PRESIDENCY UNIVERSITY
BENGALURU

SET B

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024

Semester : Semester I - 2023
Course Code : ECE1001
Course Name : Elements of Electronics Engineering
Program : B.Tech.

Date : 12-JAN-2024
Time : 9:30AM - 12:30 PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   **5 X 2M = 10M**

1. The number system with base 16 is Hexadecimal and decimal number system has base 10 .convert (1ACC)16 to (   )10.

    (CO3) [Knowledge]

2. There are different types of number systems such as decimal number system, binary number system, octal number system, and hexadecimal number system .Convert binary number 101010111100011101 to its equivalent hexadecimal number.

    (CO3) [Knowledge]

3. In a Communication system a device which provides output in electrical form or it has input in electrical form is called a _____.

    (CO4) [Knowledge]

4. Semiconductor devices are made of p type and n type materials.Differentiate between PN juction diode and zener diode.

    (CO1) [Knowledge]

5. A transistor can be used as an amplifier or switch depending on the region in which two junctions J1 & J2 are biased.If a transistor has to work in cutoff region then junction1 should be _____ biased and J2 junction should be _____ biased.

    (CO2) [Knowledge]

PART B

6. Modulation can be digital or analog. Input wave of analog scheme varies continuously like a sine wave.Define the modulation process.Explain the need for modulation .With the required waveforms Explain the different types of modulation. **(10 marks).**

(CO2,CO3) [Comprehension]

7. A transistor has three terminals emitter, base and collector. With three types of biasing configurations such as common base, common emitter, common collector. Explain in detail common emitter configuration with required circuit diagram. Also bring out the details of input and output characteristics with required graphs. **(10 marks).**

(CO2,CO3) [Comprehension]

8. a)Computer memory stores information, such as data and programs for immediate use in the computer. List and Explain the different types of memory in a computer system.**(5 marks).**
b)The communication system is meant for transmission of different kinds of information from source to destination. With a neat schematic diagram.Explain in detail the block diagram of communication system.**(5 marks).**

(CO4) [Comprehension]

9. The rectifier is a type of circuit that converts alternating (AC) current to a pulsating DC.Design a full wave rectifier using two **D1 and D2 diodes** with N1 and N2 primary and secondary coil in transformer, also plot the graph of expected wave forms.(10 marks).

(CO2,CO3) [Comprehension]

10. **a)** Basic gates are building blocks of digital circuits.With the help of symbolic representation and truth table,Explain all the basic gates.**(5 marks).**

    b) A diode is a two terminal device that conducts current in one direction.The mode of operation and the required details is represented by the Diode Approximation models. Explain all three Diode Approximation models with the required circuits and graphs. **(5 marks).**

(CO2,CO1) [Comprehension]

PART C

11. **a)** Binary subtraction is the process of subtracting binary numbers. Binary numbers include only 0 and 1. Perform binary subtraction using **1's complement** method **(22)-(33). (5 marks).**
    b) A heavily doped p-n junction diode that works in reverse bias conditions is called a Zener Diode. They are special semiconductor devices that allow the current to flow in both forward and backward directions. In the circuit shown, the knee current Iz of Zener diode is **10mA** to maintain **5v** across RL. Find minimum value of load resistance RL in ohms and current across load IL.**(5 marks).**
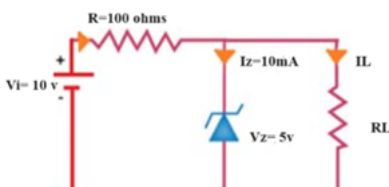
C) Q-point is located using operating voltage and current with dc load line drawn considering maximum current and voltage values. For the given fixed bias circuit of Si transistor with **β=60 and VBE=0.7v** Draw dc load line and determine operating point and mark all the points on the plot. **(10 marks).**
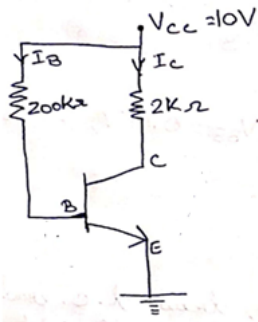
(CO3,CO2) [Application]

12. **a)** Boolean algebra is also known as binary algebra or logical algebra. The most basic application of boolean algebra is that it is used to simplify and analyze various digital logic circuits. Simply the equation **A'B'C'+A'BC'+A'BC.** And also implement simplified equation using basic gates.**(5 marks).**

b) Demorgan's theorem establishes the uniformity of a gate with identically inverted input and output. state and prove with the help of truth table DeMorgan's law for three variables A,B,C. **(5 marks)**

c) The output of a NAND gate is high when either of the inputs is high or if both the inputs are low. Realise basic gates and special gates using **NAND** gates only **(NOT, AND, OR, EXOR, EXNOR). (10 marks)**

(CO3) [Application]