

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.	Solve the water jug problem w.r.t the problem characteristics. (OR)	10M	CO1	K3
2.	Explain about breadth first search and depth first search with an example and discuss their advantages and disadvantages	10M	CO1	K2
<u>UNIT-II</u>				
3.	Using constraint satisfaction procedure to solve the following crypt-arithmic problem. $\begin{array}{r} \text{T W O} \\ + \text{T W O} \\ \hline \text{F O U R} \end{array}$	10M	CO2	K3
(OR)				
4.	Discuss A* Algorithm with suitable example.	10M	CO2	K2
<u>UNIT-III</u>				
5.	Consider the following predicates and proof: a) John likes all kinds of food. b) Apples are food. c) Chicken is food. d) Anything any are eats and is not killed by is food. e) Bill eats peanuts and is still alive f) Sue eats everything Bill eats. Solve 1) Translate to predicate logic 2) Prove that John likes Peanuts. 3) Convert the formulae into clause form. 4) Prove that John likes peanuts using resolution	10M	CO3	K3
(OR)				
6.	Explain the Unification algorithm with an example?	10M	CO3	K2
<u>UNIT-IV</u>				
7.	What do you mean by Frames? Show how frames are used for a computer department of a college. (OR)	10M	CO4	K3
8.	Describe the basic building blocks of the conceptual dependency representation.	10M	CO4	K2
<u>UNIT-V</u>				
9.	What do you mean by Planning? Explain various components of STRIPS planning system with suitable example? (OR)	10M	CO5	K2
10.	a) Explain Bayesian network in detail with suitable example. b) Explain Dempster-Shafer theory in detail?	5M 5M	CO5 CO5	K2 K2
<u>UNIT-VI</u>				
11.	Why we use Expert System? Explain Expert system architecture with neat diagram? (OR)	10M	CO6	K2
12.	What do you mean by Expert System shell. Discuss the various advantages and disadvantages of Expert system.	10M	CO6	K2

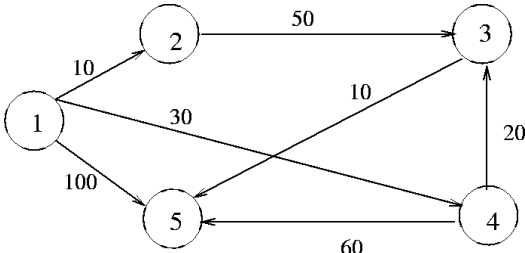
Time: 3 Hours

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
UNIT-I				
1.	Write an algorithm for the addition of two matrices and find out the time complexity of the algorithm using the tabular method.	10	CO1	K2
(OR)				
2.	Explain different types of asymptotic notations with examples	10	CO1	K2
UNIT-II				
3. a	Write the control abstraction of the Divide and Conquer method.	3	CO2	K2
b	Device an algorithm for binary search technique.	7	CO2	K2
(OR)				
4.	Describe Strassen's Matrix multiplication and analyze the complexity.	10	CO2	K2
UNIT-III				
5.	Solve the job sequencing problem given $n=4$, profits $(p_1, p_2, p_3, p_4)=(100,10,15,27)$ and deadlines $(d_1,d_2,d_3,d_4)=(2,1,2,1)$ using greedy method.	10	CO3	K3
(OR)				
6.	Calculate the shortest paths from source vertex '1' to each vertex in the graph.	10	CO3	K3
				
UNIT-IV				
7.	Solve the following 0/1 knapsack problem using dynamic programming. $n = 3$, $(w_1, w_2, w_3) = (2, 3, 4)$, $(P_1, P_2, P_3) = (1, 2, 5)$ and $m = 6$.	10	CO4	K3
(OR)				
8.	Find an Optimal Binary Search Tree by using OBST algorithm for $n = 4$, identifiers $(a_1, a_2, a_3, a_4) = (\text{do}, \text{if}, \text{int}, \text{while})$. Let $p(1:4) = (3,3,1,1)$ and $q(0:4)=(2,3,1,1,1)$.	10	CO4	K3
UNIT-V				
9.	Write the Pseudo code for BFS and explain with an example.	10	CO5	K2
(OR)				
10.	Let $w = \{5, 7, 10, 12, 15, 18, 20\}$ and $m=35$. Find all possible subsets of w that sum to m . Do this, using the sum of subsets. Draw the portion of the state space tree that is generated.	10	CO5	K3
UNIT-VI				
11.	Compute the optimal solution using LC Branch and Bound (LCBB) and LIFO Branch and Bound with $n=4$, $m=15$, $(p_1,p_2,p_3,p_4) = (15,15,17,23)$, $(w_1,w_2,w_3,w_4) = (3,5,6,9)$	10	CO6	K3
(OR)				
12.	State and prove Cook's theorem.	10	CO6	K3

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO1	Blooms Level
<u>UNIT-I</u>				
1.	a) Obtain an expression for the output levels under steady state conditions of a Low Pass circuit excited by a ramp input.	5M	1	L-2
	b) Delineate the criteria for good differentiation and integration.	5M	1	L-3
(OR)				
2.	a) Expound the response of High-pass RC circuit for sinusoidal input.	5M	1	L-3
	b) A square wave whose peak-to-peak amplitude is 2 V extends ± 1 V with respect to ground. The duration of the positive section is 0.1 s and that of the negative section is 0.2 s. if this waveform is impressed upon an RC integrating circuit whose time constant is 0.2 s, what are the steady-state maximum and minimum values of the output waveform?	5M	1	L-2
<u>UNIT-II</u>				
3.	a) Explicit the operation of two-level emitter coupled transistor clipper.	5M	2	L-2
	b) State and prove clamping circuit theorem.	5M	2	L-2
(OR)				
4.	a) Provide the circuit of different types of shunt clippers and explain their operation with the help of their transfer characteristics.	5M	2	L-1
	b) Design a diode clamper to restore the negative peaks of the input signal to zero level. Use a silicon diode with $R_f = 50 \Omega$ and $R_r = 400 \text{ k}\Omega$. The frequency of the input signal is 5kHz.	5M	2	L-3
<u>UNIT-III</u>				
5.	a) Exemplify about diode forward recovery time and reverse recovery time.	5M	3	L-2
	b) Explain about switching times of transistor	5M	3	L-3
(OR)				
6.	a) Explicate the operation of a Schmitt Trigger and derive the expressions for UTP and LTP.	5M	3	L-3
	b) Silicon transistors with $h_{FE(\min)} = 20$ are available. If $V_{CC} = V_{BB} = 10 \text{ V}$, design the bistable multivibrator.	5M	3	L-2
<u>UNIT-IV</u>				
7.	a) Picturize Astable Multivibrator and explain its operation with help of circuit diagram and waveforms.	5M	4	L-3
	b) Depict a collector coupled one shot with a gate width of 3 ms, using n-p-n transistors.	5M	4	L-2
(OR)				
8.	a) Construct a collector coupled Monostable Multivibrator and explain its operation with help of circuit diagram and waveforms.	5M	4	L-1
	b) Design an astable multivibrator to generate a square wave of 1 kHz.	5M	4	L-3

UNIT-V

- | | | | | | |
|----|----|---|----|---|-----|
| 9. | a) | With a neat sketch explain about transistor Miller time base generator. | 5M | 5 | L-1 |
| | b) | Summarize time base signal? What are the general features of time base signal? Explain. | 5M | 5 | L-3 |

(OR)

- | | | | | | |
|-----|----|---|----|---|-----|
| 10. | a) | Deduce the relation between slope transmission and displacement errors. | 5M | 5 | L-2 |
| | b) | Differentiate between Miller time base circuit and bootstrap time base circuit. | 5M | 5 | L-3 |

UNIT-VI

- | | | | | | |
|-----|----|---|----|---|-----|
| 11. | a) | Elucidate the basic operating principle of sampling gates using series and parallel switches. | 5M | 6 | L-3 |
| | b) | Paraphrase the operation of unidirectional diode gate. | 5M | 6 | L-2 |

(OR)

- | | | | | | |
|-----|----|--|----|---|-----|
| 12. | a) | Justify why pedestal is seen in the output of a sampling gate and explain how it can be reduced? | 5M | 6 | L-3 |
| | b) | Illustrate the operation of Four diode sampling gate. | 5M | 6 | L-2 |

**Python Programming
(COMMON TO CE, EEE, & MECH)****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 identifiers? Name their types and explain	5M	1	K1
b)	List any 6 application fields of python along with the user companies	5M	1	K1
	(OR)			
2. a)	Explain for loop and for extended for loop with diagram and example.	5M	1	K2
b)	What are operators? Elaborate with examples	5M	1	K1
	<u>UNIT-II</u>			
3. a)	Assume that the variable List1 refers to the list [11, 7, 6, 3, 7, 27, 42, 78, 60]. Write the python script with output for expressions that perform the following tasks:	10M	2	K4
	(i) Replace the value at position 0 in List1 with that value's Negation (ii) Add the value 100 to the end of List1			
	(iii) Insert the value 22 at position 2 in List1			
	(iv) Remove the value at position 1 in List1			
	(v) Locate the index of the value 7 in List1			
	(vi) Sort the values in List1			
	(vii) Join the values in the list newList1= [3, 2, "abc", 0.5] to the end of List1 (viii) Search values 7 in List1			
	(ix) Calculate the count of value 7 in List1			
	(OR)			
4. a)	Assume that the variable Set1 refers to the set = {'apple', 'banana', 'orange', 4, 5, 6, 2.5, 6.8}. Write the python script with output for expressions that perform the following tasks:			
	(i) Accessing an element in Set1			
	(ii) Add the value 100 to the Set1			
	(iii) Update ["guava", "cherry", 4.5] to the Set1	10M	2	K4
	(iv) Remove the value 4 in Set1			
	(v) Discard the value "cherry" in the updated Set1			
	(vi) Join Set2 = {2.5, 8, "cherry"} with Set1			
	(vii) Search values 6 in Set1 and calculate the count of value 4 in Set1			
	<u>UNIT-III</u>			
5. a)	Define function and write syntax of user define function in python with example?	5M	3	K3
b)	Write a program to find greatest among three number by using user defined function.	5M	3	K4

(OR)

6. a) Define file and explain with example different file operation mode. 10M 3 K4

UNIT-IV

7. a) What are models and how to use them in your program? 5M 4 K3
b) Write any five function of math module with example. 5M 4 K3

(OR)

8. a) Explain about python packaging and directory structure using appropriate software 5M 4 K2
b) Build python program with output to simulate a Bank Account class with support for depositMoney, withdrawMoney and showBalance operations. 5M 4 K3

UNIT-V

9. a) What is class describing the syntax for declaring class, creating object and accessing members of a class with help of a example. 10M 5 K6

(OR)

10. a) Construct python program with output to demonstrate multiple inheritance with method overriding 10M 5 K3

UNIT-VI

11. a) Define regular expression and explain the use of search() function with example. 5M 6 K2
b) Write any five metacharacter in regular expression with example 5M 6 K3

(OR)

12. a) Summarize the regular expression for checking Tens and Ones 5M 6 K2
b) Utilize the following {N,M} syntax to write regular expression 5M 6 K3

AR18

CODE: 18CET206

SET-1

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

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

**Engineering Geology
(CIVIL 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. a) Describe the importance of Geology in Civil Engineering? 6M
b) What is the significance of different physical properties in mineral identification? 6M
- (OR)
2. a) Outline the geological work of rivers? 6M
b) Summarize the weathering of rocks? 6M

UNIT-II

3. a) Explain the grades and zones of metamorphism? 6M
b) Simplify the sequence of formation of different groups of rocks? 6M
- (OR)
4. a) Briefly discuss the classification of rocks. 6M
b) Identify the importance of Petrology in Civil Engineering? 6M

UNIT-III

5. a) What are the effects of folding and their civil engineering importance? 6M
b) Summarize the unconformities? 6M
- (OR)
6. a) Categorize the joints in igneous, sedimentary and metamorphic rocks? 6M
b) Categorize the causes for development of structures? 6M

UNIT-IV

7. a) Classify the rocks based on the porosity and permeability. 6M
b) Summarize the demand of ground water? 6M
- (OR)
8. a) Describe the geological controls of Ground water? 6M
b) Summarize the causes of landslides? 6M

UNIT-V

9. a) Explain the instruments used in seismic studies? 6M
b) What are the classifications of geophysical methods? 6M
- (OR)
10. a) Summarize the geological considerations in the selection of Dam site? 6M
b) Explain the economic aspects of Reservoir? 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) What is the purpose of input & output devices and also describe the input-output subsystems. 6M
b) Define an addressing mode and explain briefly any five addressing modes. 6M
- (OR)
2. a) Define an instruction and explain steps involved in instruction execution cycle. 6M
b) Describe the RTL interpretation with some examples. 6M

UNIT-II

3. a) Summarize the ripple carry adder. 6M
b) Explain signed multiplication algorithm with an example. 6M
- (OR)
4. a) Discuss that how the negative numbers are represented in the system? 6M
b) Illustrate the restoring division algorithm with an example. 6M

UNIT-III

5. a) Make use of memory hierarchy to explain the cost, speed and capacity of memory. 6M
b) List and explain briefly various replacement algorithms. 6M
- (OR)
6. a) Demonstrate the memory interleaving. 6M
b) Contrast the Direct mapping and set-associative mapping. 6M

UNIT-IV

7. a) Outline the need of an I/O interface. 6M
b) Explain the daisy-chaining priority interrupt system. 6M
- (OR)
8. a) Explain the Asynchronous data transfer with the help of handshaking. 6M
b) Justify the interrupt initiated-I/O is a better mode of transfer than programmed I/O. 6M

UNIT-V

9. a) Explain four segment pipeline with neat sketch and various hazards faced during pipeline execution 12M
- (OR)
10. a) Discuss the concepts throughput and speedup. 6M
b) Classify the multiprocessor systems based on the way memory organization and explain any one type of multiprocessor system. 6M

AR18

CODE: 18ECT210

SET-1

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

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

**PULSE AND DIGITAL CIRCUITS
(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

1. a) Prove that a low pass RC circuit acts as an integrator 6M
b) Explain response of an RC high pass circuit for ramp input 6M
- (OR)
2. a) Draw the response of high pass RC circuit for a square wave Input wave with different RC time constants. 6M
b) Derive an expression for the percentage tilt. 6M

UNIT-II

3. Explain the working of a two level diode clipper with the help of circuit diagram wave form and transfer characteristics 12M
- (OR)
4. a) Explain clamping circuit theorem 6M
b) Explain series clippers with neat sketches 6M

UNIT-III

5. a) Explain transistor as a switch 6M
b) With the help of a diagram explain the working of a fixed bias of Bi stable multivibrator 6M
- (OR)
6. a) Explain diode as a switch 4M
b) Write about transistor switching times with neat sketches 8M

UNIT-IV

7. a) Draw the circuit diagram and explain the operation of Monostable multivibrator with neat wave forms 8M
b) Explain design procedure of Astable multivibrator 4M
- (OR)
8. a) Draw the circuit diagram and explain the operation of Astable multivibrator with neat wave forms 8M
b) Write about triggering methods of multivibrators 4M

UNIT-V

9. Draw the circuit and explain the operation of miller sweep generator and derive the expression of slope error 12M
- (OR)
10. Explain with the help of a neat circuit diagram the working of a Bi directional Sampling gate. Suggest a circuit that minimizes (or) eliminates the pedestal 12M

AR16

CODE: 16EE2010

SET-1

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

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

**Electro Magnetic Field Theory
(ELECTRICAL & ELECTRONICS ENGINEERING)**

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) State and explain Coulomb's law in vector form 6M
- b) Determine Electric field intensity (E) due to infinite uniform sheet of charge with density ρ_s . 8M

(OR)

2. a) Determine electric field intensity due to a surface charge 7M
- b) What are applications of potential function? 7M

UNIT-II

3. a) What are Laplace and Poisson's equations 7M
- b) An electric dipole located at the origin in free space has a moment $P=3a_x-2a_y+a_z$ ncm. Find potential(V) at $P_a(2,3,4)$ 7M

(OR)

4. Discuss the boundary conditions between two dielectrics 14M

UNIT-III

5. Calculate the magnetic field due to a finite current element along z-axis at a point p at 'r' away from y-axis. 14M

(OR)

6. Derive an expression for torque on a current loop 14M

UNIT-IV

7. a) Calculate the inductance in a solenoid. 7M
- b) Derive Lorentz force equation 7M

(OR)

8. A point charge of $Q=1.2C$ has velocity $\mathbf{v}=5a_x+2a_y-3a_z$, find the magnitude of the force exerted on the charge if
a) $\mathbf{E}=-18a_x+5a_y-10a_z$ b) $\mathbf{B}=-4a_x+4a_y+3a_z$ c) Both are present simultaneously 14M

UNIT-V

9. a) Find the conduction and displacement current densities in a material having conductivity of $10^{-3} S/m$ and $\epsilon_r=2.5$ if the electric field in the material is $\mathbf{E}=5\sin(9 \times 10^9 t)\mu V/m$ 7M
- b) Write max well's equations in integral form 7M

(OR)

10. Define pointing therom and derive an expression for it 14M

AR16

CODE: 16EC2012

SET-1

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

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

**RANDOM VARIABLES AND STOCHASTIC PROCESSES
(ELECTRONICS AND COMMUNICATION ENGINEERING)**

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) State and prove total probability theorem 7M
b) If $P(A) = 0.9$ and $P(B) = 0.8$ then show that $P(A \cap B) \geq 0.72$ 7M
- (OR)
2. a) A ship can successfully arrive at its destination if its engine and its satellite navigation system do not fail en route. If the engine and satellite navigation system are known to fail independently with respective probabilities of 0.05 and 0.001, what is the probability of successful arrival. 7M
b) State and prove Baye's theorem 7M

UNIT-II

3. a) Define probability density function and write its properties 7M
b) A student is known to arrive late for a class 40% of the time. If the class meets five times each week, find the probability that (i) the student is late for at least three classes in a week (ii) the student will not be late at all during a given week 7M
- (OR)
4. a) Explain Gaussian density and distribution functions with graphs 7M
b) Determine the skew of exponentially density function 7M

$$f(x) = \begin{cases} \frac{1}{b} e^{-\frac{x-a}{b}}, & x > a \\ 0, & x < a \end{cases}$$

UNIT-III

5. a) Define joint density function and write its properties 7M
b) The joint probability density function of two random variables X, Y is 7M
given by

$$f_{X,Y}(x, y) = u(x)u(y)xe^{-x(y+1)}. \text{ Determine } f_X(x/y) \text{ and } f_Y(y/x)$$

(OR)

6. a) Is the function $F_{X,Y}(x, y) = \begin{cases} 0 & x < y \\ 1 & x \geq y \end{cases}$ a valid joint distribution function? 7M

Justify your answer

- b) The joint probability density function of two random variables X, Y is 7M
given by

$$f_{X,Y}(x, y) = \frac{1}{12}u(x)u(y)e^{-\left(\frac{x+y}{4+3}\right)}. \text{ Show that } X \text{ and } Y \text{ are independent}$$

UNIT-IV

7. a) Define autocorrelation function of a wide sense stationary random 7M
process and write its properties
b) Show that a random process is defined by $X(t) = A \sin(\omega_0 t + \theta)$ where A 7M
and ω_0 are constants and θ is a uniformly distributed random variable
on $(-\pi, \pi)$ is wide-sense stationary

(OR)

8. a) Explain cross correlation of two random processes. 7M
b) If $X(t)$ is a stationary random process with mean $E[X(t)] = 3$ and auto 7M
correlation function $R_{XX}(\tau) = 9 + 2e^{-|\tau|}$, find (i) Mean value (ii) the
variance of random variable $Y = \int_0^2 X(t)dt$

UNIT-V

9. a) Derive the relation between power spectrum and auto correlation 7M
b) Determine the average power of the random process 7M
 $X(t) = A_0 \cos(\omega_0 t + \theta)$ where A_0 and ω_0 are constants and θ is a uniformly
distributed random variable on $\left(0, \frac{\pi}{2}\right)$

(OR)

10. a) Write the properties of cross power density spectrum 7M
b) Determine the rms bandwidth of power density 7M

$$\text{spectrum } S_{XX}(\omega) = \frac{10}{\left[1 + \left(\frac{\omega}{10}\right)^2\right]^2}$$

**PULSE AND DIGITAL CIRCUITS
(ELECTRONICS AND COMMUNICATION ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Define time constant of a circuit?
- b) When does low pass circuit act as differentiator?
- c) What is meant double ended clipping?
- d) State clamping circuit theorem?
- e) Define storage time of a diode?
- f) What is the turn on time of a Transistor?
- g) Define quasi stable state?
- h) List the methods of triggering?
- i) How many types of blocking oscillators are there?
- j) What is sweep time?

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) An RC low-pass filter is fed with a symmetrical square wave. The peak-to-peak amplitude of the input waveform is 10 V and its average value is zero. It is given that $RC=T/2$ where T is the period of the square wave. Determine the peak-to-peak amplitude of the output waveform. 6
- b) Explain in detail about the Response of high pass filter with waveforms for pulse input. 6

(OR)

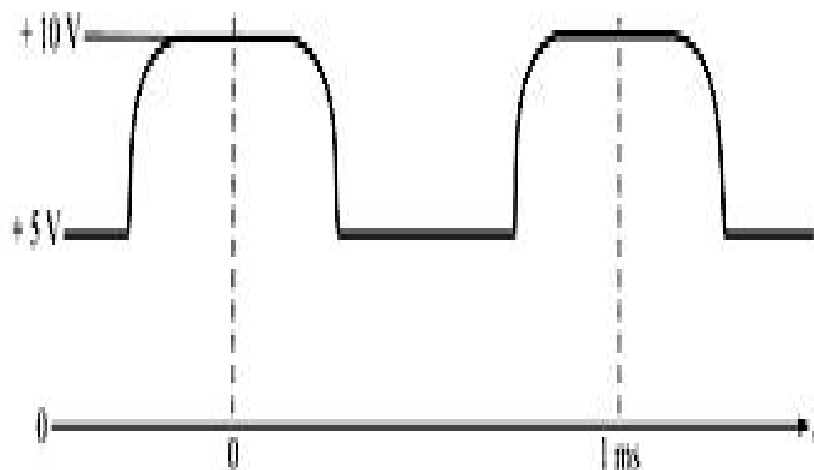
3. a) Why attenuators are required and illustrate the 3 different responses of compensated attenuators 8
- b) Draw the circuit of Low passes RL circuit and explain 4

UNIT-II

4. a) Draw the circuit diagram of emitter coupled clipper and explain its working in detail. 6
- b) Classify the type of clamping circuits and explain in detail about positive clamping circuit 6

(OR)

5. a) Explain about voltage comparators with circuit diagram. 4
 b) Design a clipping circuit with ideal components, which can give the waveform shown in below figure for sinusoidal input. 8



UNIT-III

6. Inspect in detail about switching times of junction diode with required diagrams. 12
 (OR)
 7. a) Explain the working of fixed bias bistable multi vibrator with required diagrams. 8
 b) Explain about direct coupled binary. 4

UNIT-IV

8. a) Explain the working of collector coupled astable multivibrator with waveforms and derive the expression for its frequency of oscillations 12
 (OR)
 9. a) Draw the circuit for transistor Miller time base generator and explain in detail. 8
 b) What are the different methods of generating a time base wave form. 4

UNIT-V

10. Explain the working of monostable blocking oscillator with emitter timing. 12
 (OR)
 11. a) Illustrate the operation of unidirectional sampling gate for multiple inputs with neat circuit diagram 6
 b) Explain about Bi directional sampling gates using diodes. 6