CBCS SCHEME

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20MCA31

Third Semester MCA Degree Examination, June/July 2023
Data Analytics Using Python

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Write the equivalent python expression for the following :

i) $\dfrac{x^{5/2} - g(mg + h)}{x + \dfrac{y}{ab}}$ ii) $\sqrt[n]{\log_e x + \text{Sin}\,\theta}$

iii) $\beta x^2 + \text{Sec}\,x + x\,\text{Sin}^2 x$ iv) $3.8269 * 10^2 \left[\dfrac{g+n}{a-b}\right]$

v) a is greater than any one of x, y, z. **(05 Marks)**

b. Explain the precedence and associativity with respect to arithmetic operators. Give examples. **(06 Marks)**

c. Explain range( ) function. Using for loop with range( ) function, write a program to evaluate and tabulate $f(x) = \sqrt{x^2 + 2x - 1}$ for all x varying from -1.0 to 1.0 in steps of 0.2. **(09 Marks)**

OR

2 a. Evaluate the following expression

i) 4 * 5% 2 * 3 ii) 2 ** 3 ** 2 iii) 8* (2 + 4) // 5*2 + 3% 5 * 2 iv) 3 * 2 ** 4 * 2

v) 10 > 15 OR NOT 5 = = 10 AND 5! = 5. **(05 Marks)**

b. Explain: i) While loop ii) break statement iii) Continue statement. Give suitable examples. **(07 Marks)**

c. Square of 12 is 144 and reverse of 12 is 21
Square of 21 is 441 which is reverse of 144
Write a program to point all such pair of number from 11 to 99. **(08 Marks)**

Module-2

3 a. Explain indexing and slicing in strings. Discuss negative index also. Give examples. **(06 Marks)**

b. Assume a list 'x' containing some elements. Perform the following operation on 'x' without using any built in function or method.

i) insert 7 as the first element
ii) insert 7 as the last element
iii) remove the first element
iv) remove the last element
v) insert 7 into the index position 2
vi) remove the element in index position 3
vii) reverse the sequence of elements in x
viii) remove all the elements. **(08 Marks)**

c. Explain the storage structure dictionary and the methods items( ), update( ). **(06 Marks)**

OR

4 a. Compare the storage structures strings, tuple, list sets and dictionaries. **(08 Marks)**

b. Explain how a class is declared in python with examples. **(04 Marks)**

c. Define a class 'circle' with data members radius constructor to read radius, method to compute the area and overloaded function to point radius and area, Inherit 'circle' class into another class 'Cylinder' with data member height, method to compute volume and overloaded function to print radius, length and volume. Inheritance should be carried in all the stages of instantiation, computation and point. Write a main program use the class cylinder. **(08 Marks)**

Module-3

5 a. Why NumPy is used? List and explain NumPy array attributes. With a diagram differentiate between NumPy Array and Python Lists. **(10 Marks)**

b. Explain the following Padas summarizing and descriptive statistics function with suitable examples. i) df.head( ) ii) df.cumsum( ) iii) df.sum iv) df.descrite( ) v) df.idmax( ) **(10 Marks)**

OR

6 a. Explain the following NumPy function with suitable examples :
i) np.ones( ) ii) np.full( ) iii) np.arangeo iv) np.eye( ) v) np.linspace( ) **(10 Marks)**

b. What is the use of Pandas library? Explain series and DataFrame data structures. Write code block to create a series with 10 random values ranging from 1 to 40 and store only the values greater than 20 into another series. **(10 Marks)**

Module-4

7 a. Explain the categories of optimal arguments in Pandas CSV read function. Write a python program to read a CSV file and load into a DataFrame and also write the contents of the DataFrame to a CSV file by selecting only chosen columns from the DataFrame. **(10 Marks)**

b. Write a python program to python the following operations :
i) Connect to a database
ii) Execute a simple select query
iii) Load the returned data into a DataFrame
iv) Display the dataframe contents
v) Insert a row into the database table. **(10 Marks)**

OR

8 a. Write a python program to perform the following operations.
i) Read two CSV files and load it into a DataFrame
ii) Concatenate the two CSV files contents stored in DataFrame
iii) Drop 'na' values
iv) Change column names
v) Fill missing values using fillna( ) **(10 Marks)**

b. Explain the following data transformation functions
i) duplicated ( ) ii) drop – duplicates( ) iii) map( ) iv) replace( ) v) isnull( ). **(10 Marks)**

Module-5

9 a. Write a python program to plot a simple Sinusoidal and cosine waves using Matplotlib. Using appropriate instruction apply line color as blue and line style as dotted for sine wave, set line floor as green for Cosine wave and fix the 'x' and 'y' axis range along with plot labels and legend. **(10 Marks)**

b. Write a python program to plot a histogram of the data of percentage secured by students. Customize the following settings :

i) Chang to gray background

ii) Draw a solid white line grid **(10 Marks)**

OR

10 a. What is the purpose of Matplotlib library? Explain the various types of plot that can be drawn using Matplotlib along with the name of respective plot function. **(10 Marks)**

b. List the shortcomings of Matplotlib and advantages of seaborn over Matplotlib. Write code block to plot normal distributed data using Seaborn kdeplot( ) (Kernel density estimation). **(10 Marks)**

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