

Hall Ticket No

Question Paper Code: AECB01



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-I

B.Tech V Semester End Examinations, November - 2019

Regulation: IARE-R18

BASIC ELECTRONICS ENGINEERING

(Civil Engineering)

Time: 3 Hours

Max Marks: 70

Answer any ONE question from each Module

All questions carry equal marks

All parts of the question must be answered in one place only

MODULE – I

- 1 a) What is potential barrier in a pn junction? How does it arise in a pn junction? Explain. [7M]
b) Find the factor by which the reverse saturation current of a silicon diode will get multiplied when the temperature is increased from 27°C to 82°C ? [7M]
- 2 a) Explain and differentiate between Avalanche and Zener breakdown mechanism [7M]
b) What is Peak Inverse Voltage (PIV) and explain how it is different in full wave rectifier to that from half wave rectifier? [7M]

MODULE – II

- 3 a) Explain about the enhancement mode of MOSFET [7M]
b) What is pinchoff voltage and discuss about drain current equation. [7M]
- 4 a) Write short note on CMOS circuits. [7M]
b) Draw the circuit diagram of a fixed bias and derive expression for Stability factor. [7M]

MODULE – III

- 5 a) Explain the concept of virtual ground in an Op-Amp. [7M]
b) Draw and explain internal block diagram of an Op-amp [7M]
- 6 a) Define Slew rate . Explain the concept of Slew Rate with graphs. [7M]
b) What is inverting amplifier with opamp? How it is used as a summer amplifier? [7M]

MODULE – IV

- 7 a) Draw the block diagram of an Astable multivibrator using 555timer and derive an expression for its frequency of oscillation. [7M]
b) Design and draw the wave forms of 1KHZ square waveform generator using 555 Timer for duty cycle $D=25\%$. [7M]

- 8 a) Explain successive approximation A/D converter with functional diagram for a given analog input. [7M]
b) What is the significance of data conversion in electronic circuits? Explain about ADC and DAC. [7M]

MODULE – V

- 9 a) Define weighted codes and non weighted codes with examples? [7M]
b) Convert the given expression in standard POS form [7M]
 $Y = (A+B)(B+C)(A+C)$.
- 10 a) Simplify the following 3 variable expression using Boolean algebra $Y = \sum m(1,3,5,7)$. [7M]
b) Perform the subtraction using 1's complement and 2's Complement [7M]
i) $(11010)_2 - (10000)_2$ ii) $(1000100)_2 - (1010100)_2$



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COURSE OBJECTIVES:

The course should enable the students to:	
I	Introduce components such as diodes, BJTs and FETs.
II	Know the applications of components.
III	Understand common forms of number representation in logic circuits.
IV	Be acquainted to principles and characteristics of op-amp and apply the techniques for the design of comparators, instrumentation amplifier, integrator, differentiator.

COURSE OUTCOMES (COs):

CO 1	Describe the concept of diode and its applications.
CO 2	Describe the operation of various transistors, FETs and their biasing methods.
CO 3	Understand the concept of operational amplifier with analysis of applications.
CO 4	Analysis of 555 timer IC for multivibrators and op-amp data converters.
CO 5	Explore the digital number systems and various digital logic circuits.

COURSE LEARNING OUTCOMES (CLOs):

AECB01.01	Understand the basic concept of PN junction diode.
AECB01.02	Analyze the characteristics of diode for ideal and practical conditions.
AECB01.03	Understand the applications of diode in rectifiers with and without filters.
AECB01.04	Understand the concept of breakdown mechanism in diodes with applications of Zener breakdown diodes.
AECB01.05	Describe the classification family table of various transistors.
AECB01.06	Describe the concept of Bipolar Junction transistor with various modes of operation.
AECB01.07	Understand the concept of transistor biasing with voltage divider bias.
AECB01.08	Understand the construction and working of Field Effect Transistor(FET).
AECB01.09	Understand the concept of Metal Oxide Semiconductor FET.
AECB01.10	Illustrate the basic CMOS circuits.
AECB01.11	Understand the basic concepts of operational amplifiers.
AECB01.12	Analyze the parameters of practical and ideal op-amps.
AECB01.13	Understand the concept of virtual ground in op-amps.
AECB01.14	Perform basic arithmetic operations on voltages using opamps.
AECB01.15	Examine the working of op-amp as differentiator, integrator, comparator and buffer.
AECB01.16	Understand the internal block diagram of 555 timer IC.
AECB01.17	Examine the working of 555 timer as astable and monostablemultivibrator.
AECB01.18	Understand the principle of data conversions with terminology.
AECB01.19	Analyze the A/D converters.
AECB01.20	Analyze the resistor ladder D/A converters.
AECB01.21	Perform calculations in different number systems.

AECB01.22	Understand the basic concepts of Boolean algebra and combinational logic circuits.
AECB01.23	Understand the basic sequential logic circuits.
AECB01.24	Understand counters, registers.

MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No		Course Learning Outcomes	Course Outcomes	Blooms Taxonomy Level
1	a	AECB01.01 Understand the basic concept of PN junction diode.	CO 1	Understand
	b	AECB01.01 Understand the basic concept of PN junction diode.	CO 1	Apply
2	a	AECB01.04 Understand the concept of breakdown mechanism in diodes with applications of Zener breakdown diodes.	CO 1	Understand
	b	AECB01.02 Understand the applications of diode in rectifiers with and without filters.	CO 1	Understand
3	a	AECB01.09 Understand the concept of Metal Oxide Semiconductor FET.	CO 2	Understand
	b	AECB01.08 Understand the construction and working of Field Effect Transistor(FET).	CO 2	Remember
4	a	AECB01.10 Illustrate the basic CMOS circuits	CO 2	Understand
	b	AECB01.07 Understand the concept of transistor biasing with voltage divider bias.	CO 2	Understand
5	a	AECB01.13 Understand the concept of virtual ground in op-amps.	CO 3	Understand
	b	AECB01.11 Understand the basic concepts of operational amplifiers.	CO 3	Apply
6	a	AECB01.12 Analyze the parameters of practical and ideal op-amps.	CO 3	Understand
	b	AECB01.14 Perform basic arithmetic operations on voltages using opamps.	CO 3	Remember
7	a	AECB01.17 Examine the working of 555 timer as astable and monostablemultivibrator.	CO 4	Understand
	b	AECB01.17 Examine the working of 555 timer as astable and monostable multivibrator.	CO 4	Apply
8	a	AECB01.19 Analyze the A/D converters.	CO 4	Understand
	b	AECB01.18 Understand the principle of data conversions with terminology.	CO 4	Apply
9	a	AECB01.22 Understand the basic concepts of Boolean algebra and combinational logic circuits.	CO 5	Understand
	b	AECB01.22 Understand the basic concepts of Boolean algebra and combinational logic circuits.	CO 5	Understand
10	a	AECB01.22 Understand the basic concepts of Boolean algebra and combinational logic circuits.	CO 5	Understand
	b	AECB01.21 Perform calculations in different number systems.	CO 5	Apply

Signature of Course Coordinator

HOD, ECE