

(COMPUTER SCIENCE AND ENGINEERING)

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.	Define variance and standard deviation and also finds the variance and standard deviation of the following test scores: 85, 90, 92, 88, 82, 95, 91, 87, 89, 93.	10	CO1	L3
(OR)				
2.	What are the different methods of data visualization in statistics and how are they used?	10	CO1	L1
<u>UNIT-II</u>				
3.	Discuss Monte Carlo Method with an example.	10	CO2	L3
(OR)				
4.	Explain the terms Lognormal Distribution, Weibull Distribution, Exponential Distribution, Uniform and Poisson Distribution.	10	CO2	L1
<u>UNIT-III</u>				
5.	Write a short note on Type-I and Type-II errors with examples	10	CO3	L1
(OR)				
6.	Differentiate between Z test and T test.	10	CO3	L4
<u>UNIT-IV</u>				
7.	What are the different data pre-processing steps involved in preparing data for machine learning? Explain each step briefly.	10	CO4	L2
(OR)				
8.	What are the multiple metrics used to measure the performance of machine learning model?	10	CO4	L1
<u>UNIT-V</u>				
9.	What are the different types of methods used for feature selection? Explain any two methods.	10	CO5	L3
(OR)				
10.	What is resampling? Describe the different resampling techniques used in machine learning.	10	CO5	L2
<u>UNIT-VI</u>				
11.	What is logistic regression? How is it different from linear regression? Discuss an application of logistic regression in real-world scenarios.	10	CO6	L5
(OR)				
12.	What is the Naïve-Bayes classifier? Explain how it works and give an example of a problem that can be solved using this algorithm.	10	CO6	L4

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) Write some statistical measures and explain in detail	5	1	2
	b) Explain Univariate and Bivariate analysis	5	1	2
(OR)				
2.	Summarize Probability Distribution and its types in detail.	10	1	2
<u>UNIT-II</u>				
3.	a) Explain User Defined Functions with an Example	5	2	2
	b) Explain Exception Handling in Python	5	2	2
(OR)				
4.	Explain the terms i) class ii) objects iii) constructors iv) Data Abstraction v) Inheritance	10	2	2
<u>UNIT-III</u>				
5.	Discuss the importance of data types in NumPy nd-arrays. Explain the different data types available in Numpy, and provide examples of situations where each data type would be useful.	10	3	5,6
(OR)				
6.	Explain the concept of universal functions in Numpy, and how they enable fast element-wise array computations	10	3	2
<u>UNIT-IV</u>				
7.	Explain the main data Structures in pandas. Discuss how Series and DataFrame are used to represent 1-D and 2-D data	10	4	5,6
(OR)				
8.	Explain how to compute descriptive statistics for data in a pandas DataFrame	10	4	2
<u>UNIT-V</u>				
9.	a) How do you Handle missing data in a pandas Dataframe? Explain Different Methods Available.	5	5	1,2
	b) What are Outliers in a Dataset, and how do you detect and filter them in pandas?	5	5	1
(OR)				
10.	Explain Different types of Plots with Diagrams	10	5	2
<u>UNIT-VI</u>				
11.	What is Matplotlib, and how is it used in data visualization? Explain basic components of a Matplotlib plot.	10	6	1,5
(OR)				
12.	a) What are bar plots in pandas, and how do you create them using the Matplotlib 'plot' function. Explain it with an Example	5	6	1,2
	b) What are scatter or point plots in pandas, and how do you create them using the Matplotlib 'plot' function. Explain it with an Example	5	6	1,2

**INTRODUCTION TO ELECTRICAL VEHICLE TECHNOLOGY
(ELECTRICAL AND ELECTRONICS ENGINEERING)****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. | Discuss the differences between pure electric vehicles and hybrid electric vehicles. | 10 | 1 | Understanding |
| (OR) | | | | |
| 2. | Explain the benefits of electric vehicles and discuss few standards and norms concerned with the electric vehicles. | 10 | 1 | Understanding |
| <u>UNIT-II</u> | | | | |
| 3. | Explain the different power flow control modes of a typical parallel hybrid system with the help of block diagrams? | 10 | 2 | Remembering |
| (OR) | | | | |
| 4. | Explain the major components in a electric power train | 10 | 2 | Remembering |
| <u>UNIT-III</u> | | | | |
| 5. | On what basis a motor is selected in electric vehicle? | 10 | 3 | Understanding |
| (OR) | | | | |
| 6. | Explain Constant Power Speed Ratio as applied to an electric motor? | 10 | 3 | Understanding |
| <u>UNIT-IV</u> | | | | |
| 7. | Explain the configuration of v/f controlled induction motor drive with field- weakening mode and constant-torque mode. | 10 | 4 | Understanding |
| (OR) | | | | |
| 8. | Discuss about electric propulsion unit in electric vehicle with the help of a neat sketch | 10 | 4 | Understanding |
| <u>UNIT-V</u> | | | | |
| 9. | Explain at least two different types of energy storage systems used in EVs with a neat sketch and characteristics | 10 | 10 | Understanding |
| (OR) | | | | |
| 10. | Discuss about the importance and functions of battery management system with regard to the batteries used in electric vehicle | 10 | 5 | Understanding |
| <u>UNIT-VI</u> | | | | |
| 11. | Explain the two-quadrant operation of chopper DC motor drive with suitable waveforms for electric vehicle. | 10 | 1 | Understanding |
| (OR) | | | | |
| 12 | a) Explain the controllers used in electric vehicle | 5 | 6 | Remembering |
| | b) Explain the role of inverters in electric vehicle | 5 | 6 | Remembering |

AR20

CODE: 20IOT201

SET-2

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

II B.Tech. II Semester Regular Examinations, May, 2023

Introduction to IoT

(ELECTRONICS AND COMMUNICATION ENGINEERING)

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. List out the features of IOT	4M	1	Remember
b. Summarize the various IOT enabled technology.	6M	1	Understand
(OR)			
2. a. What is IOT? Explain the characteristics of IOT.	5M	1	Understand
b. Discuss the Networking components of IOT.	5M	1	Understand

UNIT-II

3. a. Mention the types of network topologies.	4M	2	Remember
b. Discuss in detail about Network layer addressing.	6M	2	Understand
(OR)			
4. a. Explain OSI model.	4M	2	Understand
b. What are the advantages of OSI model.	6M	2	Remember

UNIT-III

5. a. Compare the different types of sensing considerations.	5M	3	Understand
b. Write few lines about the Actuators.	5M	3	Understand
(OR)			
6. a. What is a Sensor?	2M	3	Remember
b. Analyze the sensors and its Characteristics.	8M	3	Analyze

UNIT-IV

7. a. List out the various data protocols	2M	4	Remember
b. Describe the MQTT in detail.	8M	4	Understand
(OR)			
8. a. Explain COAP software	5M	4	Understand
b. Discuss about HTTP.	5M	4	Understand

UNIT-V

- | | | | | | |
|----|----|--|----|---|------------|
| 9. | a. | What is Zigbee and explain how it used for connectivity. | 5M | 5 | Apply |
| | b. | Discuss about communication protocols in Zigbee. | 5M | 5 | Understand |

(OR)

- | | | | | | |
|-----|----|----------------------------------|----|---|------------|
| 10. | a. | Explain about RFID communication | 5M | 5 | Understand |
| | b. | Analyze Bluetooth Technology. | 5M | 5 | Analyze |

UNIT-VI

- | | | | | | |
|-----|----|---|----|---|------------|
| 11. | a. | Explain the details of IOT in Agriculture. | 5M | 6 | Understand |
| | b. | Write the Advantages of IOT in Agriculture. | 5M | 6 | Remember |

(OR)

- | | | | | | |
|-----|----|---|----|---|------------|
| 12. | a. | Explain about smart irrigation | 8M | 6 | Understand |
| | b. | List out the different Applications of IOT. | 2M | 6 | Remember |

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.	Explain Cartesian, Cylindrical robots with work volume diagrams	10	1	Understanding
(OR)				
2.	Classify robots based on configuration and control system with neat sketches	10	1	Understanding
<u>UNIT-II</u>				
3.	Differentiate Pneumatic, hydraulic and electrical Actuation system	10	2	Remembering
(OR)				
4.	Compare the D.C and A.C motors with suitable block diagrams	10	2	Applying
<u>UNIT-III</u>				
5.	Classify the sensors and explain about Touch and Tactile sensor with a neat sketches	10	3	Remembering
(OR)				
6.	Explain the working principle of force and torque sensors.	10	3	Understanding
<u>UNIT-IV</u>				
7.	Differentiate digital and analogue control systems and list their applications	10	4	Remembering
(OR)				
8.	What is design process for mechatronics and write it with cycle diagram	10	4	Understanding
<u>UNIT-V</u>				
9.	Describe various interfaces available for analogue and digital data acquisition systems	10	5	Understanding
(OR)				
10.	Discuss the importance of DAC (Digital to analog converters) and explain with help of neat diagrams.	10	5	Understanding
<u>UNIT-VI</u>				
11.	What is Programmable logic controller (PLC)? What are the advantages of PLC compared to a microcontroller?	10	6	Understanding
(OR)				
12.	Classify different types of process controllers (velocity and adaptive) ? Distinguish them in detail	10	6	Understanding

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	Explain in detail about urban sprawl and trends in urbanization at regional level?	7	1	1
	b	Write a detailed note on Sub Urbanization?	3	1	2
(OR)					
2.	a	Describe in detail about Central Business district model with emphasis on sub-urbanization?	7	1	1
	b	Write a detailed importance of urbanisation studies in Smart cities planning?	3	1	2
<u>UNIT-II</u>					
3.	a	Explain in detail about Detail Development plan and Transfer of Development rights?	7	2	1
	b	Write a note on scope of regional plan?	3	2	2
(OR)					
4.	a	Describe with a case study in detail about special economic zone?	7	2	1
	b	Write a note on urban planning in towns?	3	2	2
<u>UNIT-III</u>					
5.	a	Describe in detail about evaluation, implementation and constraints in planning and design of urban development project?	7	3	1
	b	Write a note on project formulation?	3	3	2
(OR)					
6.	a	Explain in detail financing of urban development projects? constraints?	7	3	1
	b	Write a note on Layout designs?	3	3	2
<u>UNIT-IV</u>					
7.	a	Explain in detail the dimensions and components of Smart Cities?	7	4	1
	b	Write a note on Indian Smart Cities mission?	3	4	2
(OR)					
8.	a	Describe the importance of performance bench marking and global standards as a part of Smart Cities Mission?	7	4	1
	b	Write a note on categories of Smart Cities?	3	4	2
<u>UNIT-V</u>					
9.	a	Explain in detail pre-requisites for Smart Cities planning?	7	5	1
	b	Write a note on vision and mission of Indian Smart Cities program?	3	5	2
(OR)					
10.	a	Describe in detail about Area Based development as a part of Indian Smart Cities Program?	7	5	1
	b	Write note on importance of Internet of Things in Smart Cities planning?	3	5	2
<u>UNIT-VI</u>					
11.	a	Explain in detail about infrastructure for smart governance?	7	6	1
	b	Write a note on functions of smart governance	3	6	2
(OR)					
12.	a	Describe in detail initiatives and stages of implementation in smart governance	7	6	1
	b	Write a note on benefits of smart governance	3	6	2

AR18

CODE: 18IET21B

SET-1

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

II B.Tech II Semester Supplementary Examinations, May, 2023

IT SYSTEMS MANAGEMENT

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 IT Infrastructure. Explain IT infrastructure Management Activities. 6M
b) Explain Complexity of today's Computing Environment. 6M
(OR)
2. a) Define the evolutions of systems since 1960's and their management. 6M
b) Define Network? Explain Growth of Internet and its Application. 6M

UNIT-II

3. a) Explain Software Development life cycle and types of SDLC Models. 6M
b) Discuss about software economics. 6M
(OR)
4. a) Explain the Waterfall model. List out the advantages and disadvantages of Waterfall model. 6M
b) Explain Conventional Software Management Performance. 6M

UNIT-III

5. a) Define Model? Explain about Use Case Diagram in modelling. 6M
b) Describe the common tasks in IT system Management. 6M
(OR)
6. a) Explain about System Context diagram in brief. 6M
b) Explain about Strategy-Tactics-Operations (STO) approach in detail. 6M

UNIT-IV

7. a) Define Access control System in detail. 6M
b) Explain Emerging Trends in IT E-Commerce and GSM. 6M
(OR)
8. a) Explain Computer Security, Internet Security. 6M
b) What are Identity Management and Intrusion Detection? 6M

UNIT-V

9. a) Explain in detail about Disaster Recovery. 6M
b) Explain the traditional division of storage hierarchy. 6M
(OR)
10. a) Explain the mechanism of Back up Process. 6M
b) Explain Storage Management Process and Activities. 6M

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) List out static characteristics? Define any four of them? [6M]
- b) Draw and explain the DC ammeter circuit and derive the expression for shunt? [6M]

(OR)

2. a) Discuss thermocouple type RF ammeter in detail? [6M]
- b) Draw and explain the working of series type ohmmeter? [6M]

UNIT-II

3. a) Draw and explain the operation of standard AF sine and square wave generator? [6M]
- b) Explain the working of the wien's bridge method of harmonic distortion analyzer? [6M]

(OR)

4. a) Draw and explain the operation of the basic wave analyzer? [6M]
- b) Draw and explain the operation of frequency selective wave analyzer? [6M]

UNIT-III

5. a) Explain different features of CRT? [6M]
- b) Explain the measurement procedure of amplitude and time period? [6M]

(OR)

6. a) Draw and explain the working of digital storage oscilloscope? [6M]
- b) With a block diagram explain the operation of a simple CRO? [6M]

UNIT-IV

7. a) Draw and explain the Maxwell Bridge with neat diagram and derive the expression for unknown inductance? [6M]
- b) A Maxwell bridge is used to measure inductive impedance. Utilizing the bridge constants at balance are $C_1=0.01 \mu\text{F}$, $R_1=470\text{k} \Omega$, $R_2=5.1\text{k} \Omega$ and $R_3=100\text{k} \Omega$, find the series equivalent of the unknown impedance? [6M]

(OR)

8. a) Draw the circuit diagram of a wien's bridge, explain its working and derive the equation for frequency of oscillation? [6M]
- b) In a wien's bridge Utilizing R_1 , R_3 and C_1 , C_3 are 3.1k , 12.4k and $5.2 \mu\text{F}$, 20.3pF respectively, find the frequency of oscillation? [6M]

UNIT-V

9. a) What is an electrical transducer? Define active and passive transducers and give examples? [6M]
 - b) Explain the principle, construction and working of LVDT? [6M]
- (OR)**
10. a) Explain how the temperature is measured using Thermocouple? [6M]
 - b) Explain the Principle, Construction and different forms of thermistor? [6M]

AR16

CODE: 16OE2021

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, May, 2023

TRANSFORM THEORY

Time: 3 Hours

Max Marks: 70

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) Show that $Z(n^2) = \frac{z^2+z}{(z-1)^3}$ 7M
b) Find the values of $Z(\cos n\theta)$ and $Z(\sin n\theta)$ 7M
(OR)
2. If $Z(u_n) = \frac{2z^2+4z+12}{(z-1)^4}$, find u_2 and u_3 14M

UNIT-II

3. a) Find $Z^{-1}\left[\frac{z}{z^2+11z+24}\right]$ 7M
b) Using Convolution Theorem, evaluate $Z^{-1}\left[\frac{z^2}{(z-1)(z-3)}\right]$ 7M
(OR)
4. a) Find $Z^{-1}\left[\frac{z+1}{z^2-3z+2}\right]$ 7M
b) Using Convolution Theorem, evaluate $Z^{-1}\left[\frac{1}{n!} * \frac{1}{n!}\right]$ 7M

UNIT-III

5. Using Fourier integral show that $e^{-ax} - e^{-bx} = \frac{2(a^2-b^2)}{\pi} \int_0^\infty \frac{\lambda \sin \lambda x}{(\lambda^2+a^2)(\lambda^2+b^2)} d\lambda, a, b > 0$ 14M
(OR)
6. Find the Fourier cosine transform of $e^{-a^2x^2}$ and hence evaluate Fourier sine transform of $x e^{-a^2x^2}$. 14M

UNIT-IV

7. Find the Fourier transform of $f(x)$ defined by $f(x) = \begin{cases} 1, & |x| < a \\ 0, & |x| > a \end{cases}$ and hence evaluate $\int_{-\infty}^\infty \frac{\sin ap \cos px}{p} dp$ and $\int_0^\infty \frac{\sin p}{p} dp$ 14M
(OR)
8. Using Parseval's identity, show that $\int_0^\infty \frac{dx}{(x^2+a^2)(x^2+b^2)} = \frac{\pi}{2ab(a+b)}$ 14M

UNIT-V

9. Solve the difference equation, using Z-transform $y(n+2) + 3y(n+1) + 2y(n) = 0$, given $y(0) = 0, y(1) = 1$ 14M
(OR)
10. Solve the difference equation, using Z-transform $y(n+2) - 5y(n+1) + 6y(n) = 5^n$, given $y(0) = 0, y(1) = 1$ 14M

AR16

CODE: 16OE2024

SET-1

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

II B.Tech II Semester Supplementary Examinations, May, 2023

PRINCIPLES OF MECHANICAL MEASUREMENTS

Time: 3 Hours

Max Marks: 70

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. 14M
 - i. Accuracy and precision
 - ii. Resolution and Threshold
 - iii. Reproducibility and repeatability
 - iv. Dead zone and Hysteresis
- (OR)
2. Explain the following terms: 14M
 - 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? 14M
- (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? 14M

UNIT-III

5. What is thermocouple? With a neat sketch explain its construction, working principle and applications. 14M
- (OR)
6. Explain working of gas filled thermometer with neat sketches? 14M

UNIT-IV

7. Describe in detail the construction and working of an inductive and a capacitive transducers to measure linear displacement. 14M
- (OR)
8. Differentiate between resistive, inductive, capacitance type transducers? 14M

UNIT-V

9. Explain principle and working of proving ring and its applications? 14M
- (OR)
10. Describe in detail the construction and working of dynamo meter? 14M

Computational Number Theory**Time: 3 Hours****Max Marks: 70**

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 Obtain gcd of 595 and 252 7M
b Express 595 and 252 in the form of $m \cdot 252 + n \cdot 595$ 7M

(OR)

2. a. Prove that $n(n-1)(2n-1)$ is divisible by 6 7M
b. Show that the product of two numbers of the form $6n+1$ is also $6n+1$ 7M

UNIT-II

3. Show that $3^{n+2} - 8n - 9 \equiv 0 \pmod{64}$ 14M

(OR)

4. Solve the congruence $259x \equiv 5 \pmod{11}$ 14M

UNIT-III

5. Define Euler-Fermate theorem. Hence, Show that $n^{12} - a^{12}$ is divisible by 13 14M

(OR)

6. Define Wilson theorem. Hence, show that $(12! + 1)$ is divisible by 13. 14M

UNIT-IV

7. Define Mobius function μ . Determine $\mu(17), \mu(20)$ 14M

(OR)

8. Define Euler Totient Function Φ . Determine $\Phi(360)$ 14M

UNIT-V

9. Evaluate $(2/7)$ and $(2/19)$ 14M

(OR)

10. Determine whether 219 is quadratic residue of 383 or not 14M

REMOTE SENSING**Time: 3 Hours****Max Marks: 70**

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. Define the term remote sensing and explain about basic components of an ideal remote sensing system with neat sketch? 14
- (OR)
2. What is meant by electromagnetic energy and List the two models used to describe the electromagnetic energy with neat sketch? 14

UNIT-II

3. Define passive sensors and discuss about characteristics of Gamma-ray Spectrometer, Multi Spectral Scanner, Imaging Spectrometer and Thermal Scanner? 14
- (OR)
4. What do you mean by active sensors and discuss about its characteristics? 14

UNIT-III

5. Define platform and explain about air-born platforms? 14
- (OR)
6. List and describe the various orbit characteristics? Enumerate the characteristics of Sun-synchronous satellites? 14

UNIT-IV

7. Write a detailed description on the elements of visual interpretation quoting suitable examples for each? 14
- (OR)
8. Define the term image enhancement and elucidate about non-linear contrast enhancement? 14

UNIT-V

9. What is meant by image classification? Explain about the principles of image classification? 14
- (OR)
10. Explain about the unsupervised classification? 14