

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) What is Navie Bayes Classification?	6	1	K2
	b) What is Reinforcement learning?	4	1	K2
(OR)				
2.	What are the performance evaluation metrics of Classifiers and explain them each?	10	1	K2
<u>UNIT-II</u>				
3.	What are the Performance evaluation metrics of Clustering and explain them?	10	2	K2
(OR)				
4.	a) What are some applications of <i>Unsupervised Learning</i> ?	4	2	K2
	b) What are the difference between Clustering and classification.	6	2	K2
<u>UNIT-III</u>				
5.	Compute the Linear Discriminant projection for the following two-dimensional dataset n $X1=(x1,x2)=\{(4,1),(2,4),(2,3),(3,6),(4,4)\}$ n $X2=(x1,x2)=\{(9,10),(6,8),(9,5),(8,7),(10,8)\}$	10	3	K2
(OR)				
6.	a) What are the advantages of LDA?	5	3	K2
	b) Explain PCA in detail.	5	3	K2
<u>UNIT-IV</u>				
7.	What is the support vector machine? Explain SVM for classification.	10	4	K3
(OR)				
8.	What are the SVM Kernel functions and explain any two?	10	4	K2
<u>UNIT-V</u>				
9.	a) Explain Polynomial Regression	4	5	K2
	b) What are the Regularization methods and explain each?	6	5	K2
(OR)				
10.	a) Explain R-square and goodness of fit with one example each?	4	5	K2
	b) Explain Influential Observations of linear and logistic regression. .	6	5	K2
<u>UNIT-VI</u>				
11.	Explain Error Back-Propagation training networks and explain with suitable example.	10	6	K2
(OR)				
12.	a) Explain Generalized delta learning rule.	6	6	K2
	b) Explain Recurrent NN?	4	6	K2

AR20**CODE: 20DSI302****SET-2****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI****(AUTONOMOUS)****III B.Tech I Semester Regular Examinations, January, 2023****DATA HANDLING AND VISUALIZATION****(Honors / Minor)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Describe the Cartesian Coordinate System.	5	1	1,2,3
	b) Demonstrate temperature data on the coordinate system.	5	1	2,3
(OR)				
2.	a) Describe Coordinate systems with curved axes with an suitable example	5	1	2,3
	b) Explain Uncertainty in directory of visualizations	5	1	3
<u>UNIT-II</u>				
3.	a) Describe empirical cumulative distribution functions	5	2	3
	b) Describe Quantile – Quantile plots in data visualization	5	2	2,3
(OR)				
4.	a) Describe how to visualize single distributions with an example	5	2	3
	b) Demonstrate how to visualize distributions along the horizontal axis	5	2	2,3
<u>UNIT-III</u>				
5.	Explain the different approaches to visualize nested proportions with Mosaic plot, Tree map, nested Pies and parallel sets.	10	3	3
(OR)				
6.	Explain different scenarios that each call for a different type of visualization.	10	3	3
<u>UNIT-IV</u>				
7.	Discuss Visualize Time Series with line graph & scatter plot of an independent variable.	10	4	2,3
(OR)				
8.	Explain different visualizing associations among two or more quantitative variables.	10	4	3
<u>UNIT-V</u>				
9.	Define Datum. Visualize Geospatial Data in Projections & Layers	10	5	1,2,3
(OR)				
10.	a) Describe framing of probabilities as frequencies in Uncertainty	5	5	2,3
	b) Describe Hypothetical outcome plots	5	5	2,3
<u>UNIT-VI</u>				
11.	a) Explain visualizations along Linear axes	5	6	2,3
	b) Explain visualizations along Logarithmic axes	5	6	2,3
(OR)				
12.	Discuss common pitfalls of Color use and design considerations	10	6	1,2,3

Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Define step angle. Explain the operation of a variable reluctance stepper motor.	5	2	Understand
	b) With a block diagram, explain the closed loop control of a stepper motor.	5	2	Apply
(OR)				
2.	a) With neat diagrams, explain in detail the constructional details of a stepper motor.	5	2	Apply
	b) Discuss the open loop control of a stepper motor.	5	2	Understand
<u>UNIT-II</u>				
3.	a) Draw the constructional details of an SRM and explain its operating principle.	5	1	Apply
	b) Analyse the reasons for ripples in torque produced by the SRM. Also list various applications of SRM.	5	1	Analyse
(OR)				
4.	a) What is the need for position sensor in SRM control? Explain.	5	1	Understand
	b) With the help of a neat schematic diagram, explain the closed loop control of an SRM.	5	1	Apply
<u>UNIT-III</u>				
5.	What are the merits of brushless DC motors? With a neat block diagram, explain the closed loop control of a BLDC motor.	10	3	Understand
(OR)				
6.	a) Draw and discuss the back emf waveforms of a three phase BLDC motor.	5	3	Apply
	b) With a neat schematic diagram, explain the sensorless control of a three phase BLDC motor.	5	3	Apply
<u>UNIT-IV</u>				
7.	a) Explain in detail the working principle of Linear synchronous Motors.	5	4	Understand
	b) Give the analysis of Linear Induction motor in terms of electromagnetic equations.	5	4	Analyse
(OR)				
8.	Explain how the single sided linear induction motor is used for traction drive applications.	10	4	Apply
<u>UNIT-V</u>				
9.	a) Develop the equivalent circuit of Permanent magnet DC Motor.	5	5	Apply
	b) Explain the working principle of Permanent Magnet DC Motors	5	5	Understand
(OR)				
10.	a) What is a PMDC motor? Explain its working.	5	5	Understand
	b) Derive the expression for torque of a PMDC motor.	5	5	Apply
<u>UNIT-VI</u>				
11.	a) What are the different types of DC motors suitable for Traction?	5	6	Understand
	b) A train driven by separately excited dc motors has better co-efficient of adhesion than driven by series motor. Justify the statement. Draw the simplified speed/time curve for the main line services and show all necessary periods.	5	6	Analyse
(OR)				
12.	a) Discuss the main characteristics of traction drives.	5	6	Understand
	b) Compare between DC traction and AC traction.	5	6	Analyse

Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a) Explain how accuracy of a sensor is measured in detail.	5M	CO1	Understand
	b) Discuss about Resolution and Dynamic characteristics of sensors.	5M	CO1	Understand
	(OR)			
2.	a) Elaborate the role of a transfer function of sensor.	5M	CO1	Understand
	b) Discuss about hysteresis with neat diagrams.	5M	CO1	Understand
	<u>UNIT-II</u>			
3.	a) Explain in detail about potentiometric sensors.	5M	CO2	Understand
	b) Explain the working principle of LVDT sensors	5M	CO2	Understand
	(OR)			
4.	a) Illustrate how an IR sensor can be used in automation.	5M	CO2	Apply
	b) Explain the working of a Hall Effect sensor.	5M	CO2	Understand
	<u>UNIT-III</u>			
5.	a) Discuss about accelerometer characteristics.	5M	CO3	Understand
	b) Explain about Thermal Accelerometers in neat schematics.	5M	CO3	Understand
	(OR)			
6.	a) Illustrate any three real time applications of Accelerometer.	5M	CO3	Apply
	b) Explain the working principle of Piezoelectric Accelerometers.	5M	CO3	Apply
	<u>UNIT-IV</u>			
7.	a) Explain any one real time application which may use a mercury pressure sensor in detail.	5M	CO4	Apply
	b) Illustrate the working principle of Piezoresistive sensors.	5M	CO4	Understand
	(OR)			
8.	a) Explain about the working principle of Bellows with neat schematics.	5M	CO4	Apply
	b) Compare various optoelectronic sensors on various aspects.	5M	CO4	Understand
	<u>UNIT-V</u>			
9.	a) Explain any one distance measurement application using ultrasound sensor.	5M	CO5	Apply
	b) Explain the working of capacitive microphone.	5M	CO5	Understand
	(OR)			
10.	a) Explain how an Ultrasonic sensor can be used to replicate RADAR principle.	5M	CO5	Apply
	b) Compare different types of Microphones.	5M	CO5	Understand
	<u>UNIT-VI</u>			
11.	a) In farm based applications explain the role of thermal, humidity and moisture based sensors.	5M	CO6	Apply
	b) Illustrate about thermistors and explain how temperature can be measured.	5M	CO6	Understand
	(OR)			
12.	a) Explain any one home automation IOT application using thermal, humidity and moisture sensors.	5M	CO6	Apply
	b) Discuss about optical hygrometer with neat diagrams.	5M	CO6	Understand

AR20**CODE: 20ROI302****SET-2****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****III B.Tech I Semester Regular Examinations, January, 2023
KINEMATICS AND DYNAMICS OF ROBOT MANIPULATOR
(Honors / Minor)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | | Marks | CO | Blooms Level |
|----|---|-------|-----|--------------|
| 1. | A frame F has been moved 10 units along the y-axis and 5 units along the z-axis of the reference frame. Find the new location of the frame $F = \begin{bmatrix} 0.527 & -0.574 & 0.628 & 5 \\ 0.369 & 0.819 & 0.439 & 3 \\ -0.766 & 0 & 0.643 & 8 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ | 10 | CO1 | Applying |

(OR)

- | | | | | |
|----|---|----|-----|----------|
| 2. | A point $p(2,3,4)^T$ is attached to a rotating frame. The frame rotates 90° about the x-axis of the reference frame. Find the coordinates of the point relative to the reference frame after the rotation. | 10 | CO1 | Applying |
|----|---|----|-----|----------|

UNIT-II

- | | | | | |
|----|---|----|-----|----------|
| 3. | A point $p(7,3,1)^T$ is attached to a frame F_{noa} and is subjected to the following transformations. Find the coordinates of the point relative to the reference frame at the conclusion of transformations.
1. Rotation of 90° about the z-axis,
2. Followed by a rotation of 90° about the y-axis,
3. Followed by a translation of $[4,3,7]$ | 10 | CO2 | Applying |
|----|---|----|-----|----------|

(OR)

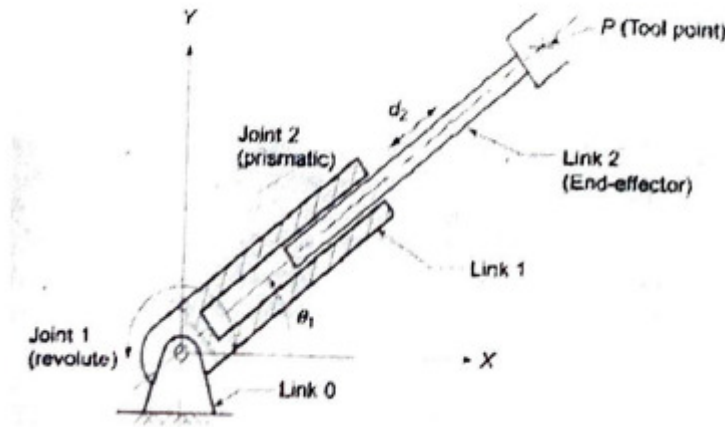
- | | | | | |
|----|---|----|-----|----------|
| 4. | Calculate the matrix representing $\text{Rot } x; 40^\circ$ | 10 | CO2 | Applying |
|----|---|----|-----|----------|

UNIT-III

- | | | | | |
|----|--|----|-----|----------|
| 5. | Explain with a neat sketch about roll, pitch, and yaw in forward and inverse kinematic equations in a robot co-ordinate system | 10 | CO3 | Applying |
|----|--|----|-----|----------|

(OR)

- | | | | | |
|----|---|----|-----|----------|
| 6. | Obtain the position and orientation of tool point 'P'
(Assume suitable dimensions) | 10 | CO3 | Applying |
|----|---|----|-----|----------|



UNIT-IV

- | | | | | |
|----|--|----|-----|----------|
| 7. | Solve for the coefficients of two cubics that are connected in a two-segment spline with continuous acceleration at the intermediate via point. The initial angle is θ_0 the via point is θ_v and the goal point is θ_g | 10 | CO4 | Applying |
|----|--|----|-----|----------|

(OR)

- | | | | | |
|----|--|----|-----|----------|
| 8. | It is desired to have the first joint of a 6-axis robot go from an initial angle of 30° to a final angle of 75° in 5 seconds. Using a third-order polynomial, calculate the joint angle at 1, 2, 3, and 4 seconds. | 10 | CO4 | Applying |
|----|--|----|-----|----------|

UNIT-V

- | | | | | |
|----|---|----|-----|---------------|
| 9. | Explain translation, rotation, and combined translation and rotation of the robot with suitable illustrations | 10 | CO5 | Understanding |
|----|---|----|-----|---------------|

(OR)

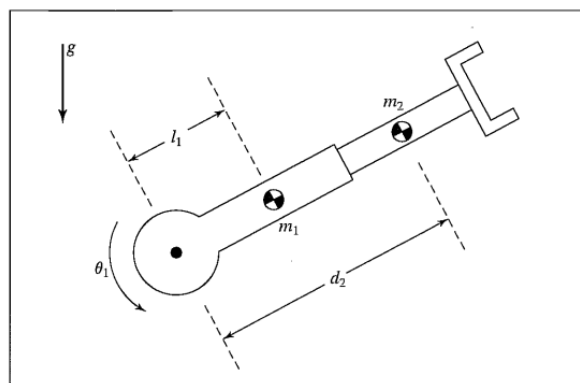
- | | | | | |
|-----|---|----|-----|----------|
| 10. | Find out the $T_{6/J_{11}}$ and $T_{6/J_{41}}$ elements of the Jacobian for the simple revolute robot | 10 | CO5 | Applying |
|-----|---|----|-----|----------|

UNIT-VI

- | | | | | |
|-----|--|----|-----|---------------|
| 11. | Formulate manipulator dynamics in cartesian space using langraian-euler formulation. | 10 | CO6 | Understanding |
|-----|--|----|-----|---------------|

(OR)

- | | | | | |
|-----|--|----|-----|----------|
| 12. | Derive the Cartesian-space form of the dynamics for the two-link planar arm of robot shown in figure. Write the dynamics in terms of a frame attached to the end of the second link. | 10 | CO6 | Applying |
|-----|--|----|-----|----------|



Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | | Marks | CO | Blooms Level |
|-------|--|-------|----|--------------|
| 1. a) | Identify the components of smart energy management system. | 5 | 1 | Understand |
| b) | Discuss the challenges for energy efficiency of highly urban cities. | 5 | 1 | Understand |

(OR)

- | | | | | |
|-------|--|---|---|------------|
| 2. a) | Discuss the significance of the term smart energy pertaining to efficient energy management. | 5 | 1 | Understand |
| b) | Discuss the energy efficiency aspects of net zero building. | 5 | 1 | Understand |

UNIT-II

- | | | | | |
|-------|---|---|---|------------|
| 3. a) | Discuss the opportunities for developing solar cities. | 5 | 2 | Understand |
| b) | Illustrate greenhouse effect principle for solar thermal energy conversion. | 5 | 2 | Apply |

(OR)

- | | | | | |
|-------|---|---|---|------------|
| 4. a) | Explain need of electric vehicles. | 5 | 2 | Understand |
| b) | Elaborate on functional blocks of solar PV energy conversion. | 5 | 2 | Understand |

UNIT-III

- | | | | | |
|-------|---|---|---|-------|
| 5. a) | Interpret how EV ecosystem contribute for smart city energy management. | 5 | 3 | Apply |
| b) | Electric vehicles could be utilized for peak power supply. Justify. | 5 | 3 | Apply |

(OR)

- | | | | | |
|-------|--|---|---|------------|
| 6. a) | Describe the significant power train and power supply components of electric vehicles. | 5 | 3 | Understand |
| b) | Demonstrate the electrical standards for Level-1, Level-2 and fast chargers. | 5 | 3 | Apply |

UNIT-IV

- | | | | | |
|-------|--|---|---|-------|
| 7. a) | Discuss the objectives of smart transportation for urban community. | 5 | 4 | Apply |
| b) | Justify the significance of non-motorized transport for smart city transport system. | 5 | 4 | Apply |

(OR)

- | | | | | |
|-------|---|---|---|------------|
| 8. a) | Detail the functioning of various components of smart urban transport system. | 5 | 4 | Understand |
| b) | Discuss the alternate approaches for energy efficient urban transport management. | 5 | 4 | Understand |

UNIT-V

- | | | | | |
|-------|--|---|---|------------|
| 9. a) | Describe application aspects of real time traffic information system. | 5 | 5 | Understand |
| b) | Illustrate the importance of smart parking system in real time traffic monitoring. | 5 | 5 | Understand |

(OR)

- | | | | | |
|--------|--|---|---|------------|
| 10. a) | Interpret the features of automated fare collection. | 5 | 5 | Understand |
| b) | Discuss the smart transport solutions for commercial vehicles. | 5 | 5 | Understand |

UNIT-VI

- | | | | | |
|--------|--|---|---|---------|
| 11. a) | Illustrate smart education initiatives made in Indian digital cities. | 5 | 6 | Analyse |
| b) | Demonstrate objectives of net zero energy plus smart buildings adopted at smart cities of the country. | 5 | 6 | Analyse |

(OR)

- | | | | | |
|--------|--|---|---|---------|
| 12. a) | Discuss the successful solar energy management system. | 5 | 6 | Analyse |
| b) | Explain intelligent signalling system . | 5 | 6 | Analyse |

AR18

CODE: 18IET321

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B. Tech I Semester Supplementary Examinations, January, 2023

FUNDAMENTALS OF FUZZY LOGIC

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- 1 Let **A, B and C** be the fuzzy sets defined as 12M
 $A = \{(x_1, 0.2), (x_2, 0.1), (x_3, 1), (x_4, 0.8)\}$, $B = \{(x_1, 0.6), (x_2, 0.2), (x_3, 0), (x_4, 0.5)\}$
 $C = \{(x_1, 0.1), (x_2, 0.25), (x_3, 0.11), (x_4, 1)\}$. Find 1. $(A \cup B)$ 2. $(A \cup B) \cup C$
3. $(A \cap B) \cap C$ 4. $(A \cap B)^c$ 5. $A^c \cap B^c$ 6. $(A \cap B) \cup (A \cap C)$
(OR)
2 Let $\mu_B = \left\{\frac{0.5}{60}, \frac{0.8}{40}, \frac{1}{20}\right\}$, $\mu_T = \left\{\frac{0.9}{10}, \frac{0.6}{8}, \frac{0.4}{6}\right\}$ and $\mu_U = \left\{\frac{1}{0.9}, \frac{0.6}{0.7}, \frac{0.4}{0.6}\right\}$ find the following relations 1. 12M
 $R = B \times T$ 2. $S = T \times U$ 3. $R \circ S$.

UNIT-II

3. a) Let $A = \left\{\frac{0.1}{x_1}, \frac{0.9}{x_2}, \frac{0}{x_3}\right\}$, $B = \left\{\frac{0}{y_1}, \frac{1}{y_2}, \frac{0}{y_3}\right\}$, if $B' = \left\{\frac{0.2}{y_1}, \frac{1}{y_2}, \frac{0.3}{y_3}\right\}$, find A' using generalized Modus 6M
Tollens.
b) Give a brief explanation on : (i) Fuzzy Propositions, (ii) Fuzzy Connectives (iii) Fuzzy 6M
Inference
(OR)
4. Given the fuzzy sets A & B on X & Y, as $A = 1 - 0.2x, x \in [0, 5]$; $B = 0.25y, y \in [0, 4]$, 12M
(a). Construct a fuzzy relation R for the implication $A \rightarrow B$
b). Using max-min composition, find B' given $A' = \left\{\frac{1}{3}\right\}$

UNIT-III

5. a) Construct a fuzzy set using “Lagranges Interpolation” method for the following data: 6M
 $\{(0, 0), (0.5, 0.2), (0.8, 0.9), (1, 1), (1.2, 0.9), (1.5, 0.2), (2, 0)\}$. Draw the diagrams.
b) Explain the “Direct method with multiple experts” in construction of a fuzzy set. Give an 6M
example.
(OR)
6. a) Explain the method of construction of fuzzy set. Give an example. 6M
b) Explain the “Direct method with one expert” in construction of a fuzzy set. Give an example. 6M

UNIT-IV

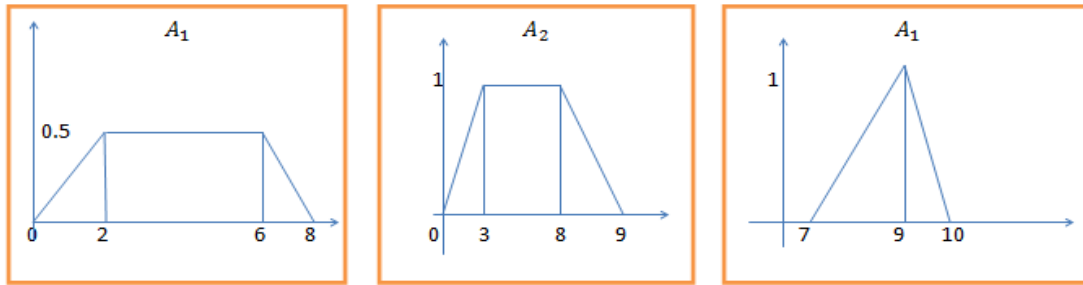
7. a) Explain the working of “Fuzzy Rule Base”. 6M
b) Explain the process of Fuzzification. 6M

(OR)

8. Design a Fuzzy controller for a train of a station whose inputs are distance (D) from a station of range 0 to 100 Km, Speed of a train (S) of range 0 to 80 km per Hour. The output is Break power (P) used to control the train. Find the break power (P) when the train is at a distance (D)= 50 km. And speed of the train (S) =60 km. Per hour. 12M

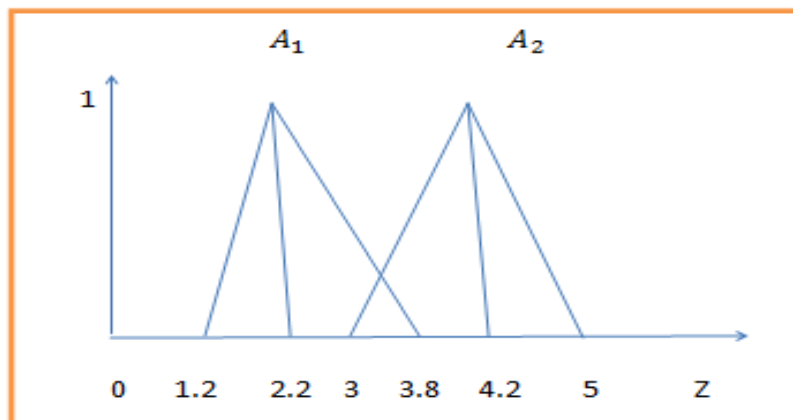
UNIT-V

9. Given three fuzzy sets A_1 , A_2 & A_3 as shown below, Calculate the defuzzified value of z^* using 12M
 1. Centroid Method 2. Centre of Sums method 3. Mean of Maxima method



(OR)

10. For the union of two fuzzy sets A_1 & A_2 as shown below, Calculate the defuzzified avalue of z^* 12M
 using 1. Centroid Method 2. Center of Sums method 3. Mean of Maxima method



AR18

CODE: 18IET325

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, January, 2023

PRINCIPLES OF MECHANICAL MEASUREMENTS

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. Distinguish between the following. 12
 - i. Accuracy and precision
 - ii. Resolution and Threshold
 - iii. Reproducibility and repeatability
 - iv. Dead zone and Hysteresis
- (OR)**
2. Explain the following terms: 12
 - i. Speed of response
 - ii. Sensitivity
 - iii. Dead time
 - iv. Dead Zone

UNIT-II

3. Describe the construction, working and theory of Bourdon tube for measurement of pressures? 12
- (OR)**
4. Explain the working of ultrasonic flow meters. Explain the different techniques used for measurement of flow velocity. What are the advantages and disadvantages of these flow meters? 12

UNIT-III

5. What is thermocouple? With a neat sketch explain its construction, working principle and applications. 12
- (OR)**
6. Explain working of gas filled thermometer with neat sketches? 12

UNIT-IV

7. Describe in detail the construction and working of an inductive and a capacitive transducers to measure linear displacement. 12
- (OR)**
8. Differentiate between resistive, inductive, capacitance type transducers? 12

UNIT-V

9. Explain principle and working of proving ring and its applications? 12
- (OR)**
10. Describe in detail the construction and working of dynamometer? 12

AR18

CODE: 18IET329

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, January, 2023

PYTHON PROGRAMMING

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Brief introduction of history & features of Python. 6M
b) Explain Python environment setup & modes of running programs using IDLE. 6M
- (OR)**
2. a) Classify the basic data types in Python with suitable examples. 6M
b) Explain Python built-in functions & type casting with suitable examples. 6M

UNIT-II

3. a) Illustrate Python conditional suites (if, if...else, if...elif...else, nested). 6M
b) Illustrate Python loop control statements (break, continue, pass). 6M
- (OR)**
4. a) Explain indentation, multiline statements, quotation, comments in Python. 6M
b) Write a Python program to check password for a user id. 6M

UNIT-III

5. a) Explain the operation of concatenation, repetition, indexing, slicing in Python sequences. 6M
b) Explore the working of **string** operations & functions in Python. 6M
- (OR)**
6. a) Explore the working of **list** operations & functions in Python. 6M
b) Explore the working of 'user-defined' functions with a Python program. 6M

UNIT-IV

7. a) Define Error. Classify the Errors in a PYTHON program. 6M
b) Explore the working of single and multiple exceptions with a Python program. 6M
- (OR)**
8. a) Define file. Describe file I/O (read, write, append) functions in Python. 6M
b) Write a Python program to count lines, words & characters in a text file. 6M

UNIT-V

9. a) Overview of OOPs features in Python. 6M
b) Define 'class' & 'object' with a suitable Python program. 6M
- (OR)**
10. a) Explain the concept of Data Hiding with a Python program. 6M
b) Illustrates the concept of Class Inheritance with a Python program. 6M

AR18

CODE: 18IET32A

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, January, 2023

ADVANCED CODING – I

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Define String. Explain String slicing with example. Also write any four string manipulation functions in python. 8M
- b) Develop a python code to solve the following problem. 4M
Given 4 numbers, the task was to check whether fourth number can be obtained using arithmetic operators (+,-,X) between other three numbers. Knowing that an operator can be used only once. input will contain 4 integers and out will be **Yes** if you found fourth number using three otherwise **No**.

Sample Test case:

Input:

3 4 5 23

Output:

Yes

(OR)

2. a) What is the difference between Mutable and Immutable Sequence? Explain with example. 8M
- b) Develop a python code to solve the following problem. 4M
A pangram is a string that contains every letter of the alphabet. Given a sentence determine whether it is a pangram in the English alphabet. Ignore case. Input consists of a string and output should Print "Yes" if pangram otherwise "No".

Sample Test case:

Input:

The quick brown fox jumps over the lazy dog

Output:

Yes

UNIT-II

3. a) Explain creating user defined exception with example. 6M
- b) Define Polymorphism. How it can be achieved in python? Give example(s). 6M

(OR)

4. a) Define exception. How python handle exceptions? Give example(s). 6M
- b) With example, explain constructor and destructor in python. 6M

UNIT-III

5. a) What are Efficiency measures of an Algorithm? Explain. 6M
- b) Solve the following time complexity recurrence relation using back substitution method. 6M

$T(n) = 2T(n-2) + n, T(1)=1$

(OR)

1 of 2

6. a) Explain the characteristics of an algorithm. 6M
b) Explain the Asymptotic notations used for complexity representation. 6M
Evaluate the time complexity of the following code.
m = i = 1
while(m < n):
 m = m + i
 i += 1
j = 1
while(j <= m):
 print(j)
 j *= 2

UNIT-IV

7. a) What is Josephus Circle problem. Give a solution using python. 6M
b) Develop a python code to solve the following problem. 6M
Given an integer array with n elements check if it contains a sub array having Zero-sum if such array exists print exists otherwise not exists.
Sample Test case:
Input: 3 4 -7 3 1 3 1 -4 -2 -2
Output: Exists

(OR)

8. a) Develop a python code to solve the following problem. 6M
Count the number of prime numbers in the given range using Sieve of Eratosthenes.
Sample Test case:
Input: 50
Output: 15
b) Implement Extended Euclidean algorithm. Give example. 6M

UNIT-V

9. a) Implement Queue using Linked List. 8M
b) Write an algorithm for the following operations on Double Linked List. 4M
i) Delete at the begin
ii) Traversing the list in reverse
(OR)
10. a) Implement Stack using Queues. 8M
b) Differentiate Array and Linked Lists. 4M

AR13

CODE: 13EC3017

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.TECH I Semester Supplementary Examinations, January, 2023

PULSE AND DIGITAL CIRCUITS
(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is an attenuator?
b) State the lower 3-db frequency of high-pass circuit?
c) Define Series clipper and shunt clipper
d) Draw the circuit diagram of Slicer
e) Define Storage time of a diode
f) Give some applications of Unidirectional Sampling gates
g) Explain the role of Commutating Capacitors?
h) Compare the voltage and current time base generator?
i) Define the term Recovery Time for Astable Multivibrator?
j) Define Settling time, transition time in a Bistable Multivibrator

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

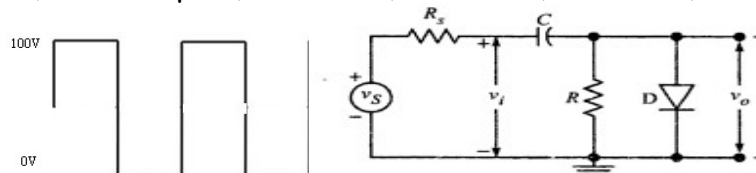
2. a) An ideal 1microsec pulse is fed to an amplifier. Calculate and plot the output waveform under the following conditions: the upper 3-dB frequency is 0.1MHz 6M
b) Explain the response of RC low pass circuit for exponential pulse input signal. 6M
- (OR)
3. a) Describe the relationship between rise time and RC time constant of a low pass RC circuit. 6M
b) Draw the different output waveforms of a RC Low Pass circuit when it is applied with Different inputs like (i) Step-voltage input (ii) pulse input (iii) Square input 6M

UNIT-II

4. a) Explain the response of the clamping circuit when a square wave input is applied under steady state conditions. 6M
b) A pulse of 5 V amplitude and pulse width of 0.5 msec is applied to a high pass RC circuit consisting of $R=22\text{ K ohms}$ and $C=0.47\text{ micro F}$. Sketch the output waveform and determine the percentage tilt in the output. 6M

(OR)

5. a) Draw the basic circuit diagram of positive peak clamper circuit and explain its operation. 6M
b) For the input voltage $V_i=100\text{V}$. Calculate and plot the Steady state output voltage ($T_1=100\mu\text{sec}$, $T_2=1000\mu\text{sec}$, $C=0.1\text{ uF}$, $R=100\text{K}\Omega$, $R_s=100\Omega$, $R_f=100\Omega$) 6M



UNIT-III

6. a) Describe the switching times of BJT by considering charge distribution across the base region. Explain this for cut-off, active and saturation region.. 6M
b) Explain the temperature sensitivity parameters of a transistor 6M
(OR)
7. a) Explain the storage and transition times of the diode as a switch. 6M
b) Explain the operation of bistable multi-vibrator circuit with circuit diagram and waveform 6M

UNIT-IV

8. a) Draw the various wave shapes of the astable multi vibrator. 6M
b) Design a Schmitt trigger circuit using NPN transistors having $h_{fe}(\text{MIN}) = 60$. $V_{be} \text{ cut-off} = 0\text{V}$, $V_{ce}(\text{Sat}) = 0.2\text{V}$ and $V_{be}(\text{Sat}) = 0.7\text{V}$. Given $V_{cc} = 8\text{V}$ and o/p swing = 6V, $UTP = 3.5\text{V}$, $LTP = 1.5\text{V}$, $R_1 = 10\text{K}$ AND $R_2 = 2\text{K}$. Determine R_{c1} , R_{c2} and R_e 6M
(OR)
9. a) Explain how to draw the various waveforms and calculate their voltage levels in an emitter-coupled monostable multi vibrator 6M
b) Explain the operation of Astable multivibrator. 6M

UNIT-V

10. a) Explain the basic principles of Miller and Bootstrap time base generators 6M
b) Define sweep speed error, transmission error and displacement error pertaining to sweep circuits. Also derive the expressions for the same with respect to an exponential sweep circuit. How are linearly varying current waveforms generated? 6M
(OR)
11. a) Explain Transistor miller time base generator. 6M
b) Explain about Sampling gates. 6M