Name: **Enrolment No:**	

UPES

End Semester Examination, May 2024

Course: Python Programming — **Semester: IV**

Program: B. Tech (Applied Petroleum Engineering, Upstream) — **Time : 03 hrs.**

Course Code: CSEG2039 — **Max. Marks: 100**

Instructions: (a) This is a closed book exam. Possessing a mobile phone and any other communication devices during the exam is strictly prohibited. (b) Avoid hard coding. (c) Use correct indentation

SECTION A (5Q x 4M = 20 Marks)

S. No.	Statement of the question	Marks	CO
Q 1	Write a python code to (a) define a list with named **lst** containing the following four elements below: **90 3.14 crude oil sour water** (b) define an object named **second** that belongs to an empty class named, **time**	**4**	**CO1**
Q 2	Write a python code to (a) define a dictionary named **water** that can store the following properties of water with density (1000), viscosity (0.01) and specific heat (4.186), (b) find all the keys of the **water**, (c) modify the viscosity to 0.05	**4**	**CO1** **CO3**
Q 3	Write a python code to (a) define a complex number (named **vector**) with 2 and 5 as the real part and imaginary part, respectively, (b) define a user define function named **sqr** that returns the square of an input number, (c) find the square of the number 625, using the function **sqr**	**4**	**CO1** **CO3**
Q 4	Write a python code to create (a) identity matrix (20 rows, 20 columns), and (b) a matrix (1 row, 20 columns) that contains only zero. (c) print the following words in its exact form as output containing all alphabets and special characters shown in bold fonts. **"python's \n code"**	**4**	**CO1**
Q 5	Write a python code to plot the data shown in **Table 1**. The exact final output is shown in **Fig. 1**	**4**	**CO1** **CO3**

SECTION B (4Q x 10M = 40 Marks)

Q 6	Write a python code to **(a)** define a function named **square** that draws a square of any desired length, orientation, and can be placed in desired location (x, y), **(b)** define a function named **triangle** that draws an equilateral triangle of any desired length, orientation, can be placed in desired location (x, y), **(c)** use the two functions (**square** and **triangle**) to draw the image shown in **Fig. 2.** All the squares and triangles are of length 100 units.	**10**	**CO1** **CO2** **CO3** **CO4**

Q 7	Write a python program to define an array (named **mat1**) containing 1 ***2*** 3 (elements of 1st row), 4 ***5*** 6 (elements of 2nd row) and 7 ***8*** 9 (elements of 3rd row). (b) Use slicing, to create a variable named **mat2** that only contains the elements of mat1 which are **bold and italics**.	**10**	**CO1** **CO2** **CO3**
Q 8	(a) Write python codes to define a class named **gas**. The class should contain the following attributes: **Name of gas, Molecular weight, boiling point in °C, density in g/L, specific gravity** (b) Create five instances of the class gas. The name and their properties are given in **Fig 3**. (c) Write lines of codes to identify the gas with highest molecular weight. (d) Write lines of codes to identify the gas with lowest density	**10**	**CO1** **CO2** **CO3** **CO4**
Q 9	Write python code to define a function (named **one_d**) that converts a nested list and return a one-dimensional list. Include lines of code to test your function with the input arguments given in **Table 2**. In case the function is correct, you should obtain the exact return value as in **Table 2**. **OR** Write a python code to print the following pattern of **cone** exactly as shown. c co con cone	**10**	**CO1** **CO2** **CO3** **CO4**
SECTION-C (2Q x 20M = 40 Marks)			
Q 10	Write a python program to create three numbers of classes, named as **A**, **B**, and **C**. **B** contains a method to find the sum of number series (such as 1, 2, 3, 4, 5, 6, and many more). While, **A** contains method to find the sine of angle (in degree). While, class **C** do not have any such methods defined. $$\frac{3+4+5+6+7+8+9+10}{\sin(30)}$$ Write a python program to evaluate the above expression only using the object that belongs to class **C**. Use appropriate names of your choice. **OR** Imagine that a file named **solution.csv** is stored in IDLE working directory or folder. The data in rows and columns are shown in **Table 1.** Write a python program to find the concentration of acetic acid for all samples. $\left(c = \frac{volume\ of\ acetic\ acid}{volume\ of\ acetic\ acid + volume\ of\ water}\right)$	**20**	**CO1** **CO2** **CO3** **CO4**
Q 11	Analyze the python codes below to predict the outputs: (2 marks each) (i) print(5 // 3) Output: _____ (ii) print(5 % 3) Output: _____ (iii) str1 = "python's code" print(str1[6]) Output: _____ (iv) print(str1[1:4]) Output: _____	**20**	**CO1** **CO2** **CO3**

	(v) water = [] water.append("boil") print(water) Output: _____ (vi) word = "ab" for i in word: print("welcome {}".format(i)) Output: _____ (vii) print(len("python")) Output: _____ (vii) a, b, c, d = 1, 2, 3, 4 print(d > c**b) Output: _____ (viii) print(c > b or a > d) Output: _____ (ix) print(5 in [7.675, "float", 5]) Output: _____ (x) print(type({1, 2, "hello"})) Output: _____		

Table 1: Sample of acetic acid and water mixed at different volume ratios.

Sample	acetic acid (ml)	water (ml)
A	1	5
B	2	4
C	3	3
D	4	2
E	5	1

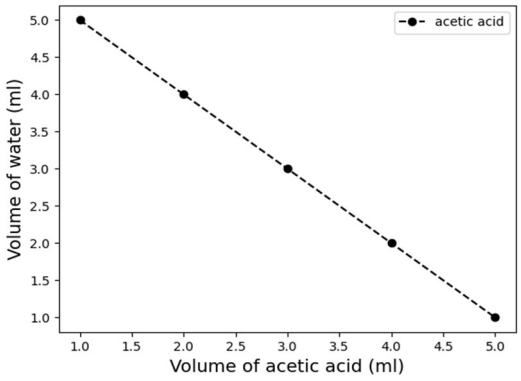

Fig 1: Expected output of the graph

Table 2: Input arguments and its corresponding expected output when we print.

Input arguments	Expected output	
[[1] , [2] , [3] , [4] , [5]]	[1, 2, 3, 4, 5]	
[[1, 2], [3, 4], [5, 6, 7, 8]]	[1, 2, 3, 4, 5, 6, 7, 8]	

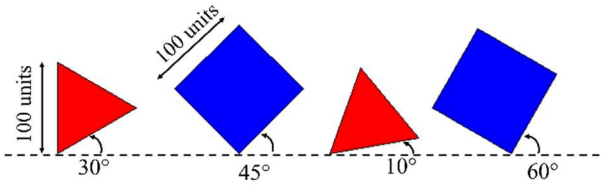

Fig. 2: Length and orientation of triangles and squares

Gas	Molecular weight	Boiling point 1 atm °C (°F)	Density at 60 °F (15.6 °C), 1 atm g/l	Density at 60 °F (15.6 °C), 1 atm Relative to air = 1
Methane	16.043	−161.5 (−258.7)	0.6786	0.5547
Ethylene	28.054	−103.7 (−154.7)	1.1949	0.9768
Ethane	30.068	−88.6 (−127.5)	1.2795	1.0460
Propylene	42.081	−47.7 (−53.9)	1.8052	1.4757
Propane	44.097	−42.1 (−43.8)	1.8917	1.5464

Fig 3: Properties of various gases.