CBCS Scheme

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15ELN15

First Semester B.E. Degree Examination, Dec.2015/Jan.2016
Basic Electronics

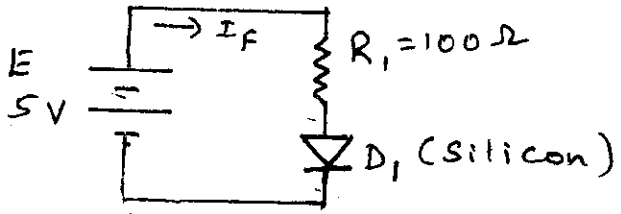
Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. For the circuit shown in fig.Q1(a) draw the DC load line and locate Q – pt. **(04 Marks)**

Fig.Q1(a)



b. What is the need for capacitor filter? For a Half – Wave Rectifier, explain the operation of C – filter. **(06 Marks)**

c. Considering npn transistor in common emitter configuration, explain how it acts as voltage amplifier. **(06 Marks)**

OR

2 a. Explain the working of a Bridge Full – Wave Rectifier, with a neat circuit diagram and waveforms. **(06 Marks)**

b. Discuss the load and line regulation using zener diode with neat circuit diagram and appropriate expressions. **(06 Marks)**

c. Calculate the values of I_C and I_E for a BJT with $\alpha_{dc} = 0.97$ and $I_B = 50\ \mu A$. Determine β_{dc}. **(04 Marks)**

Module-2

3 a. Precisely analyse the circuit of voltage divider bias and hence determine the V_C and V_{CE}. Mention the advantages of voltage divider bias. **(10 Marks)**

b. Derive an equation for output voltage for a non – inverting Op – amp. Find the gain of amplifier if $R_F = 10K\Omega$ and $R_1 = 1K\Omega$. **(06 Marks)**

OR

4 a. A base bias circuit with a 12V supply uses a transistor with $h_{FE} = 70$. Design the circuit so that $I_C = 2mA$ and $V_{CE} = 9V$ (Assume $R_E = 0$). **(06 Marks)**

b. Explain the working of Op – amp as integrator. **(05 Marks)**

c. Derive the expression of 3 input summing amplifiers. **(05 Marks)**

Module-3

5 a. Convert the following : i) $172.625_{(10)} = (\quad)_2$ ii) $(ABCD.72)_{16} = (\quad)_8$
iii) $(1\,0\,1\,1\,1\,1\,0\,1\,.\,0\,1\,0\,1)_2 = (\quad)_{10}$. **(06 Marks)**

b. Perform the following operations using 1's and 2's compliment technique
i) $(56)_{10} - (79)_{10}$ ii) $(23)_{10} - (18)_{10}$ **(06 Marks)**

c. State and prove de Morgan's theorem using truth table for 2 variables. **(04 Marks)**

OR

6 a. Explain full adder circuit with truth table. Realise the circuit for sum and carry using basic gates. Also write the diagram showing FA using two half adders. **(06 Marks)**

b. Simplify and realize the following expressions using only NAND and NOR.

i) $Y = (A + \overline{B})(B + C)(\overline{C} + \overline{B})$ ii) $Y = AB + AC + BD + CD$. **(10 Marks)**

Module-4

7 a. Explain the operation of NOR Latch with symbol, circuit and truth table. **(06 Marks)**

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

OR

8 a. How is Flip – Flop different from a Latch? Explain the gated RS Flip - Flop with symbol, circuit and truth table. **(08 Marks)**

b. Interface stepper motor to 8051 microcontroller with a neat block diagram. Explain its working principle. **(08 Marks)**

Module-5

9 a. Explain Amplitude Modulation with relevant waveforms. Derive the equation for instantaneous value of modulated signal in volts and define modulation index. **(08 Marks)**

b. Define the term transducer. Mention any four characteristics a transducer should posess. **(02 Marks)**

c. Briefly explain the working of thermistor. Mention its applications. **(06 Marks)**

OR

10 a. Explain the frequency modulation with necessary waveforms. Bring out the difference between AM and FM. **(08 Marks)**

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

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