CBCS SCHEME

USN 1 C R 1 7 E C 0 0 2

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 base 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)**

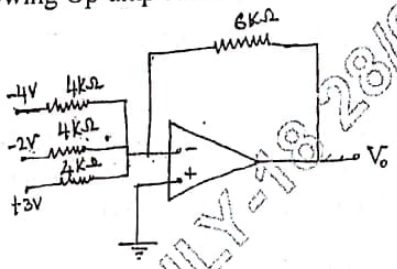

Fig.Q3(c)

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)**

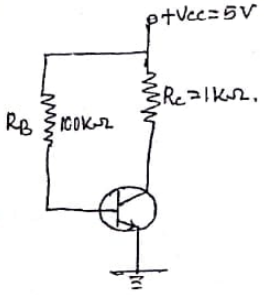

Fig.Q4(a)

b. Define the following terms with respect to Op-amp. i) Slew-rate ii) CMRR iii) PSRR **(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) $(11001.011)_2 = (\ )_{10}$ iii) $(64.73)_8 = (\ )_{16}$
ii) $(186.75)_{10} = (\ )_2$ iv) $(ABCD)_{16} = (\ )_2$.

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.
$Y = A\overline{B}\,\overline{C} + \overline{A}\,\overline{B}\,\overline{C} + \overline{A}\,\overline{B} + \overline{A}\,\overline{C}$. (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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