PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION-JAN 2023

Course Code: ECE101
Course Name: Elements of Electronics Engineering
Program   : B.TECH

Date: 27-JAN-2023
Time: 9:30 AM to 12:30 PM
Max Marks: 100
Weightage: 50 %

Instructions:
i)   *Read all the questions carefully and answer accordingly.*
ii)   *Question paper consists of 3 Parts.*

PART A

Each question carries FIVE Marks   **(10Q X 3M=30M)**

1. In a Bridge Rectifier, Identify the components used for its construction.

   (a) Two p-n junction diodes, step-down transformer
   (b) Four p-n junction diodes, center-tapped step down transformer
   (c) Four p-n junction diodes, step-down transformer
   (d) Two p-n junction diodes, step-down transformer   (CO.2) [Knowledge]

2. In a Bipolar junction transistor, which of the following is true?

   (a) It consists of two p-n junctions
   (b) An arrangement of two p-n junction diode connected back-to-back
   (c) It has four terminals: Base, Emitter, Collector and Modulator
   (d) Both (a) and (b)   (CO.2) [Knowledge]

3. In transistor, the size of terminals: emitter, base and collector, in decreasing order is given
   by:
   (a) Base>Emitter>Collector
   (b) Collector>Emitter>Base
   (c) Emitter>Base>Collector
   (d) None of these   (CO.2) [Knowledge]

4. The Zener Diodes are special purpose diodes manufactured:
   a. with Heavily doped Semiconductor to maintain Constant Current Level
   b. with Lightly doped Semiconductor to maintain Constant Voltage Level
   c. with Lightly doped Semiconductor to maintain Constant Current Level
   d. with Heavily doped Semiconductor to maintain Constant Voltage Level (CO.2) [Knowledge]

5. A Zener diode acts as a: ------------

   a) Voltage Regulator
   b) Current Regulato
   c) Amplifier
   d) None of these

                                                                (CO.1) [Knowledge]

6. Identify the logic gate, which has Output as zero for all cases when one of the input is
zero. (a) NOT   (b) OR   (c) AND (d) Ex-OR

Which law states: A+B = B+A?

(a) Distributive Law   (b) Associative Law   (c) Commutative Law   (d) Identity law

(CO.3) [Knowledge]

7. The Radix of : DECIMAL, BINARY , OCTAL and HEXADECIMAL Number System is

     a. 9,1,7,15
     b. 10,0,7,16
     c. 9,2,8,15
     d. 10,2,8,16   (CO.3) [Knowledge]

8. In Binary Number System, Find 1's and 2's Compliment of (11001001110010) is

     a. (00110110001101)2 and (000101100011101)2
     b. (01110110001100)2 and (00110110001110)2
     c. (00110110001101)2 and (00110110001110)2
     d. (00110110101101)2 and (11100110001110)2   (CO.3) [Knowledge]

9. When the Amplitude of the High carrier Signal is changed in accordance to the intensity of
the information signal is called as

     a. Amplitude- Demodulation
     b. Frequency Modulation
     c. Intensity Modulation
     d. Amplitude Modulation   (CO.3) [Knowledge]

10. 8085 is a ------- Bit Microprocessor, representing the width of ---------- BUS

     a. 4-bit, ADDRESS BUS
     b. 8-bit, DATA BUS
     c. 16-bit, DATA BUS
     d. 32-bit, ADDRESS BUS   (CO.4) [Knowledge]

Part B

Answer all the Questions. Each Question carries FIVE Marks.   **(2Qx15M=30M)**

11. The communication system is a system which describes the information exchange between two points. The process of transmission and reception of information is called communication. Modulation is used by singers and other vocalists to modify characteristics of their voices, such as loudness or pitch. Technically it expresses the multiplication of the original signal by another periodic signal. Describe the major elements involved through a Block diagram of Communication System. Henceforth, briefly illustrate the process of Modulation, need of modulation and the different types of modulation techniques.

(C.O.No.3) [Comprehension]

12. PN-Junction diode is a two terminal semiconductor device that is used for allowing current flow in one direction. They are created by doping or ion implantation process. PN junction diode can be used as a rectifier, logic gate, voltage stabilizer, switching device etc. As BJT is a device in which two PN-diodes are connected back-to-back, which is widely used for amplification purpose in Common – Emitter configuration. Henceforth, illustrate the working of a PN-Junction diode in Forward and Reverse Bias Conditions with relevant diagrams. Illustrate with relevant diagrams the Input and Output Characteristics of Common Emitter configuration.

(C.O.No.1) [Comprehension]

Part C

Answer all the Questions. Each Question carries TWENTY Marks.   **(2Qx20M=40M)**

13. a) Current amplification factor in a BJT transistor is a ratio of output current to its output current. As a transistor can be operated in 3 Configurations: CB, CE and CC with their respective current gain factors. Accordingly, Derive the following relationship: (a) $\alpha \to \beta$ (b) $\beta \to \alpha$

(C.O.No.2) [Comprehension]

b) Binary subtraction is a mathematical operation used to subtract one binary number from another. It is implemented in a computational machines using the logic of binary addition and two's compliment method. According perform the following operations:

     i) Subtract $(1111)_2$ from $(0111)_2$ using 2's Complement Method.

(C.O.No.3) [Comprehension]

     ii) Implement all the basic gates using NAND Universal Gate.

(C.O.No.3) [Comprehension]

14. a) The basic Laws of Boolean Algebra that relates to the commutative law allowing a change in position for addition and multiplication, the associative law allowing the removal of brackets for addition and multiplication and the distributive law allowing the factoring of an expression. Accordingly:

    i) Prove with the help of Truth-Table the Commutative, Distributive and Associative Laws
    of   Boolean Algebra.   (C.O.No.4) [Comprehension]
    ii) For the given SOP expression: Y= $\sum$ m (0, 1, 2, 5, 6, 7)
        * Derive the Boolean expression
       * Simplify
      * Implement using AND-OR and NAND- NAND Logic diagram.

b) 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. Describe the Architecture of 8085 Microprocessor with neat diagram.

(C.O.No.4) [Comprehension]