Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering
End Sem Examination May-2023
RA3CO32 Python for Robotics Engineers

Programme: B.Tech. Branch/Specialisation: RA

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. If a= "This is an experiment", then str(a[4:-1]) will give output as- **1**
(a) ' is an experimen' (b) ' is an experiment'
(c) ' is an ' (d) 'is an experi'

ii. If l = [3,5,78,345,465,5678], then l [2] will give output as- **1**
(a) 3 (b) 5 (c) 78 (d) 345

iii. If c = np.array ([[2,3,4,5],[4,7,8,4],[5,8,3,2]]), Then c.shape will give output as- **1**
(a) (3, 4) (b) (4,3) (c) (4,4) (d) (3,3)

iv. Which of the following method creates a new array object that looks at the same data? **1**
(a) view (b) copy (c) paste (d) All of these

v. Which of the following line/curve is useful in determining the failure point according to fatigue criteria? **1**
(a) Gerber Line/curve (b) Goodman Line
(c) Soderberg line (d) All of these

vi. The region of safety in maximum shear stress theory contains which of the given shape- **1**
(a) Hexagon (b) Rectangle (c) Square (d) None of these

vii. In diesel cycle heat rejection occurs at _____. **1**
(a) Constant volume process (b) Constant pressure process
(c) Constant temperature process (d) Constant enthalpy process

viii. Which libraries will be used in a program for calculating and plotting fluid streamlines? **1**
(a) Numpy (b) Matplotlib.pyplot
(c) Both (a) and (b) (d) None of these

P.T.O.

ix. Point out the correct combination with regards to kind keyword for graph plotting. **1**
(a) 'hist' for histogram (b) 'box' for boxplot
(c) 'area' for area plots (d) All of these

x. Which of the following is implemented on DataFrame to compute the correlation between like-labeled Series contained in different DataFrame objects? **1**
(a) corrwith (b) corwith (c) corwit (d) None of these

Q.2 i. How is python advantageous over C++? **2**
ii. Explain all types of numerical operators in python. **8**
OR iii. Explain the programming process for List, Tuple and Dictionary in Python. Also write their uses. **8**

Q.3 i. What are the uses of Numpy? **2**
ii. Write a program to give table of 8 in output. **8**
OR iii. Write a program to draw contour plots in python. **8**

Q.4 i. Write the mathematical equations helpful in describing Simple Spring Mass system. **2**
ii. Write a program for plotting of Von Mises Region. Show some example to illustrate the utility of Von Mises plot. Also draw the graphical output. **8**
OR iii. Write a program to plot shear force diagram of a cantilever beam of length l meters and having a point load of W newtons at the end of beam. Also draw the graphical output. **8**

Q.5 i. Draw p-v diagram of Diesel cycle. Also label the processes. **2**
ii. Write a program to plot streamlines of fluid flow. Also draw the graphical output. **8**
OR iii. Explain how python can be helpful in solving one dimensional and two-dimensional heat equations. **8**

Q.6 Attempt any two:
i. Write a program for Newton Raphson Method. **5**
ii. Write a program for Linear Differential Problem. **5**
iii. Write a short note on Data Interpretation. **5**

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Marking Scheme

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Q.1	i)	a) ' is an experimen'	**1**
	ii)	c) 78	**1**
	iii)	a) (3, 4)	**1**
	iv)	a) view	**1**
	v)	d) all of the above	**1**
	vi)	a) Hexagon	**1**
	vii)	a) constant volume process	**1**
	viii)	c) Both	**1**
	ix)	d) all of the mentioned	**1**
	x)	a) corrwith	**1**
Q.2	i.	Reason	**2**
	ii.	Numerical operators like addition, subtraction, remainder, division, etc multiplication, modular,exposention	**8**
OR	iii.	Commands -List Floor Division 1.25 Marks for each other	**2**
		Commands -Tuple	**2**
		Commands – Dictionary	**2**
		Uses	**2**
Q.3	i.	Uses	**2**
	ii.	Program step by step	**8**
OR	iii.	Program step by step	**8**
Q.4	i.	Equation	**2**
	ii.	Program step by step	**6**
		Output	**2**
OR	iii.	Program step by step	**6**
		Output	**2**
Q.5	i.	p-v diagram	**2**
	ii.	Program step by step	**6**
		Output	**2**
OR	iii.	One dimensional	**4**

		Two dimensional	**4**
Q.6		Attempt any two	
	i.	Program step by step	**5**
	ii.	Program step by step	**5**
	iii.	Short note	**5**

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