & -2 \\ 6 & -4 \end{bmatrix}$.
3. Write Python code to verify $(AB)^{-1} = B^{-1}A^{-1}$ (Use proper matrices A and B).

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_1^{10}(x^2 + 5x)dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=5).
2. Write Python program to evaluate interpolate value $f(2.5)$ of the given data.

x	1	2	3	4
Y=f(x)	1	8	27	64

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 4x - 9 = 0$ by using Regula-falsi method.

2. Write Python program to evaluate fourth order forward difference of the given data.

x	1	2	3	4	5
Y=f(x)	40	60	65	50	18

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-10

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using Python evaluate each of the following expression.
   a. 50 modulus 5 + 11 - (13 +7) × 10 ÷ 5
   b. 60 × 20 floor division 3 + 15 modulus 3
   c. 2^7 - 2^3 + 8 floor division 4
2. Using Python code
   List1 = [5, 10, 15, 20, 25, 30] and List2 = [7, 14, 21, 28, 35, 42]
   Evaluate
   (a) List1 + List2
   (b) 3*List1
   (c) 5*List2
3. Write Python code to find area of triangle whose base is 10 and height is 15.

Q.2. Attempt any two of the following. **[10]**

1. Using Python construct the following matrices.
   1. An identity matrix of order 10 × 10.
   2. Zero matrix of order 7 × 3.
   3. Ones matrix of order 5 × 4.
2. Write Python program to find the value of function $f(x) = x^2 + x$, $(-5 \leq x \leq 5)$.
3. Write Python program to find the determinant of matrix

$$A = \begin{bmatrix} 1 & 0 & 5 \\ 2 & 1 & 6 \\ 3 & 4 & 0 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 5 \\ -1 & 4 \end{bmatrix}.$$

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_1^3 \frac{1}{x}dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=8).

2. Write Python program to evaluate interpolated value $f(2.7)$ of the given data f(2)=0.69315,f(2.5)=0.91629,f(3)=1.09861.

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 4x - 9 = 0$ by using Regula-falsi method.

2. Write Python program to estimate the value of the integral $\int_0^1 cos(x)dx$ using Trapezoidal rule (n=5).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-11

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Evaluate following expression on Python.
   (a) M =[1,2,3,4,5,6,7], Find length M.
   (b) L="XY"+"pqr", Find L.
   (c) s='Make In India', Find (s[:5]) & (s[:9]).
2. Use Python to evaluate expression of the following matrix.

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

   (a) Eigen Value of A.
   (b) determinant of A.
   (c) inverse of A.
3. Write Python code to reverse the string S=[3,4,5,6,7,8,9,10,11,12,13].

Q.2. Attempt any two of the following. **[10]**

1. Using Python code to list Name of 5 teacher in your college with their subject.
2. Use linsolve command in python to solve the following system of linear equations.

$$\begin{aligned} x - 2y + 3z &= 7 \\ 2x + y + z &= 4 \\ -3x + 2y - 2z &= -10 \end{aligned}$$

3. Generate all the prime numbers between 51 to 100 using Python program.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^{10} e^x \, dx$ using Simpson's $(\frac{3}{8})^{th}$ rule(Take h = 0.5).

2. Write Python program find the approximate root of the function $x^5 + 3x + 1$, in [-2, 0] using Newton Raphson Method correct upto 4 decimal places.

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 4x - 9 = 0$ by using Regula-falsi method.

2. Write Python program to evaluate interpolate value $f(153)$ of the given data.

x	150	152	154	155
Y=f(x)	12.247	12.329	12.410	12.490

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-12

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using Python evaluate each of the following expression.
   a. 23 modulus 2 + 9 - (3 +7) × 10 ÷ 2
   b. 35 × 10 floor division 3 + 15 modulus 3
   c. 3^5 - 2^5 + 4 floor division 7
2. Use while command on Python to find odd positive integer between 25 to 50.
3. For matrix $A = \begin{bmatrix} 1 & 0 & 5 & 4 \\ 2 & 1 & 6 & -1 \\ 3 & 4 & 0 & 2 \end{bmatrix}$ apply the following operations by using python.
   a. Delete 2^{nd} row.
   b. Delete 1^{st} column.
   c. Add column [9, 9] as 2^{nd} column.

Q.2. Attempt any two of the following. **[10]**

1. Write Python find the eigenvalues and corresponding eigenvectors of the matrix
$$\begin{bmatrix} 1 & 3 & 3 \\ 2 & 2 & 3 \\ 4 & 2 & 1 \end{bmatrix}.$$
2. Write Python program to find the product of n natural numbers using while loop.
3. Generate all prime numbers between 1 to 200 using Python code.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^{\pi} sin(x)dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=5).

2. Write Python program to diagonalize the matrix

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

and find matrix P and D.

b. Attempt any one of the following. **[8]**

1. Write a Python program to obtained the approximate real root of $x^3 - 2x - 5 = 0$ in [2,3] using Regula-falsi method.
2. Write a Python program to estimate the value of the integral $\int_1^5 \frac{1}{(1+x)} dx$ using Trapezoidal rule (n=10).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-13

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using Python code, evaluate the following expression of two complex number $z_1 = 3 + 2j$ and $z_2 = -4 + 1j$

   a. $z_1 + z_2$

   b. $z_1 - z_2$

   c. $z_1 * z_2$

2. Use Python code to find area and circumference of square whose length is 5.

3. Write Python program to generate the square number from 1 to 10.

Q.2. Attempt any two of the following. **[10]**

1. Write Python code to reverse the string S=[1,2,3,4,5,6,7,8,9].

2. Write Python program to find $f(x) = x^2 + 3x$, Where $(-1 \leq x \leq 3)$.

3. Write Python code to find average of number 50 to 100.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^5 \sqrt{1 + x^3} dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=10).

2. Write Python program to evaluate interpolate value $f(5.5)$ of the given data.

x	3	5	7	9
Y=f(x)	5	7	27	64

b. Attempt any one of the following. **[8]**

1. Write a Python program to obtained the approximate real root of $x^3 - 4x - 9 = 0$ by using Regula-falsi method.

2. Write a Python program to evaluate f(2.7) by backward difference formula of the given data.

x	1	2	3	4	5
Y=f(x)	40	60	65	50	18

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-14

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Use print code on Python (a=4,b=6,c=8,d=12).
   (a) print(a+c)
   (b) print(a*b)
   (c) print(c**d)
   (d) print(a/b)
   (e) Expression: 3 + (9 - 2) / 7 * 2 ** 2
2. For the following two statements use '+'string operation on Python.
   a. string1 = Hello, string2 = World!
   b. string1 = Good, string2 = Morning
3. Use Python loop to print('Hallo',i,'You Learn Python')
   where i = ['Saurabh','Akash','Sandeep','Ram','Sai']

Q.2. Attempt any two of the following. **[10]**

1. Using Python code construct any two matrices A and B
   1. Show that A+B=B+A.
   2. Find A-B.
2. Write Python program to find the sequence of function $f(x) = x + 5$, $(-5 \leq x \leq 5)$
3. Using sympy module of python find the eigenvalues and corresponding eigenvectors of the matrix

$$A = \begin{bmatrix} 4 & 2 & 2 \\ 2 & 4 & 2 \\ 2 & 2 & 4 \end{bmatrix}.$$

Q.3. a. Attempt any one of the following. **[7]**

1. Write a Python program to estimate the value of the integral $\int_0^1 \frac{1}{(1+x^2)} dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=4).

2. Write a Python program to obtained a real root of $f(x) = x^3 - 8x - 4 = 0$ using Newton–Raphson method.

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 2x - 5 = 0$ in [2,3] using Regula-falsi method.

2. Write Python program to evaluate approximate value of f(1.5) by using forward difference formula of the given data.

x	1	2	3	4	5
Y=f(x)	30	50	65	40	18

.

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-15

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Using for loop on Python, find range from 1 to 11 integers.
2. Use Python code to find,
   (a) sin75
   (b) pi/2
   (c) e
   (d) cos56
3. Write Python program to find diameter, area, circumference of the circle with radius is 5.

Q.2. Attempt any two of the following. **[10]**

1. Using Python code construct any three matrices A,B and C to show that (A+B)+C=A+(B+C).
2. Using python find the eigenvalues and corresponding eigenvectors of the matrix

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

3. Generate all prime numbers between 1000 to 2000 using Python program.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^6 e^x dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=6).
2. Write Python program to estimate a root of an equation $f(x) = 3x - cos(x) - 1$ using Newton–Raphson method correct up to four decimal places.

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 4x - 9 = 0$ by using Regula-falsi method.

2. Write Python program to evaluate interpolate value f(2.2) of the given data f(2)=0.593,f(2.5)=0.816,f(3)=1.078.

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-16

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write Python program to find absolute value of a given real number(n).
2. Using Python program
   List1 = [5, 10, 15, 20, 25, 30] and List2 = [7, 14, 21, 28, 35, 42]
   Evaluate
   (a) List1 + List2
   (b) 7*List1
   (c) 11*List2
3. Write Python program to find the area and circumference of a circle(r=5).

Q.2. Attempt any two of the following. **[10]**

1. Using Python code, find percentage of marks 70,80, 55, 78, 65 in five subject out of 100 each.
2. Using sympy module of python, find the following terms of vector x = [1, -5, 0] and y = [2, 3, -1].
   a. 5x
   b. x+y
   c. x-3y
3. Write python code to find the determinant and inverse of matrices

$$A = \begin{bmatrix} 1 & 0 & 5 \\ 2 & 1 & 6 \\ 3 & 4 & 0 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 5 \\ -1 & 4 \end{bmatrix}$$

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^{\pi} sin(x)dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=6).

2. Write Python program to estimate a root of an equation $f(x) = x^5 + 5x + 1$ using Newton–Raphson method in the interval [-1,0].

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^2 - 2x - 1 = 0$ by using Regula-falsi method in the interval [2,3].

2. Write Python program to estimate the value of the integral $\int_2^{10} \frac{1}{(1+x)}dx$ using Trapezoidal rule (n=8).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-17

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write the Python code to print 'Python is bad' and 'Python is wonderful' , where wonderful is global variable and bad is local variable.

2. Write Python code to evaluate eigen value and eigen vector of the following matrix.

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

3. Write Python code, find a, b and c such that $a^2 + b^2 = c^2$.(where $1 \leq a, b, c \leq 50$)

Q.2. Attempt any two of the following. **[10]**

1. Using Python code construct any two matrices A and B to show that $(AB)^{-1} = B^{-1}A^{-1}$.

2. Use linsolve code in python to solve the following system of linear equations.

$$\begin{aligned} x - 2y + 3z &= 7 \\ 2x + y + z &= 4 \\ -3x + 2y - 2z &= -10 \end{aligned}$$

3. Write python code to find trace and transpose of the matrix $\begin{bmatrix} 1 & 3 & 3 \\ 2 & 2 & 3 \\ 4 & 2 & 1 \end{bmatrix}$

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to find f(3) of the functional value f(1)=2, f(2)=10, f(4)=68 by using Lagrange method.

2. Write Python program to estimate a root of an equation $x^5 - 5x + 6 = 0$ using Newton–Raphson method correct up to four decimal places.

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^2 - 2x - 1 = 0$ by using Regula-falsi method in the interval [1,3].

2. Write Python program to estimate the value of the integral $\int_0^1 x^2 dx$ using Trapezoidal rule (n=10).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-18

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Use Python code to find minimum value from the given numbers 16,3,5,48,2,4,5,6,78,12,5,6,24.
2. Use Python code to find hypotenuse of triangle whose sides are 12 and 5.
3. Use Python code to remove all digits after decimal of the given Number 125312.3142.

Q.2. Attempt any two of the following. **[10]**

1. Using Python code, find the below matrices, where $A = \begin{bmatrix} 2 & 4 \\ 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 3 \\ 5 & 4 \end{bmatrix}$
   (a) A+B
   (b) A^T
   (c) A^{-1}
2. Use while code on Python to find sum of first twenty natural number.
3. Write Python program to diagonalize the matrix

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

and find matrix P and D.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_1^3 \frac{1}{x} dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=8).
2. Write Python program to evaluate interpolate value $f(2.9)$ of the given data.

x	1	2	3	4
Y=f(x)	11	9	27	64

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 5x - 9 = 0$ in [2,3] using Regula-falsi method.

2. Write Python program to estimate the value of the integral $\int_0^1 cos(x)dx$ using Trapezoidal rule (n=5).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-19

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write python code to display multiplication tables of numbers 2 to 10.
2. Write Python code to check if a number is Zero, Odd or Even.
3. Write Python code to list name and birth date of 5 students in your class.

Q.2. Attempt any two of the following. **[10]**

1. Write python code to find transpose and inverse of matrix

$$A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$$

2. Declare the matrix

$$A = \begin{bmatrix} 5 & 2 & 5 & 4 \\ 10 & 3 & 4 & 6 \\ 2 & 0 & -1 & 11 \end{bmatrix}$$

find a row echelon form and the rank of matrix A.

3. Declare the matrix

$$A = \begin{bmatrix} 2 & -1 & 2 & 7 \\ 4 & 7 & 3 & 4 \\ 4 & 2 & 0 & -1 \end{bmatrix}$$

find the matrices L and U such that $A = LU$.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_0^1 \frac{1}{1+x^2}dx$ by using Simpson's $(\frac{3}{8})^{th}$ rule (n=6).

2. Write Python program to obtained the approximate real root of $x^3 - 8x - 4 = 0$ using Regula-falsi method.

b. Attempt any one of the following. **[8]**

1. Write Python program to estimate the value of the integral $\int_0^1 x^2 dx$ using Trapezoidal rule (n=5).

2. Write python program to find $sin(42)^0$ using Newton backward interpolation formula for the data:
$sin30^0 = 0.5, sin35^0 = 0.5736, sin40^0 = 0.6428, sin45^0 = 0.7071.$

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-20

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write Python code to print first n natural numbers and their square roots of input integer n.
2. Use Python code to find sum of square of first twenty five natural numbers.
3. Write Python code to find all positive divisors of given number n.

Q.2. Attempt any two of the following. **[10]**

1. Write python code to display tuple 'I am Indian ' and the second letter in this tuple
2. Write python code to display the matrix whose all entries are 10 and order is (4,6).
3. Write Python program to diagonalize the matrix

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

and find matrix P and D.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_1^3 cos(x)dx$ using Simpson's $(\frac{3}{8})^{th}$ rule (n=6).
2. Write Python program to evaluate interpolate value $f(5)$ of the given data.

x	1	2	3	6
Y=f(x)	2	6	12	42

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 5x - 9 = 0$ in [2,3] using Regula-falsi method.

2. Write Python program to estimate the value of the integral $\int_1^5 (x^3 - 3x + 2)dx$ using Trapezoidal rule (n=5).

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-21

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write Python code to display multiplication tables of numbers 20 to 30.
2. Write Python code to list name and birth date of 5 students in your class.
3. Write Python function $f(a,b) = \frac{(4a+b)}{3(a-6b)}$, find the value of $f(12,25)$.

Q.2. Attempt any two of the following. **[10]**

1. Using Python construct the following matrices.
    1. Matrix of order 5×6 with all entries 1.
    2. Zero matrix of order 27×33.
    3. Identity matrix of order 5.
2. Write python code to perform the $R_2 + 2R_1$ row operation on given matrix.

$$R = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 2 & 2 \\ 3 & 3 & 3 \end{bmatrix}$$

3. Write python code to find all the eigen values and the eigen vectors of the matrix.

$$\begin{bmatrix} 2 & -1 & -1 & 0 \\ -1 & 3 & -1 & -1 \\ -1 & -1 & 3 & -1 \\ -1 & -1 & -1 & 2 \end{bmatrix}$$

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to find the approximate root of the equation $x^5 + 3x + 1 = 0$, by using Newton Raphson method.

2. Write a Python program to evaluate interpolate value $f(3)$ of the given data.

x	1	2	3	4
Y=f(x)	11	22	33	66

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $xsin(x)+cos(x) = 0$ by using Regula-falsi method.

2. Write Python program to find $sin(37)^0$ using Newton backward interpolation formula for the data:
$sin30^0 = 0.5, sin35^0 = 0.5736, sin40^0 = 0.6428, sin45^0 = 0.7071.$

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-22

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write Python code to sort a tuples in ascending order $(49, 17, 23, 54, 36, 72)$.
2. Find the values of the following expressions if x and y are true and z is false.
   (a) (x or y) and z.
   (b) (x and y) or not z.
   (c) (x and not y) or (x and z).
3. Write Python code to find the tuple 'MATHEMATICS' from range 3 to 9.

Q.2. Attempt any two of the following. **[10]**

1. Write Python program that prints whether the given number is positive, negative or zero.
2. Write Python program to find the sum of first n natural numbers.
3. Using Python accept the matrix

$$A = \begin{bmatrix} 1 & -3 & 2 & -4 \\ -3 & 9 & -1 & 5 \\ 5 & -2 & 6 & -3 \\ -4 & 12 & 2 & 7 \end{bmatrix}$$

   Find the Null space, Column space and rank of the matrix.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to find the approximate root of $f(x) = x^3 - 10x^2 + 5 = 0$, using Newton Raphson method. Take $x_0 = 0.5$.
2. Write Python program to evaluate interpolate value $f(2)$ of the given data.

x	11	12	13	14
Y=f(x)	21	19	27	64

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - x^2 - 2 = 0$ in [1,2], using Regula-falsi method.

2. Using python accept the matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 0 & 8 \end{bmatrix}$$

Find the transpose of the matrix, determinant, inverse of the matrix. Also reduce the matrix to reduced row echelon form and diagonalize it.

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-23

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write Python program to find the sum of first n natural numbers.
2. Write Python code to prints all integers between 1 to 100 that are divisible by 3 and 7.
3. Write Python code to prints all integers between 1 to n, which are relatively prime to n.

Q.2. Attempt any two of the following. **[10]**

1. Write Python code to find determinant, transpose and inverse of matrix.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ 4 & 9 & 11 \end{bmatrix}$$

2. Write Python program to find the roots of the quadratic equation $ax^2 + bx + c = 0$.
3. Using Python solve the following system of equations using LU – Factorization method

$$\begin{aligned} 3x - 7y - 2z &= -7 \\ -3x + 5y + z &= 5 \\ 6x - 4y &= 2 \end{aligned}$$

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_1^3 \frac{1}{x} dx$ by using Simpson's $(\frac{1}{3})^{rd}$ rule (n=8).
2. Write Python program to obtained the approximate real root of $x^4 - 8x^2 - 4 = 0$ using Regula-falsi method.

b. Attempt any one of the following. **[8]**

1. Write Python program to estimate the value of the integral $\int_0^1 x^5 dx$ using Trapezoidal rule (n=10).

2. Write Python program to find $sin(35)^0$ using Newton backward interpolation formula for the data:
$sin30^0 = 0.5, sin35^0 = 0.5736, sin40^0 = 0.6428, sin45^0 = 0.7071$.

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-24

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write Python program to calculate the surface area of sphere $A = 4\pi r^2$.
2. Use Python code to find the remainder after dividing by 'n' to any integers.
3. Write Python program to prints all integers between 1 to 50 that are divisible by 3 and 7.

Q.2. Attempt any two of the following. **[10]**

1. Write Python program to find perfect square between 1 to 100.
2. Write Python program to prints whether the given natural number is divisible by 5 and less than 100.
3. Write Python program to diagonalize the matrix

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

and find matrix P and D.

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to estimate the value of the integral $\int_1^3 cos(x)dx$ using Simpson's $(\frac{3}{8})^{th}$ rule (n=5).
2. Write Python program to evaluate f(1.9) by using backward difference formula of the given data.

x	1	2	3	4
Y=f(x)	11	10	15	10

b. Attempt any one of the following. **[8]**

1. Write Python program to obtained the approximate real root of $x^3 - 5x - 9 = 0$ in [2,4] using Regula-falsi method.

2. Write Python program to evaluate interpolate value $f(17)$ of the given data.

x	12	22	32	62
Y=f(x)	25	65	125	425

Savitribai Phule Pune University, Pune
Board of Studies in Mathematics
S.Y.B.Sc. (Computer Science)
Mathematics Practical Examination
MTC-233: Python Programming Language-I

(CBCS 2019 Pattern)(Semester-III)

Slip No.:-25

Time: 3 hour Maximum Marks: 35

Q.1. Attempt any two of the following. **[10]**

1. Write Python program to print the integers between 1 and 1000 which are multiples of 7.

2. Write Python program to prints whether the given number is divisible by 3 or 5 or 7.

3. Write Python code to find $A + B$ and $B * A$ for the given Matrices.

$$A = \begin{bmatrix} 4 & 2 & 4 \\ 4 & -1 & 1 \\ 2 & 4 & 2 \end{bmatrix} \text{ \& } B = \begin{bmatrix} 5 & 2 & 3 \\ 3 & -7 & 5 \\ 3 & 1 & -1 \end{bmatrix}$$

Q.2. Attempt any two of the following. **[10]**

1. Write Python program to find the area and circumference of a circle with radius r.

2. Use Python code to solve the following system of equations by gauss elimination method

$$\begin{aligned} x + y + 2z &= 7 \\ -x - 2y + 3z &= 6 \\ 3x - 7y + 6z &= 1 \end{aligned}$$

3. Write Python code to find eigen values, eigen vectors of the matrix and determine whether the matrix is diagonalizable.

$$A = \begin{bmatrix} 1 & -1 & 1 \\ -1 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$$

Q.3. a. Attempt any one of the following. **[7]**

1. Write Python program to find the approximate root of the equation $f(x) = x^2 - 50$ by using Newton Raphson method.

2. Write Python program to evaluate f(2.4) by forward difference formula of the given data.

x	0	1	2	3
Y=f(x)	11	10	11	21

b. Attempt any one of the following. **[8]**

1. Write Python program to estimate the value of the integral $\int_0^1 sin^2(\pi x)dx$ using Simpson's $(\frac{1}{3})^{rd}$ rule (n=6).

2. Write Python program to find f(4) using Lagranges interpolation formula from the data: $f(1) = 6, f(2) = 9, f(5) = 30, f(7) = 54$.

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1.Implement a list library (doublylist.h) for a doubly linked list of integers with the create, display operations. Write a menu driven program to call these operations. [10]

Q2. Write a program that sorts the elements of linked list using any of sorting technique. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a list library (singlylist.h) for a singly linked list of integer with the operations create, display. Write a menu driven program to call these operations [10]

Q2. Write a program that copies the contents of one stack into another. Use stack library to perform basic stack operations. The order of two stacks must be identical.(Hint: Use a temporary stack to preserve the order). [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Sort a random array of n integers (accept the value of n from user) in ascending order by using insertion sort algorithm. [10]

Q2. Write a C program to evaluate postfix expression. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Read the ‘n’ numbers from user and sort using bubble sort. [10]

Q2. Write a program to reverse the elements of a queue using queue library. Implement basic queue operations init, enqueue, dequeue. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Create a random array of n integers. Accept a value x from user and use linear search algorithm to check whether the number is present in the array or not and output the position if the number is present. [10]

Q2. Implement a priority queue library (PriorityQ.h) of integers using a static implementation of the queue and implement the below two operations.

1) Add an element with its priority into the queue.
2) Delete an element from queue according to its priority. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Sort a random array of n integers (accept the value of n from user) in ascending order by using selection sort algorithm. [10]

Q2. Implement a queue library (dyqueue.h) of integers using a dynamic (linked list) implementation of the queue and implement init, enqueue, dequeue, isempty, peek operations. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Sort a random array of n integers (accept the value of n from user) in ascending order by using quick sort algorithm. [10]

Q2. Write a program that checks whether a string of characters is palindrome or not. The function should use a stack library (cststack.h) of stack of characters using a static implementation of the stack. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a list library (singlylist.h) for a singly linked list of integer With the operations create, delete specific element and display. Write a menu driven program to call these operations [10]

Q2. Write a C program to check whether the contents of two stacks are identical. Use stack library to perform basic stack operations. Neither stack should be changed. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Write a program to convert an infix expression of the form (a*(b+c)*((d-a)/b)) into its equivalent postfix notation. Consider usual precedence's of operators. Use stack library of stack of characters using static implementation. [10]

Q2 Read the data from the 'employee.txt' file and sort on age using Counting sort and Quick sort and write the sorted data to another file 'sortedemponage.txt'. [20]

Q3 Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a linear queue library (st_queue.h) of integers using a static implementation of the queue and implementing the init(Q), add(Q) and peek(Q) operations. Write a program that includes queue library and calls different queue operations [10]

Q2. Read the data from the file "employee.txt" and sort on names in alphabetical order (use strcmp) using bubble sort and selection sort. [20]

Q3 Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Read the data from file 'cities.txt' containing names of cities and their STD codes. Accept a name of the city from user and use sentinel linear search algorithm to check whether the name is present in the file and output the STD code, otherwise output “city not in the list”. [10]

Q2. Implement a priority queue library (PriorityQ.h) of integers using a static implementation of the queue and implementing the below two operations. Write a driver program that includes queue library and calls different queue operations.

1) Add an element with its priority into the queue.
2) Delete an element from queue according to its priority. [20]

Q3 Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Read the data from file 'cities.txt' containing names of cities and their STD codes. Accept a name of the city from user and use linear search algorithm to check whether the name is present in the file and output the STD code, otherwise output “city not in the list”. [10]

Q2.Implement a circular queue library (cir_queue.h) of integers using a dynamic (circular linked list) implementation of the queue and implementing init(Q), AddQueue(Q) and DeleteQueue(Q) operations. Write a menu driven program that includes queue library and calls different queue operations. [20]

Q3 Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a stack library (ststack.h) of integers using a static implementation of the stack and implementing the operations like init(S), S=push(S) and S=pop(S). Write a driver program that includes stack library and calls different stack operations. [10]

Q2. Write a program that sorts the elements of linked list using bubble sort technique. [20]

Q3 Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Create a random array of n integers. Accept a value x from user and use linear search algorithm to check whether the number is present in the array or not and output the position if the number is present. [10]

Q2. A doubly ended queue allows additions and deletions from both the ends that is front and rear. Initially additions from the front will not be possible. To avoid this situation, the array can be treated as if it were circular. Implement a queue library (dstqueue.h) of integers using a static implementation of the circular queue and implementing the following operations. [20]

a. isFull(Q)
b. addFront(Q)
c. getRear(Q)
d. deleteRear(Q)

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Sort a random array of n integers (accept the value of n from user) in ascending order by using selection sort algorithm. [10]

Q2. Implement a linear queue library (dyqueue.h) of integers using a dynamic (circular linked list) implementation of the queue and implementing the five queue operations (init(Q), AddQueue(Q, x), X=DeleteQueue(Q), X=peek(Q), isEmpty(Q)). [20]

Write a program to reverse the elements of a queue using queue library.

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Sort a random array of n integers (accept the value of n from user) in ascending order by using recursive Counting sort algorithm. [10]

Q2. A postfix expression of the formab+cd-*ab/ is to be evaluated after accepting the values of a, b, c and d. The value should be accepted only once and the same value is to be used for repeated occurrence of same symbol in the expression. Formulate the problem and write a C program to solve the problem by using stack [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1 Implement a list library (singlylist.h) for a singly linked list. Create a linked list, reverse it and display reversed linked list. [10]

Q2 Write a program that copies the contents of one stack into another. Use stack library to perform basic stack operations. The order of two stacks must be identical.(Hint: Use a temporary stack to preserve the order). [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Sort a random array of n integers (accept the value of n from user) in ascending order by using recursive Counting sort algorithm [10]

Q2. Write a program that multiply two single variable polynomials. Each polynomial should be represented as a list with linked list implementation

[20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Sort a random array of n integers (accept the value of n from user) in ascending order by using selection sort algorithm [10]

Q2. There are lists where insertion should ensure the ordering of data elements. Since the elements are in ascending order the search can terminate once equal or greater element is found. Implement a doubly linked list of ordered integers (ascending/descending) with insert, search and display operations. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a stack library (ststack.h) of integers using a static implementation of the stack and implementing the operations like init(S), S=push(S), isFull(S). Write a driver program that includes stack library and calls different stack operations. [10]

Q2. There are lists where new elements are always appended at the end of the list. The list can be implemented as a circular list with the external pointer pointing to the last element of the list. Implement singly linked circular list of integers with append and display operations. The operation append(L, n), appends to the end of the list, n integers either accepted from user or randomly generated. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Write a program that reverses a string of characters. The function should use a stack library(cststack.h). Use a static implementation of the stack. [10]

Q2. Read the data from the file "employee.txt" and sort on names in alphabetical order (use strcmp) using insertion sort and selection sort [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1.Implement a linear queue library (st_queue.h) of integers using a static implementation of the queue and implementing the operations like init (Q), AddQueue(Q, x) and X=DeleteQueue(Q). Write a program that includes queue library and calls different queue operations. [10]

Q2. Read the data from file 'cities.txt' containing names of cities and their STD codes. Accept a name of the city from user and use sentinel linear search algorithm to check whether the name is present in the file and output the STD code, otherwise output “city not in the list”. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a priority queue library (PriorityQ.h) of integers using a static implementation of the queue and implementing the below operation [10]

Add an element with its priority into the queue

Q2. Read the data from file 'sortedcities.txt' containing sorted names of cities and their STD codes. Accept a name of the city from user and use binary search algorithm to check whether the name is present in the file and output the STD code, otherwise output "city not in the list". [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a circular queue library (cir_queue.h) of integers using a dynamic (circular linked list) implementation of the queue and implementing the operations like init (Q), AddQueue(Q, x) and isEmpty (Q). Write a menu driven program that includes queue library and calls different queue operations. [10]

Q2. Read the data from the file "employee.txt" and sort on names in alphabetical order (use strcmp) using insertion sort and selection sort. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Write a program to convert an infix expressionof the form (a*(b+c)*((d-a)/b))intoits equivalent postfix notation. Consider usual precedence's of operators. Use stack library of stack of characters using static implementation. [10]

Q2. Read the data from the 'employee.txt' file and sort on age using Counting sort, Merge sort, Quick sort and write the sorted data to another file 'sortedemponage.txt'. [20]

Q3 Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a stack library (ststack.h) of integers using a static implementation of the stack and implementing the operations like init(S), S=Push(S,x) and isEmpty(S). Write a driver program that includes stack library and calls different stack operations. [10]

Q2. There are lists where insertion should ensure the ordering of data elements. Since the elements are in ascending order the search can terminate once equal or greater element is found. Implement a singly linked list of ordered integers (ascending/descending) with insert, search, and display operations. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Write a program that adds two single variablepolynomials. Each polynomial should be represented as a list with linked list implementation.

[10]

Q2.Read the data from the file and sort on names in alphabetical order (use strcmp) using Counting sort, Merge sort and write the sorted data to another file 'sortedemponname.txt' [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Implement a stack library (ststack.h) of integers using a static implementation of the stack and implementing the above six operations. Write a driver program that includes stack library and calls different stack operations. [10]

Q2. Read the data from the ‘employee.txt’ file and sort on age using Merge sort, Quick sort and write the sorted data to another file 'sortedemponage.txt'.

[20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1.Implement a stack library (ststack.h) of integers using a static implementation of the stack and implementing the operations like init(S), S=push(S), and X=peek(S). Write a driver program that includes stack library and calls different stack operations. [10]

Q2. There are lists where new elements are always appended at the end of the list. The list can be implemented as a circular list with the external pointer pointing to the last element of the list. Implement singly linked circular list of integers with append and display operations. The operation append(L, n), appends to the end of the list, n integers accepted from user. [20]

Q3. Viva [5]

SAVITIBAI PHULE UNIVERSITY OF PUNE
S. Y. B.Sc. (Computer Science) Semester III
Practical Examination
SUBJECT: CS-233 Practical course based on CS231
Time: 3 hours Max. Marks: 35

Q1. Write a program that merges two ordered linked lists into third new list. When two lists are merged the data in the resulting list are also ordered. The two original lists should be left unchanged. That is merged list should be new one. Use linked implementation. [10]

Q2.Read the data from the file "employee.txt" and sort on names in alphabetical order (use strcmp) using bubble sort and selection sort. [20]

Q3. Viva [5]