PRESIDENCY UNIVERSITY
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SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023

Semester : Semester II - 2022
Course Code : ECE1001
Course Name : Sem II - ECE1001 - Elements of Electronics Engineering
Program : CAI,COM,CSE&CSG

Date : 9-JUN-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** (5 X 2 = 10M)

1. A capacitor is used to filter the pulsating DC o/p once rectification so that an almost stable DC voltage can be supplied to the load. Mention the values of PIV and ripple factor for full wave rectifier.

    (CO2) [Knowledge]

2. The NAND and NOR gates are called as the universal gates as these gates are used to perform any type of logic application. Implement AND gate using NOR gate.

    (CO3) [Knowledge]

3. The transistor is a three terminal semiconductor device in which amplifies the signal. Define current amplification factor α and β of a transistor in common base configuration and common emitter configuration.

    (CO2) [Knowledge]

4. Find the equivalent resistances of 3 resistances 50Ω, 100Ω and 150Ω connected in series and parallel.

    (CO1) [Knowledge]

5. A microprocessor contains ALU, an array of registers and control unit. Mention the number of bits available for program counter and stack Pointer.

    (CO4) [Knowledge]

ANSWER ALL THE QUESTIONS   **(2 X 15 = 30M)**

6. a) DC load line is the locus of all possible operating point at which BJT remains in active region. It is drawn on the output Characteristics of BJT. Fig shows a fixed bias circuit.
    (i) Determine VCE and IC for the circuit.
    (ii) Draw the DC load line for the circuit and locate the Q point on it. (Given β=100, RB = 530KΩ, RC = 2KΩ, VCC = +6V).   (10 Marks).
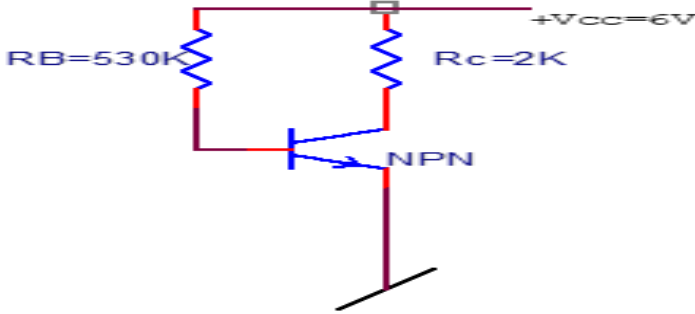
b) Communication is basically a process of establishing a connection for the information exchange between two points. The essential components of a communication system are information source, input transducer, transmitter, communication channel, receiver and destination. Explain the Block Diagram of Communication System.   (5M)

(CO3,CO2) [Comprehension]

7. a) A transistor is a semiconductor device which transfers a weak signal from low resistance circuit to high resistance circuit. Explain the input and output characteristics of Common Emitter configuration indicating active saturation and cutoff region on the output characteristics.   (5M)
    b)
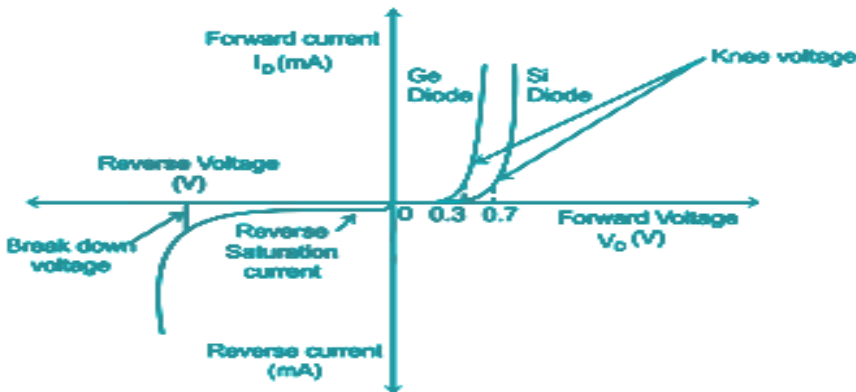
   a.Mention the Knee Voltage for Si and Ge type diode under forward bias condition from the given figure.   (1M)
   b. Explain reverse saturation current and peak inverse voltage (PIV) of diode.   (3M)
   c. Mention the mathematical expression for diode current equation. If the reverse saturation current of silicon type diode is 10µA at 25 degree centigrade with 0.6V forward voltage. Calculate the diode forward current.   (6M)

(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS   **(3 X 20 = 60M)**

8. a) Buses are the set of pins which helps in communication inside and outside the microprocessor. Differentiate between the address bus, data bus and control bus.   (5M)
   b) Microprocessor is capable of performing arithmetic and logical operations. It performs these operations with the help of internal registers. Explain the role of accumulator in arithmetic and logical operations of microprocessor.   (5M)
   c) The decimal number can be converted into various numbers systems using defined set of procedural steps. Convert the given decimal numbers in binary and hexadecimal number systems
       i) (345)d   (4M)
       ii)(1024)d   (6M)

                                                      (CO4,CO3) [Application]

9. a) The process of transforming a signal into a form appropriate for transmission is known as modulation. Explain the need of Modulation. What are the different types of modulation.   (7M)
   b) Rectifier is the circuit used for converting AC voltage to pulsating DC. Explain the working of full wave Bridge rectifier with input and output waveform.   (7M)
   c) Explain the advantages of universal gates for implementing the Boolean expressions. Briefly discuss SOP and POS with examples. Implement
       i) f = A+ BCD' using NAND gates.   (3M)
       ii)f = (B + C) (A' + B' + C' + D') (A' + B) using basic gates.   (3M)
                                               (CO3) [Application]

10. a) Using Boolean laws simplify the following equations and implement using AND-OR logic
        i) A'BCD+ABCD+ABCD+ACB'D+BCD   (5M)
        ii) AC+ABC+A'BC+AB   (5M)
    b) Digital Logic employs both the 1's and 2's complement for the subtraction. Add the following decimal numbers after converting to its equivalant binary numbers.
        i) Add (67)10 and (12)10   (5M)
        ii)Add (44)10 and (35)10   (5M)
                                             (CO3) [Application]