PRESIDENCY UNIVERSITY
BENGALURU

SET A

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. If a given number A=97 ,find the 1's complement of A.

    (CO3) [Knowledge]

2. Hexadecimal number system exist with base 16 and decimal number system exist with base 2.convert (1ADF)16 to (   )10.

    (CO3) [Knowledge]

3. The memory in microprocessor is meant for storing the data .The memory storage capacity of 8085 microprocessor is _____.

    (CO4) [Knowledge]

4. Semiconductor diode operated with minimum knee voltage ……...…........volts for Ge and ….....…......…volts for Si.

    (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 active region then junction1 should be _____ biased and J2 junction should be _____ biased.

    (CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   **5 X 10M = 50M**

6. Modulation in a communication system is carried out to successfully transmit and receive the different information signals through different channels .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 Zener Diode, also referred to as a breakdown diode, is a specially doped semiconductor device engineered to function in the reverse direction. with required circuit diagram and equations explain zener diode as voltage regulator. **(10 marks)**

    (CO2,CO3) [Comprehension]

8. 8085 microprocessor is a program controlled semiconductor device (IC), which fetches, decodes and executes instructions. The basic units or blocks of a microprocessor are ALU, an array of registers and control unit.With a neat schematic diagram.Explain in detail the block diagram of 8085 microprocessor. **(10 marks).**

(CO4) [Comprehension]

9. The bridge rectifier is a type of full-wave rectifier that uses four diodes in a bridge circuit configuration to convert alternating (AC) current to a pulsating DC.Design a full wave Bridge rectifier using 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)There are 3 categories of gates such as basic gates, universal gates and special function gates.With the help of symbolic representation and truth table ,Explain all the basic gates. **(5 marks).**

b) A diode is a semiconductor device that essentially acts as a one-way switch for current 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

ANSWER ALL THE QUESTIONS   2 X 20M = 40M

11. **a)1's complement subtraction** is a method to subtract two binary number. This method allows subtraction of two binary numbers by addition. Perform binary subtraction using 1's complement method **(56)-(23). (5 marks).**

b) A Zener Diode, also referred to as a breakdown diode, is a specially doped semiconductor device engineered to function in the reverse direction. 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).**
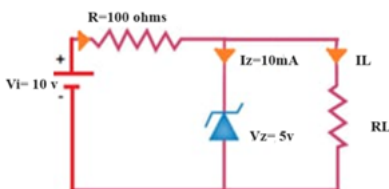
c) A dc load line is a straight line drawn on output characteristics of a transistor. This line is used for finding operating voltage and current. For the given common emitter fixed bias circuit, draw dc load line and mark all the required quantities in the plot assume **β=100, neglect VBE. (10 marks).**
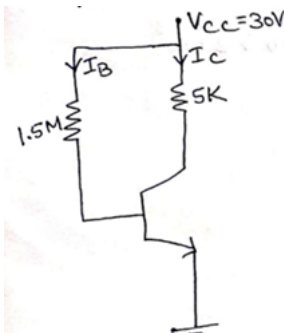
(CO3,CO2) [Application]

12. **a)** Boolean algebra laws and theorems are a set of rules that are required to reduce or simplify any given complex Boolean expression. Simply the equation **XY+XYZ+XYZ'+X'YZ.** And also implement simplified equation using basic gates. **(5 marks).**

b) DeMorgan's theorem is one way of simplification used in Boolean algebra State and prove with the help of truth table DeMorgan's law for **two** variables **A, B. (5 marks).**

c) Universal gates such as NAND and NOR gates can be used to implement any Boolean function. Realise basic gates and special function gates using **NAND gates** only (**NOT, AND, OR, EXOR, EXNOR).(10 marks).**

(CO3) [Application]