PRESIDENCY UNIVERSITY
BENGALURU

SET - B

SCHOOL OF ENGINEERING
END TERM EXAMINATION - FEB 2023

Semester : Semester I - 2022
Course Code : ECE1001
Course Name : Sem I - ECE1001 - Elements of Electronics Engineering
Program : B.Tech - (All Programs)

Date : 20-FEB-2023
Time : 1.00PM - 4.00PM
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 **(10 X 2 = 20M)**

1. State and explain De-morgan's theorem for two inputs.

    (CO1) [Knowledge]

2. There are six laws of boolean algrebra which helps in simplifications of circuits. Explain the identity and compliment law of boolean algebra ?

    (CO1) [Knowledge]

3. Implement a AND gate using a NOR gate. How many gates are required?

    (CO1) [Knowledge]

4. 8085 is an 8-bit general purpose microprocessor. How many byte of memory it can address?

    (CO1) [Knowledge]

5. Microprocessor buses come in a variety of bit sizes and can be either unidirectional or bidirectional. The data is sent out via data buses. What is the data bus's size and nature ?

    (CO1) [Knowledge]

6. Out of different registers present in 8085, which registers may be used in pairs to hold 16 bit data ?

    (CO1) [Knowledge]

7. Rectifier is used to convert AC to pulsating DC. Which rectifires have best efficiency?

    (CO1) [Knowledge]

8. Zener diode works in reverse biased conditions and helps in voltage regulation. Mention the two types of breakdown. Which breaddown will require more voltage amongst the two and why ?

    (CO1) [Knowledge]

9. Diode Approximation is a mathematical method used to approximate the non-linear behavior of real diodes to enable calculations and circuit analysis. Explain the ideal diode model

    (CO1) [Knowledge]

10. The smoothness of the output DC signal is measured by a factor known as the ripple factor. The output DC signal with fewer ripples is considered a smooth DC signal while the output with high ripples is considered a high pulsating DC signal. Consider a bridge wave rectifier. Ripple factor of bridge full wave rectifier is _____

(CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   **(4 X 10 = 40M)**

11. DC load line are used to find the optimum operating points. State the two purpose of DC load line. Ram wants to find the Q point for his circuit as shown below. Explain the process to find the DC load line and the Q point.

(CO2) [Comprehension]

12. A diode is a two terminal semiconductor device, P-N junction diode is formed by combining the N-Type and P-Type material together and providing the leads to connect external biasing. The figure below represents PN junction diode characteristics. Refer the figure and answer the following questions:
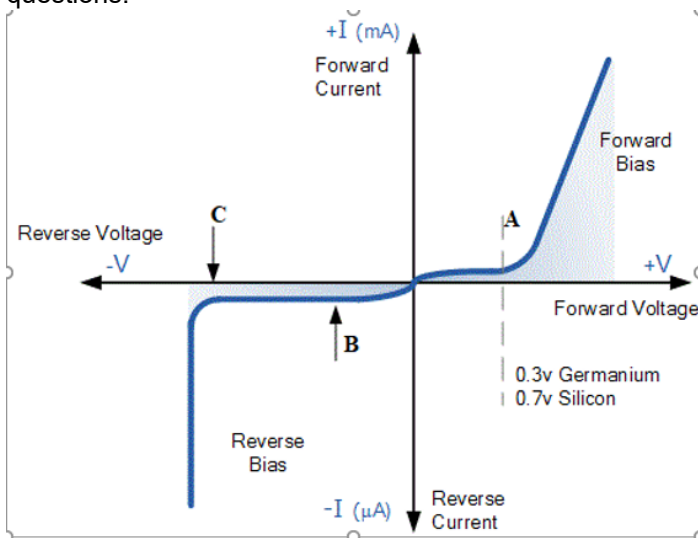
1. In forward bias condition, at point A, value of silicon diode and Germanium diode is 0.7V and 0.3V respectively. Identify and define Point A? (2 M)
2. In reverse bias condition, point B represents very low value of current, how the current is measured in reverse bias condition? (1 M)

(a) μ Amperes   (b) n Amperes   (c) Amperes   (d) Both (a) & (b)

1. For above PN Junction diode if forward current is given as 3 mA and forward voltage is given as 6 V calculate the static resistance of Diode? (3 M)
2. Identify and define Point B and C and also Define and when they occur in PN junction Diode? (4 M)

(CO2) [Comprehension]

13. a) The communication system is a framework for describing the transfer of information between two sites. Communication is the process of sending and receiving information. Use a communication system block diagram to illustrate the key components.

b) Singers and other vocalists utilise modulation to change the loudness or pitch of their vocals, among other things. In terms of technical expression, it represents the multiplication of the initial signal by a different periodic signal. Henceforth, briefly describe modulation's procedure, its necessity, and different modulation approaches.

(CO2) [Comprehension]

14. 8085 has different kinds of special registers like Accumulator, Instruction Registers, Program Counters and Stack Pointers. Briefly explain these registers and using examples/psedo codes explain the working of each of these four registers. Imagine and write some potential consequences of manipulating the stack pointer incorrectly in a program,

(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS   (2 X 20 = 40M)

15.a) Using different boolean laws, simplify the following and implement the circuits using both AND-OR and NAND-NAND   (CO3) [Application]
$i) \bar{A}B\bar{C}D + \bar{A}BCD + ABD$
$ii) AC + ABC + \bar{A}BC + AB$

15.b) Digital logic employs both the 1's complement and the 2's complement for subtraction. Perform the following procedures using 1's complement. Mention the steps in detail.   (CO3) [Application]
i) 15-7
ii) 7-15

15.c) Based on the base, the digital system uses the decimal, binary, hexadecimal, and octal number systems. The following number should be converted using the other number systems mentioned.   (CO3) [Application]
i) 85 in decimal to binary and octal
ii) 1EAC in hexadecimal to binary
iii) 10100110101111 in binary to hexadecimal

16.a) A Microprocessor is an important part of a computer architecture. It is a programmable device that takes in input performs some arithmetic and logical operations over it to produce a desired output. The Intel 8085 is the first commercial 8-bit microprocessor designed using NMOS-technology, widely used in washing machines, microwave ovens, mobile phones, etc. Henceforth, sketch the internal Architecture of 8085 Microprocessor. Also explain the role of temporary and general purpose registers.   (CO3) [Application]

16.b) Buses in microcontrollers are sets of pins, wires or signals having common function. Explain the three types of busses and mention the differences between any two of them.   (CO3) [Application]

16.c) In microprocessor, the ALU performs the actual arithmetic and logic operation such as Addition, Subtraction, AND, OR, etc. The ALU will perform the arithmetic and logic operation on the numbers, which are stored in the register Accumulator and other register. The ALU is directly connected with these registers, and the operation of ALU is controlled by control signal generated from timing & control unit. If Accumulator is stored with value (86), and the other Register B is holding value (18), then perform the following sequence of control operations: (CO3) [Application]
i) Convert the given [Register-A = (86) and Register-B = (18)] Decimal Number to Binary Number.
ii) Perform 2's Compliment of Register–B and store the result in Register-C.