

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)	What are the different types of inspections carried out for maintaining civil structures?	7m	1	1
b)	How does improper drainage contribute to the deterioration of structures?	3m	1	1
	(OR)			
2. a)	Explain different repair strategies for deteriorated structures with suitable examples.	7m	1	2
b)	Discuss the importance of early detection of structural damage in reinforced concrete buildings.	3m	1	2
	<u>UNIT-II</u>			
3. a)	Explain the role of bonding agents in repair and rehabilitation of structures.	5m	2	2
b)	Describe the use of quick-setting compounds in emergency repair works	5m	2	3
	(OR)			
4. a)	What are the different types of grouting materials used in structural repairs? Explain with applications.	5m	2	3
b)	Discuss the factors to be considered while selecting protective coatings for concrete structures.	5m	2	2
	<u>UNIT-III</u>			
5. a)	How does elevated temperature exposure affect the mechanical properties of concrete?	6m	3	1
b)	What are the effects of improper curing on the strength and durability of concrete?	4m	3	1
	(OR)			
6. a)	Explain the different types of cracks that occur in concrete structures.	5m	3	2
b)	What are the causes of corrosion in reinforced concrete structures?	5m	3	1

UNIT-IV

7. a) How does ground-penetrating radar (GPR) help in assessing the condition of concrete structures? 5m 4 2
- b) Describe the principle and application of Schmidt rebound hammer testing. 5m 4 2

(OR)

8. a) Explain the steps involved in performing a half-cell potential test for corrosion detection in reinforcement. 6m 4 2
- b) What are the key advantages of using infrared thermography in structural assessment? 4m 4 1

UNIT-V

9. a) Discuss the different types of jacketing techniques used for strengthening columns 5m 5 2
- b) What are the effects of fire damage on concrete structures, and how can they be rehabilitated? 5m 5 1

(OR)

10. a) Explain the methods used for repairing leakage in water-retaining structures. 5m 5 2
- b) What precautions should be taken while performing retrofitting on a heritage structure? 5m 5 1

UNIT-VI

11. a) Explain how does base isolation help in reducing seismic forces in buildings? 5m 6 2
- b) What are the key differences between ductile and non-ductile retrofitting techniques? 5m 6 1

(OR)

12. a) Explain the role of shear walls in improving the seismic performance of RC buildings. 6m 6 2
- b) What factors should be considered before selecting a suitable retrofitting method for an earthquake-prone region? 4m 6 2

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Max Marks: 60

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			Marks	CO	Blooms Level
UNIT-I					
1.	a)	Describe the vibroflotation technique of densifying granular soil.	5	1	1
	b)	State the need for densification of granular soils	5	1	1
(OR)					
2.	a)	What are the various techniques used for constructing stone columns?	5	1	1
	b)	Distinguish between Sand Drains and geodrains , also state various advantages of Sand Drains and geodrains	5	1	2
UNIT-II					
3.	a)	Explain the principle and application of soil-lime stabilization.	5	2	2
	b)	Discuss the various foundation techniques adopted in expansive soils.	5	2	2
(OR)					
4.	a)	Explain briefly bituminous stabilization of soil	5	2	1
	b)	Explain in detail chemical stabilization with calcium chloride, sodium silicate and gypsum.	5	2	2
UNIT-III					
5.	a)	Explain the open sumps and vacuum well dewatering systems.	5	3	1
	b)	What are the filter requirements of a filler material around the drains?	5	3	1
(OR)					
6.	a)	Explain single and multistage well point system of dewatering.	5	3	2
	b)	State various advantages and disadvantages of Sumps and Ditches	5	3	1
UNIT-IV					
7.	a)	Describe with illustrations the differences between geotextiles and geomembranes.	5	4	2
	b)	What are the practical applications of geotextiles?	5	4	2
(OR)					
8.	a)	Explain in detail the behaviour of soil on reinforcing with geotextiles.	5	4	1
	b)	Write the functions and applications of geo grids	5	4	1
UNIT-V					
9.	a)	What do you understand by reinforced earth? Enumerate various applications of reinforced earth.	5	5	1
	b)	Explain the five design principles of reinforced earth walls.	5	5	1
(OR)					
10.	a)	Write a short note on soil nailing.	5	5	1
	b)	Mention various stability checks to be considered in soil nailing and write a short notes on them	5	5	1
UNIT-VI					
11.	a)	What is a grout? Explain in detail the applications of grouting.	5	6	2
	b)	Describe briefly different grouting techniques.	5	6	3
(OR)					
12.	a)	Explain in detail with the help of a neat sketch the different stages of grouting.	5	6	2
	b)	Explain in detail the post grout tests.	5	6	2

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	Discuss origin and motivating challenges of Data Mining.	10	CO1	K2
	(OR)			
2.	What is data pre-processing? Explain different types of pre-Processing techniques?	10	CO1	K1
	<u>UNIT-II</u>			
3.	Explain Multi-dimensional data model in detail?	10	CO2	K1
	(OR)			
4.	Implement the data warehouse system?	10	CO2	K2
	<u>UNIT-III</u>			
5.	What is data generalization and summarization? Explain data generalization and summarization based characterization.	10	CO3	K2
	(OR)			
6. a.	What is attribute relevance analysis?	4	CO3	K2
b.	How to discriminating between different classes?	6	CO3	K2
	<u>UNIT-IV</u>			
7. a.	What is Association rule? Explain market basket analysis?	4	CO4	K2
b.	What is Apriori algorithm? Explain how it is used to find frequent sets?	6	CO4	K2
	(OR)			
8. a.	How generating Association rules from frequent item sets?	4	CO4	K2
b.	What is FP growth algorithm? Explain in detail?	6	CO4	K1
	<u>UNIT-V</u>			
9.	Explain classification by decision tree induction with an example.	10	CO5	K3
	(OR)			
10. a.	Explain Naive Bayesian classification algorithm?	5	CO5	K1
b.	Explain Backpropagation algorithm in Classification?	5	CO5	K1
	<u>UNIT-VI</u>			
11.	Discuss the strengths and weaknesses of K-Means clustering. Explain Bisecting K-Means.	10	CO6	K2
	(OR)			
12.	Explain DBSCAN algorithm in detail.	10	CO6	K2

III B. Tech II Semester Supplementary Examinations, July, 2025
EMBEDDED AND REAL TIME OPERATING SYSTEMS
(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

	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. a)	Highlight the characteristic features of embedded system.	6	1	K2
b)	Illustrate the block diagram of an embedded system.	4	1	K2
	(OR)			
2. a)	Classify the embedded systems based on generation, complexity and performance	6	1	K2
b)	Discuss brief on the history of embedded systems.	4	1	K2
	<u>UNIT-II</u>			
3. a)	What is an Application-Specific Instruction Set Processor (ASIP), and why is it used?	5	2	K2
b)	How do digital signal processors (DSPs) optimize signal processing tasks?	5	2	K2
	(OR)			
4. a)	Describe the basic architecture of a general-purpose processor.	5	2	K2
b)	Explain the concept of sequential logic at the RT level.	5	2	K2
	<u>UNIT-III</u>			
5. a)	Explain the working principle of UART (Universal Asynchronous Receiver-Transmitter).	5	3	K3
b)	What is RS232, and how does it function in embedded systems?	5	3	K2
	(OR)			
6. a)	How does Wi-Fi encryption (WEP, WPA, WPA2) ensure secure communication?	5	3	K3
b)	How does Bluetooth pairing and security work?	5	3	K2
	<u>UNIT-IV</u>			
7. a)	What is an RTOS kernel, and how does it differ from a general-purpose OS kernel?	5	4	K3
b)	How does a preemptive scheduler differ from a cooperative scheduler?	5	4	K2
	(OR)			
8. a)	What is interrupt latency, and how can it be minimized in RTOS?	5	4	K2
b)	How does an RTOS handle nested interrupts?	5	4	K3
	<u>UNIT-V</u>			
9. a)	How does a mailbox differ from a message queue?	5	5	K3
b)	Explain the role of event registers in synchronizing multiple tasks.	5	5	K1
	(OR)			
10. a)	What is priority inversion, and how does it affect RTOS performance?	5	5	K3
b)	Compare priority inheritance and priority ceiling protocols in RTOS.	5	5	K2
	<u>UNIT-VI</u>			
11. a)	What are Off-the-Shelf Operating Systems, and how are they used in embedded systems?	5	6	K3
b)	What are the key features of Embedded NT?	5	6	K3
	(OR)			
12.	List and explain about various embedded operating systems.	10	6	K3

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

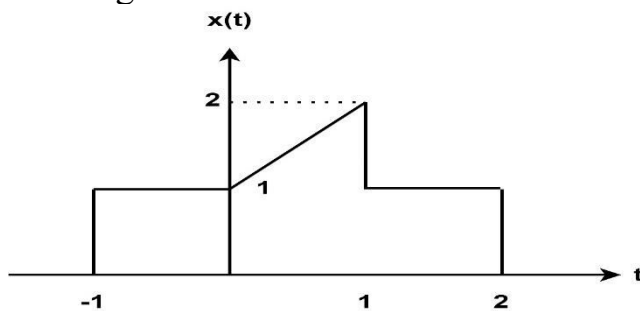
All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

Marks	CO	Blooms Level
10	1	K3

1. For the signal $X(t)$ shown in figure. find the following signals
- $x(t-3)$ and $x(t+3)$
 - $x(2t+2)$ and $x(\frac{1}{2}t-2)$
 - $x(\frac{5}{3}t)$ and $x(\frac{3}{5}t)$
 - $x(-t+2)$ and $x(-t-2)$
 - Express given signal in terms of elementary signals



(OR)

2. What is a system? Explain the properties of a system. Discuss the classification of system with example

UNIT-II

3. Determine whether the systems described by the equations are linear, time invariant, dynamic and stable:

(i) $y_1(t) = x(t-3) + (3-t)$ (ii) $y_1(t) = dx(t)/dt$

(iii) $y(n) = nx(n) + bx^2(n)$

(OR)

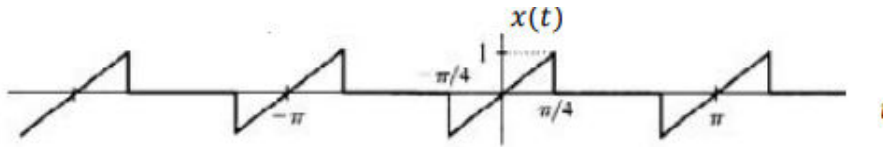
4. Determine convolution of following two sequences by

1) Graphical method 2) Matrix second method

$x(n) = \{1, -1, 2, 3\}$ $h(n) = \{1, -2, 3, -1\}$

UNIT-III

- | | | | | |
|----|---|----|---|----|
| 5. | Find the trigonometric Fourier series and exponential Fourier series for the waveform shown in figure below | 10 | 3 | K3 |
|----|---|----|---|----|



(OR)

- | | | | | |
|----|---|----|---|----|
| 6. | Explain at least 5 properties of Fourier series with examples | 10 | 3 | K2 |
|----|---|----|---|----|

UNIT-IV

- | | | | | |
|----|---|----|---|----|
| 7. | Find the Fourier Transform of Rectangular pulse. Sketch the signal and Fourier transform. | 10 | 4 | K2 |
|----|---|----|---|----|

(OR)

- | | | | | |
|----|--|----|---|----|
| 8. | State and prove differentiation and integration properties of Fourier Transform. | 10 | 4 | K2 |
|----|--|----|---|----|

UNIT-V

- | | | | | |
|----|---|---|---|----|
| 9. | a State and prove convolution theorem in Laplace domain. | 5 | 5 | K1 |
| | b State and prove Time scaling property of Laplace transforms | 5 | 5 | K1 |

(OR)

- | | | | | |
|-----|--|---|---|----|
| 10. | a Find the Laplace transform and ROC for the signal $x(t) = e^t \sin 2t, t \leq 2$ | 5 | 5 | K3 |
| | b Determine the inverse Laplace of the following function. | 5 | 5 | K3 |

$$X(S) = \frac{1}{S(S+1)(S+3)}$$

UNIT-VI

- | | | | | |
|-----|---|---|---|----|
| 11. | a Find the z-transform of $a_n \sin(n\omega)u(n)$. | 5 | 6 | K3 |
| | b State and explain the following properties of Z-transform: i) Time Shifting ii) Time Reversal iii) Frequency Shifting | 5 | 6 | K1 |

(OR)

- | | | | | |
|-----|--|---|---|----|
| 12. | a State and Prove Initial and Final value theorems in z-transform. | 5 | 6 | K1 |
| | b Find the Inverse Z-transform of the sequence $X(Z) = z/(2z^2 - 3z + 1)$, ROC: $ z > 1$ | 5 | 6 | K3 |

**Advanced Computer Networks
(Information Technology)****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 the relevance of a network protocol architecture? With neat diagram, brief the responsibilities of network support layers in OSI reference model?	5 M	CO1	L1
	b) Briefly explain the coaxial cable, optical fiber, twisted pair and their applications.	5 M	CO1	L2
(OR)				
2.	a) List the five key differences between OSI reference model and TCP/IP reference model.	5 M	CO1	L1
	b) Use the ATM reference model to create a basic network architecture. Show how the layers interact with each other using a diagram.	5 M	CO1	L3
<u>UNIT-II</u>				
3.	With an example give a detail on Link State Routing.	10 M	CO2	L4
(OR)				
4.	How distance vector routing algorithm works. Explain it with an example?	10 M	CO2	L5
<u>UNIT-III</u>				
5.	a) Explain MAC layer of IEEE 802.11 wireless LAN standard.	5 M	CO3	L2
	b) What is the maximum number of VLANs that can be configured on a switch supporting the 802.1Q protocol? Why?	5 M	CO3	L1
(OR)				
6.	Examine the structures of several types of network switches. Compare and evaluate their features and performance in different network conditions.	10 M	CO3	L4
<u>UNIT-IV</u>				
7.	Analyze the Point-to-Point Protocol (PPP) and explain how it can handle several network layer protocols.	10 M	CO4	L4
(OR)				
8.	a) What is the need for Network address translation (NAT)?	5 M	CO4	L1
	b) What are the features of IPv6?	5 M	CO4	L1
<u>UNIT-V</u>				
9.	a) What are the features of routing protocols in MANET?	5 M	CO5	L1
	b) Discuss about the transport layer issues in MANETs.	5 M	CO5	L5
(OR)				
10.	a) Write short notes on challenges and issues in MANETs.	5 M	CO5	L1
	b) How MANETs, WSNs, and WMNs are similar and different?	5 M	CO5	L1
<u>UNIT-VI</u>				
11.	a) State different real-time applications of Ad-hoc Wireless networks.	5 M	CO6	L2
	b) Explain the importance of the Ad-hoc Sensor network security.	5 M	CO6	L2
(OR)				
12.	a) Explain in detail the functioning of Wireless Sensor Networks (WSN)?	5 M	CO6	L2
	b) State different real-time applications of Ad-hoc networks.	5 M	CO6	L2

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
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UNIT-I

- | | | | | | |
|----|----|--|----|-----|----|
| 1. | a) | Explain the types of energy sources used in Unconventional Machining Processes. | 5M | CO1 | L2 |
| | b) | Discuss the effects of the amplitude, frequency of vibrations, abrasive grain size and mass flow rate on the rate of material removal and surface finish obtainable in ultrasonic machining. | 5M | CO1 | L2 |

(OR)

- | | | | | | |
|----|----|---|----|-----|----|
| 2. | a) | Explain the advantages, disadvantages and limitations of USM process. | 5M | CO1 | L2 |
| | b) | What various types of transducers used in USM? Explain their working principles and compare them. | 5M | CO1 | L2 |

UNIT-II

- | | | | | | |
|----|----|---|----|-----|----|
| 3. | a) | Explain the elements of abrasive flow finishing process giving a neat sketch. | 5M | CO2 | L2 |
| | b) | Mention the advantages, limitations and applications of water jet machining. | 5M | CO2 | L2 |

(OR)

- | | | | | | |
|----|----|---|----|-----|----|
| 4. | a) | List out the materials of abrasives and nozzles used in Abrasive jet machining process. | 5M | CO2 | L1 |
| | b) | Compare magnetic abrasive finishing and abrasive flow finishing. | 5M | CO2 | L2 |

UNIT-III

- | | | | | | |
|----|----|--|----|-----|----|
| 5. | a) | Explain the electrochemical grinding process with a neat sketch and state its advantages over conventional grinding. | 5M | CO3 | L2 |
| | b) | Explain the working principle of chemical machining with neat sketch. | 5M | CO3 | L2 |

(OR)

- | | | | | | |
|----|----|---|----|-----|----|
| 6. | a) | Explain the process parameters that affect the material removal rate and surface quality in electro chemical machining. | 5M | CO3 | L2 |
| | b) | List out the applications and advantages of chemical machining process. | 5M | CO3 | L1 |

UNIT-IV

7. a) Derive the expression for surface finish and MRR in EDM process. How do you increase MRR without effecting surface finish? 5M CO4 L2
- b) Explain with help neat sketches any two types of flushing methods in EDM process. 5M CO4 L2

(OR)

8. a) Discuss the factors influencing the choice of electrode material in EDM. 5M CO4 L2
- b) List the Process parameters of EDM and explain their significance in machining. 5M CO4 L1

UNIT-V

9. a) Explain the types of plasma arc torches used in Plasma Arc Machining. 5M CO5 L2
- b) Sketch and explain the generation and control of electron beam used in EBM process. 5M CO5 L2

(OR)

10. a) Compare EBM and LBM on the following aspects: 5M CO5 L2
- (i) Machining rate
- (ii) Tool wear rate
- (iii) Accuracy.
- b) Discuss the parameters that govern the performance of plasma arc machining. 5M CO5 L2

UNIT-VI

11. a) Illustrate the process of drilling curved holes using Electro Stream Drilling. 5M CO6 L2
- b) Explain the role of electrolyte in the ESD process and its impact on material removal. 5M CO6 L2

(OR)

12. a) Summarize the differences between penetration drilling and dwell drilling in ESD. 5M CO6 L2
- b) Compare the effects of different process parameters on Material Removal Rate (MRR) in STEM. 5M CO6 L2

**PRINCIPLES OF SIGNALS AND SYSTEMS
(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

UNIT-I

1. what are the basic operations of signals? Illustrate any three operations on signals 12 M

(OR)

2. a) Whether the following signals are periodic or not? If periodic determine the fundamental period. 6 M

(i) $x(t) = 2 \cos(10t + 1) - \sin(4t - 1)$

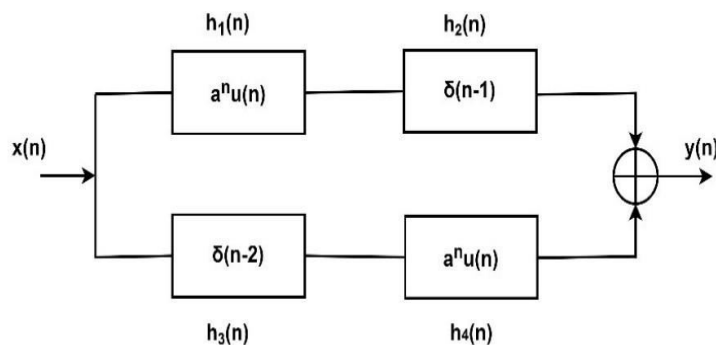
(ii) $y[n] = \sin\left(\frac{6\pi}{7}n + 1\right)$

- b) Explain the following System properties 6 M

(a) Memory-less, (b) Causal, (c) Linear, (d) Time-invariant

UNIT-II

3. Find the overall impulse response of the system shown in figure below 12 M

**(OR)**

4. a) What are the properties of convolution? 4 M
b) Explain about different types of sampling techniques? 8 M

UNIT-III

5. Find Fourier transform of signum function 12 M

(OR)

6. a) Find the Fourier transform of $x(t) = e^{-a|t|}$, $a > 0$ and plot its magnitude spectrum 6 M
b) State and prove any five properties of Fourier Transform. 6 M

UNIT-IV

7. Obtain inverse Laplace transform of $F(s) = (2s+1)/(s+1)(s^2 + 2s + 2)$ 12 M

(OR)

8. a) State and prove any five properties of Laplace Transform. 6 M
 b) Find the Laplace Transform and ROC of $x(t) = e^{-at} \sin \omega t u(t)$ 6 M

UNIT-V

9. Find Z transform of following signals (i) $\sin \omega t$ (ii) e^{at} 12 M

(OR)

10. a) Find the Z-Transform and ROC following sequence $\sin \omega n u(n)$ 6 M
 b) Find the Inverse Z-Transform of $X(z) = \frac{z^{-1}}{3-4z^{-1}+z^{-2}}$; ROC $|z| > 1$ 6 M

2 of 2

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CODE: 18HST302

SET-1

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

III B.Tech II Semester Supplementary Examinations, July,2025

HUMAN VALUES

(Common to CIVIL, CSE & IT Branches)

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) What are the basic guidelines for value education? 6
- b) Critically examine the prevailing notions of happiness in society and their consequences. 6

(OR)

2. a) Illustrate the purpose of self-exploration. 6
- b) Discuss about the value time and co-operation. 6

UNIT-II

3. a) Distinguish between the needs of the Self and the needs of the Body. What are the needs of the 'self' and the 'body'? 6
- b) In what way are we irresponsible towards our bodies? What are its consequences? 6

(OR)

4. a) Explain how activities in self (I) are interrelated. 6
- b) 'Human being is co-existence of the Self and the Body' - elaborate on this statement. 6

UNIT-III

5. a) What do you understand by 'trust'? What is its importance in human relationships? 6
- b) Enumerate some important values that lie at the base of good relationships. 6

(OR)

6. a) "Family is a natural laboratory to understand human relationships" - elaborate. 6
- b) What is the role of the value system in family harmony? How can you maintain harmony in a relationship? 6

UNIT-IV

7. a) Define harmony in nature and how you will create it. 6
- b) Define existence? Show that existence is in the form of co-existence. 6

(OR)

8. a) Discuss the human interrelationship with nature. 6
- b) What are the four orders of nature? Briefly explain them. 6

UNIT-V

9. a) What is ethical human conduct? Explain in terms of values, policies and character with appropriate examples. 6
- b) What do you mean by universal human order? What are its implications? 6

(OR)

10. a) Explain the concept of holistic perception of harmony in existence. 6
- b) What are the principles for Humanistic Education 6