USN | | | | | | | | | | 17ELN15/25

First/Second Semester B.E. Degree Examination, June/July 2018
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. Explain the operation of p-n junction diode under forward and reverse bias condition.
                                                                       (08 Marks)
   b. Explain how zener diode can be used as voltage regulator.   **(05 Marks)**
   c. With a neat diagram, explain the output characteristics of a transistor in common lease configuration.   **(07 Marks)**

OR

2 a. With neat circuit diagram, explain the operation of Centre – tapped full wave rectifier. Draw input and output waveforms.   **(08 Marks)**
   b. Explain the working principle of NPN transistor.   **(08 Marks)**
   c. Explain the relationship between α and β. Find the values of β , α for a transistor has $I_B = 10\mu A$ and $I_C = 1mA$.   **(04 Marks)**

Module-2

3 a. With neat circuit diagram, explain the operation of voltage divider bias circuit with necessary equations.   **(05 Marks)**
   b. What is Op – amp? List the characteristics of an ideal Op-amp. **(05 Marks)**
   c. Find the output of the following Op-amp circuit.   **(05 Marks)**
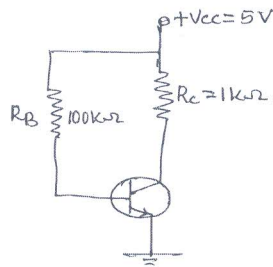

Fig.Q3(c)
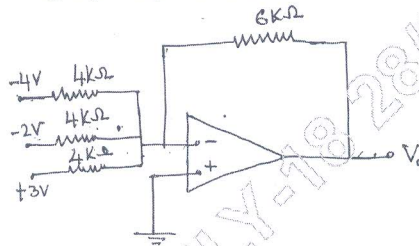
   d. Draw the circuit of Op-amp integrator. Derive the expression of output voltage.   **(05 Marks)**

OR

4 a. For the circuit shown in fig.Q4(a), find the Q – point values and draw d.c load line, where $V_{BE} = 0.7V$ and $\beta = 50$.   **(08 Marks)**

Fig.Q4(a)

   b. Define the following terms with respect to Op-amp.   **(05 Marks)**
   c. Draw the circuit of inverting Op-amp. Derive the expression for the voltage gain.   **(07 Marks)**

Module-3

5 a. Convert : **(08 Marks)**
   i) $(11001.011)_2 = (\quad)_{10}$ iii) $(64.73)_8 = (\quad)_{16}$
   ii) $(186.75)_{10} = (\quad)_2$ iv) $(ABCD)_{16} = (\quad)_2$.

   b. Subtract the following using 2's Complement method. **(04 Marks)**
   i) $(111001)_2 - (101011)_2$ ii) $(1111)_2 - (1011)_2$.

   c. Simplify the following expression and realize using basic gates
      $Y = ABC + AB\overline{C} + \overline{A}BC$. **(04 Marks)**

   d. State and prove de – Morgan's theorem using truth table for 2 variable. **(04 Marks)**

OR

6 a. Explain full adder circuit with truth table. Realize the circuit for sum and carry using basic gates. Also write the diagram showing full adder using two half adder. **(10 Marks)**

   b. Implement Ex - OR gate using only NAND gate. **(05 Marks)**

   c. Simplify and realize the following using only NAND gate.
      $Y = \overline{A}\,\overline{B}\,\overline{C} + \overline{A}\,\overline{B}\,\overline{C} + \overline{A}\,\overline{B} + \overline{A}\,\overline{C}$. **(05 Marks)**

Module-4

7 a. Mention the difference between Latch and Flip flop. **(05 Marks)**

   b. Define Microcontroller, write important features. **(05 Marks)**

   c. With a neat block diagram, explain the architecture of 8051 microcontroller. **(10 Marks)**

OR

8 a. Write a note on NOR – gate latch. **(04 Marks)**

   b. Explain the working of clocked RS Flip flop using NAND gates. **(06 Marks)**

   c. Interface stepper motor to 8051 micro – controller. With a neat block diagram, explain its working principle. **(10 Marks)**

Module-5

9 a. With the help of block diagram, explain communication system. **(04 Marks)**

   b. Define Amplitude modulation. Derive Mathematical expression for the same. Draw waveforms. **(08 Marks)**

   c. Explain the construction and principle of operation of LVDT. **(08 Marks)**

OR

10 a. List the difference between AM and FM. **(04 Marks)**

   b. Explain Frequency modulation, with neat waveform. **(08 Marks)**

   c. Briefly explain the working of thermistor. Mention its applications. **(08 Marks)**

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