First/Second Semester B.E. Degree Examination, Aug./Sept.2020
Basic Electronics

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least ONE question from each part.*

Module-1

1. a. Explain with circuit diagram and waveforms the working of half wave rectifier. **(05 Marks)**
   b. Draw the circuit of a clamper which clamps negative peak of the input square waveform to zero level and explain its operations. **(07 Marks)**
   c. In a Bipolar Junction Transistor circuit, find the relation between α_{dc} and β_{dc}. If $\alpha_{dc} = 0.98$ $I_B = 100\mu A$, compute the value of I_C, I_E and β_{dc}. **(08 Marks)**

2. a. With a neat circuit diagram, explain the working of a series and a shunt clipper. **(08 Marks)**
   b. In Zener voltage regulator circuit, find the value of resistance R which is connected in series with input $v_i = 16V$, when $I_Z = 20mA$, $V_Z = 10V$ and $R_L = 1k\Omega$. **(05 Marks)**
   c. Draw the output characteristics of a transistor in common emitter configuration and explain the various regions. **(07 Marks)**

Module-2

3. a. In a voltage divider bias circuit using NPN transistor $R_1 = 33k\Omega$, $R_2 = 12k\Omega$, $R_C = 1.2K\Omega$, $R_E = 1K\Omega$, $V_{CC} = 18V$. Find the emitter voltage, collector voltage and collector to emitter voltage. **(07 Marks)**
   b. What are the ideal characteristics of an op-amp? **(05 Marks)**
   c. With a circuit diagram, explain how an op-amp can be used as a differentiator and integrator. **(08 Marks)**

4. a. In a base bias circuit using NPN transistor $R_C = 2.2K\Omega$, $R_B = 470K\Omega$, $V_{CC} = 18V$, $\beta = 100$. Find I_B, I_C and V_{CE}. **(05 Marks)**
   b. Draw the block diagram of an op-amp and explain the function of each block. **(06 Marks)**
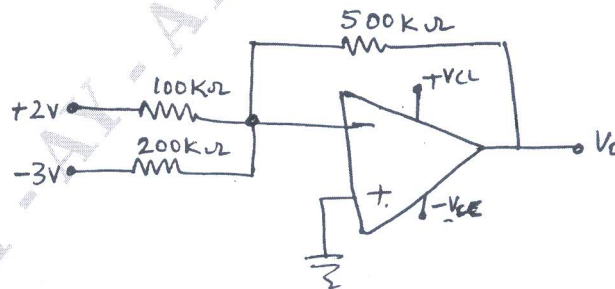   c. In the op-amp circuit shown in Fig.Q4(c).

Fig.Q4(c)

   Find the value of V_0. **(04 Marks)**
   d. Explain how an op-amp can be used as an inverting amplifier. **(05 Marks)**

Module-3

5 a. Simplify the following an realize using basic gates.
$$Y = A\overline{B}\overline{C} + \overline{A}\overline{B}C + A\overline{B}\overline{C} + \overline{A}B\overline{C}.$$ (05 Marks)

   b. Subtract :
   i) $(11010)_2$ from $(11101)_2$
   ii) $(11101)_2$ from $(11010)_2$ using 2's complement method. (05 Marks)

   c. Realize two input X–OR gate using NOR gates. (05 Marks)

   d. Explain the working of two input AND gate using Diodes. (05 Marks)

6 a. Simplify the following and realize using NAND gates :
$$F = XY + XY\overline{Z} + XYZ + \overline{X}YZ.$$ (04 Marks)

   b. Convert :
   i) $(1D6.CA8)_{16} = (\quad)_8$
   ii) $(204.2)_8 = (\quad)_{10}$
   iii) $(532.65)_{10} = (\quad)_2.$ (06 Marks)

   c. Design a logic circuit using basic gates with three inputs A, B, C and one output Y. Output will be high only when A and C are at '1' or B and C are at '1'. (05 Marks)

   d. Design a full adder and implement using gates. (05 Marks)

Module-4

7 a. Explain the working of RS Latch using NOR gates. (05 Marks)

   b. With a neat block diagram explain the architecture of 8085 microporcessor. (10 Marks)

   c. Write a note on LVDT. (05 Marks)

8 a. Draw the circuit of RS flip flop using NAND gates and a clock. Explain its working with truth table. (06 Marks)

   b. What are the difference between microprocessor and microcontroller? (05 Marks)

   c. Explain the flag register of 8085. (04 Marks)

   d. Explain the working of thermister. (05 Marks)

Module-5

9 a. Draw the basic block diagram of communication system and explain. (05 Marks)

   b. What is amplitude modulation? Explain with the waveforms. (05 Marks)

   c. Explain the principle of operation of mobile phone. (05 Marks)

   d. With the block diagram, explain the optical fibre communication system. (05 Marks)

10 a. What is modulation? Explain the need for modulation. (05 Marks)

   b. Compare Amplitude Modulation and Frequency Modulation. (05 Marks)

   c. Draw and explain a typical telephone network. (05 Marks)

   d. Explain the block diagram of ISDN. (05 Marks)

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