14ELN15/25

First/Second Semester B.E. Degree Examination, July/August 2022
Basic Electronics

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a. Define load line for a diode and explain the DC load line for circuit consisting of supply voltage in series with resistance and diode.   **(06 Marks)**
    b. Draw the bridge rectifies circuit and explain its working with waveform.   **(06 Marks)**
    c. In a full wave rectifier consists of two diode each having internal resistance of 600Ω. The circuit feeds a pure resistive load of 1800Ω. The secondary voltage with reference to the centre tap is 250V. Calculate DC load current, DC output power and PIV across each diode.   **(04 Marks)**
    d. Draw a sketch to show the various currents and voltages of a transistor and hence obtain relationship between β_{dc} and α_{dc}.   **(04 Marks)**

OR

2   a. What do you mean by a noise clipper? Explain series and shunt noise clipper circuits with circuit diagram.   **(06 Marks)**
    b. Draw the input and output characteristics of a transistor in common – base configuration indicate various region of operation and explain the shapes of the curves.   **(10 Marks)**
    c. Calculate I_C and I_E for a transistor that has $\alpha_{dc} = 0.98$ and $I_B = 100\mu A$. determine the value of β_{dc} = for the transistor.   **(04 Marks)**

Module-2

3   a. Define biasing of transistor. Explain with a neat diagram the operation of voltage divider bias circuit.   **(08 Marks)**
    b. Define the following in case of practical op–Amp.
        i) CMRR   ii) Slew rate   iii) Offset voltage   iv) PSRR.   **(04 Marks)**
    c. For the base bias circuit using NPN transistor find I_C, I_B and V_{CB} if $R_C = 2.2K\Omega$, $R_B = 470K\Omega$, $V_{CC} = 18V$ and transistor has $h_{FE} = 100$. Assume $V_{BE} = 0.7V$. Draw the DC load line and indicate the Q point.   **(08 Marks)**

OR

4   a. Explain how an op-Amp can be used for the following applications with circuit diagram and derive expression for output voltage.
        i)   Inverting amplifier
        ii) Differentiator
        iii) Voltage follower.   **(10 Marks)**
    b. Design an adder circuit using op-amp to given the output $V_0 = -(8V_1 + 6V_2 + 5V_3)$.   **(06 Marks)**
    c. Explain why closed loop configuration of op-Amp is used in all practical amplifier circuit and bring out the advantages of closed loop operation with negative feedback.   **(04 Marks)**

Module-3

5 a. Explain the construction of NOT gate using transistor along with truth table. **(04 Marks)**
   b. State and prove the following :
   i) De Morgan's theorem
   ii) Distributive property. **(06 Marks)**
   c. Convert :
   i) $(95.0625)_{10} = (\quad)_2$
   ii) $(243.65)_8 = (\quad)_{10}$
   iii) $(10101.10100110)_2 = (\quad)_8 = (\quad)_{16}$ **(06 Marks)**
   d. Subtract $(1010)_2$ from $(11000)_2$ using is and 2's complement method. **(04 Marks)**

OR

6 a. Design a full adder circuit and show the implementation using suitable gates. **(06 Marks)**
   b. Explain the basic logic gates with symbol, truth table, Boolean expression and switch logic. **(06 Marks)**
   c. Show the implementation of 2 input Ex–OR gate using only NAND gates. **(04 Marks)**
   d. Simplify and implement using NAND gates $y = A\left(B + CA\overline{(\overline{AB} + AC)}\right)$. **(04 Marks)**

Module-4

7 a. Explain the operation of clocked RS flip-flop using NAND gate. **(06 Marks)**
   b. What is thermistor? Explain its advantages and limitations. **(06 Marks)**
   c. Explain the architecture of 8085 micro-processor with neat block diagram. **(08 Marks)**

OR

8 a. Explain the pin diagram and architecture of 8051 micro controller with neat figures. **(10 Marks)**
   b. Explain the working of LVDT. **(05 Marks)**
   c. What is a transducer? Distinguish between active and passive transducers. **(05 Marks)**

Module-5

9 a. Explain with block diagram the elements of communication systems. **(06 Marks)**
   b. Define modulation index in AM. Derive an expression for total power in an AM signal. **(06 Marks)**
   c. Explain the principle of OFC With neat block diagram. **(08 Marks)**

OR

10 a. Compare the performance of AM and FM communication system. **(04 Marks)**
   b. Explain the AM detection With neat circuit diagram. **(06 Marks)**
   c. Explain principle operations of cellular mobile phone. **(05 Marks)**
   d. What is ISDN? Explain with block diagram. **(05 Marks)**

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