DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ADE QUESTION BANK

Course Title: ANALOG AND DIGITAL ELECTRONICS

Course Code: EC2101ES

Course Objectives:-

1. **To introduce components such as diodes , BJTS and FET**

2. **To know the applications of components**

3. **To give understanding of various types of amplifier circuits.**

4. **To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.**

5. **To understand the concepts of combinational logic circuits and sequential circuits.**

CourseOutcomes(CO's):-
1. **Know the characteristics of various components.**
2. **understand the utilization of components**
3. **Design and analyse small signal amplifier circuits.**
4. **Learn postulates of Boolean algebra and to minimize combinational functions.**
5. **Design and analyse combinational and sequential circuits.**
6. **Know about the logic families and realization of logic gates**

UNIT–I

DIODES AND APPLICATIONS

S.No		Questions	BT	CO	PO
Part –A(ShortAnswerQuestions)					
1		What is a Diode? How many terminals does it has?	L1	CO1	PO1
2		Explain about Effect of Temperature in p-n junction?	L2	CO1	PO1,PO4
3		Define LED ? Write its Applications?	L3	CO2	PO1
4		Write short notes on Switching Times?	L2	CO3	PO1,PO10
5		Explain about Tunnel Diodes?	L1	CO1	PO1
6		Briefly explain about photo diode?	L2	CO1	PO1,PO10
7		Write few advantages and disadvantages of photo diode?	L2	CO2	PO1,PO10
8		Write few Diode applications?	L3	CO2	PO1,PO10
9		Write few advantages and disadvantages of LED?	L2	CO2	PO1,PO10
10		Explain about intrinstic and extrinsic semiconductors?	L1	CO1	PO1,PO3
Part– B(LongAnswerQuestions)					
11	a)	Explain P-N Junction as a Rectifier	L2	CO1	PO3,PO4
	b)	Write a short notes on (i) Photo diode (ii)LED	L3	CO3	PO1,PO10
12	a)	Explain V-I Characteristics and effect of Temperature of p-n junction diode	L4	CO1	PO3,PO4
	b)	Explain Full wave Rectifier with capacitor filter	L3	CO3	PO3

13	a)	Derive Diffusion Capacitance	L3	CO3	PO2,PO3
	b)	Explain about forward and reverse bias of p-n junction diode	L2	CO2	PO3,PO4
14	a)	Define Full wave Rectifier with the help of circuit diagram and waveforms and also derive Efficiency and Transformer Utilization Factor for it.	L2	CO3	PO2,PO3,PO4
	b)	Briefly explain about comparators	L1	CO3	PO3

15	a)	With the help of circuit diagram and waveforms Explain Half wave Rectifier and also derive RMS value and Ripple factor for it.	L2	CO3	PO2, PO3
	b)	Explain clipping circuits in detail.	L1	CO3	PO3,PO4
16	a)	Explain V-I Characteristics and effect of Temperature of p-n junction diode	L3	CO1	PO3
	b)	Derive Diffusion Capacitance	L4	CO3	PO2,PO3

UNIT–II

BJT'S

S.No		Questions	BT	CO	PO
		Part –A(ShortAnswerQuestions)			
1		Define BJT?	L1	CO1	PO1
2		What are the three terminals that BJT has?	L2	CO1	PO1
3		Explain about common base configuration?	L2	CO2	PO3
4		Write the output characteristics of CE configuration?	L3	CO2	PO3
5		Explain self bias with neat circuit diagram?	L2	CO1	PO1,PO3
6		Write few advantages and disadvantages of BJT?	L3	CO2	PO2,PO10
7		Define stability?	L1	CO1	PO1
8		Define amplifier?	L1	CO1	PO1
9		Explain transistor characteristics?	L2	CO1	PO1,PO2
10		Why we are using BJT 's than FET's ?	L5	CO2	PO2
		Part– B(LongAnswerQuestions)			
11	a)	What is BJT? Explain junction transistor, transistor as an amplifier in BJT?	L2	CO2	PO1
	b)	Define about common emitter transistor configuration in details?	L3	CO3	PO3, PO4
12	a)	Explain about common base transistor configaration in details?	L3	CO3	PO3, PO4
	b)	Derive the relation between current amplification factor for ALPHA and BITA?	L5	CO3	PO2,PO3,PO4
13	a)	Explain about common collector transistor configuration in details?	L3	CO3	PO2
	b)	Comparison of all transistor configaration i.e,CB,CE,CC.	L2	CO2	PO2,PO4
14	a)	Explain about operating point, emitter bias, thermal runway.	L1	CO2	PO1
	b)	Define RC coupled amplifier in details?	L3	CO2	PO3
15	a)	Sketch two cascaded CE amplifier in details?	L4	CO2	PO3
	b)	Explain about multistage CE amplifier in details?	L4	CO3	PO3,PO4
16	a)	Derive the relation between current amplification factor for ALPHA and BITA?	L5	CO2	PO2,PO3,PO4
	b)	Explain about operating point, emitter bias, thermal runway	L1	CO1	PO2

UNIT–III

FET'S AND DIGITAL CIRCUIT

S.No	Questions	BT	CO	PO
	Part –A(ShortAnswerQuestions)			
1	Define FET and MOSFET?	L1	CO2	PO1

2		Explain binary operations of a system?	L1	CO2	PO1
3		Explain OR gate and NOT gate?	L2	CO1	PO10
4		Define AND gate with circuit diagram?	L2	CO1	PO10
5		With the help of circuit diagram and truth table explain Exclusive OR (EX-OR) gate?	L2	CO2	PO3,PO4
6		Define Demorgans law?	L1	CO2	PO2
7		Explain NAND gate?	L2	CO3	PO3
8		Define TTL in short ?	L2	CO3	PO3
9		Write about DTL in short?	L2	CO3	PO3,PO4
10		Explain about HTL in short?	L2	CO3	PO3
Part– B(LongAnswerQuestions)					
11	a)	Explain JFET with V-I characteristics?	L3	CO1	PO2
	b)	Explain MOSFET in details?	L2	CO2	PO3
12	a)	Explain all logic gates in details?	L4	LO4	PO3, PO4
	b)	Sketch the CMOS inverter in details?	L2	CO3	PO3
13	a)	Define about modified DTL - NOR gate?	L2	CO6	PO3,PO4
	b)	Explain about TTL - NAND gate in details?	L2	CO6	PO3,PO4
14	a)	Define about RTL and DCTL - NOR gate in details?	L3	CO6	PO3,PO4
	b)	Explain about CMOS - NAND gate in details?	L2	CO6	PO3,PO4
15	a)	Comparison of all logic families?	L1	CO4	PO2
	b)	Explain low frequency of CS and CD amplifier?	L2	CO3	PO2
16	a)	Write the differences between FET and MOSFET ?	L4	CO2	PO2
	b)	Explain about modified DTL - NAND gate?	L2	CO5	PO5

UNIT–IV

COMBINATIONAL LOGIC CIRCUITS

S.No		Questions	BT	CO	PO
Part –A(ShortAnswerQuestions)					
1		Explain digital logic gates in short?	L1	CO6	PO1,PO10
2		Write few don't care conditions?	L2	CO4	PO1
3		Define NAND implementation?	L3	CO6	PO2
4		Define NOR implementation?	L3	CO6	PO2
5		Explain POS operation with one example?	L5	CO4	PO3
6		Define SOP operation with one example?	L5	CO4	PO4
7		What is binary adder?	L1	CO6	PO4
8		What is binary subtractor?	L1	CO6	PO1
9		Explain decimal adder?	L1	CO6	PO1
10		What is decoder and encoder in short?	L2	CO6	PO1
Part– B(LongAnswerQuestions)					
11	a)	Explain basic theorems and properties of Boolean algebra?	L3	CO4	PO1
	b)	Explain Full adder in details with truth table?	L4	CO6	PO2
12	a)	Explain binary multiplier in details?	L2	CO6	PO2
	b)	Explain about magnitude comparator?	L2	CO6	PO3,PO4
13	a)	Design 4×1 multiplexer in details?	L3	CO6	PO3,PO4
	b)	Explain about 2 to 4 decoders?	L4	CO4	PO3,PO4
14	a)	Design EXCLUSIVE - OR function in details?	L2	CO4	PO3
	b)	Simplify the given k- map in to POS form $F(A,B,C,D)= SIGMA\ m(0,1,2,5,8,9,10)$	L5	CO4	PO2,PO3,PO4
15	a)	Simplify the given k-map by using Don't care conditions $F(A,B,C,D)= SIGMA\ (012346910+d(7,11,12,13,15)$	L5	CO4	PO2,PO3,PO4
	b)	Explain about subtractor with truth table ?	L2	CO4	PO2
16	a)	Simplify POS operation and SOP operation with examples?	L3	CO4	PO1

			BT	CO	PO
	b)	Sketch 1×4 Demultiplexer in details?	L2	CO4	PO3,PO4

UNIT-V

SEQUENTIAL LOGIC CIRCUITS

S.No		Questions	BT	CO	PO
		Part –A(ShortAnswerQuestions)			
1		Explain about sequential logic circuit? In short?	L2	CO5	PO5
2		What are storage elements?	L1	CO5	PO5
3		What are latches?	L1	CO5	PO5
4		Define flip-flops?	L1	CO5	PO1
5		Define ROM in short?	L2	CO5	PO5
6		Define RAM in short?	L2	CO5	PO5
7		Explain about shift registers?	L2	CO5	PO5
8		What are counters?	L2	CO5	
9		Explain about ripple counters?	L2	CO5	
10		Define ROM and RAM?	L3	CO5	
		Part– B(LongAnswerQuestions)			
11	a)	Write the differences between combinational and sequential circuits?	L4	CO5	
	b)	Write the differences between latches and flip-flops?	L4	CO5	
12	a)	Explain state reduction and assignment with one example?	L3	CO5	
	b)	Define shift registers SISO (or) SIPO in details?	L2	CO5	
13	a)	Explain shift registers of PIPO?	L2	CO5	
	b)	Write differences between synchronous and Asynchronous counters?	L4	CO5	
14	a)	Explain about Ripple counter in details?	L4	CO5	
	b)	Define RAM in details?	L2	CO5	
15	a)	Explain about ROM in details?	L2	CO5	
	b)	Write the differences between RAM and ROM?	L4	CO5	
16	a)	Explain about synchronous counter in details?	L2	CO5	
	b)	Explain about combinational circuit in details?	L2	CO5	

*BloomsTaxonomyLevel(BT)(L1–Remembering;L2–Understanding;L3–Applying;L4–Analyzing;L5–Evaluating;L6–Creating)

Course Outcomes

(CO)ProgramOutcomes(PO)