First/Second Semester B.E. Degree Examination, June/July 2018
Basic Electronics

Time: 3 hrs.

Max. Marks:100

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

Module-1

1 a. Draw and explain the V-I characteristics of Si and Ge diode. **(06 Marks)**
   b. A Zener diode with $V_z = 4.3V$ and Z_Z equal to 22Ω when $I_z = 20mA$. Calculate the upper and lower limits of V_z when I_z changes by ± 5 mA. **(06 Marks)**
   c. Sketch the typical input and output characteristics for the CE configuration. Briefly explain the three regions of operation. **(08 Marks)**

OR

2 a. Explain the working of positive clamping. **(05 Marks)**
   b. A diode with $V_F = 0.7V$ is connected as a Half wave rectifier. The load resistance is 500Ω, and the (r.m.s) ac input is 22v. Determine the peak output voltage, the peak load current, and the diode peak inverse voltage. **(05 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} (or h_{FE}) for the transistor. **(04 Marks)**
   d. With a circuit diagram, explain the working of a centre tapped FWR. **(06 Marks)**

Module-2

3 a. List the factors, which affect the stability of operating point. **(04 Marks)**
   b. For CE – circuit shown in Fig Q3 (b) draw the DC load line and obtain Q-point values. Assume $\beta = 100$ and $V_{BE} = 0.7V$.
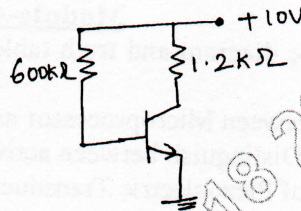

Fig Q3(b)   **(08 Marks)**

   c. With a neat diagram, explain how op-amp can be used as differentiator **(04 Marks)**
   d. For the op-amp circuit of Fig Q3(d), find the output voltage and closed loop gain.
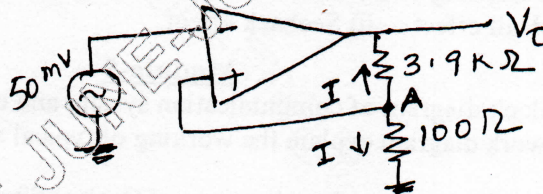

Fig Q3(d)   **(04 Marks)**

OR

4 a. With a neat circuit diagram, explain the voltage divider biasing circuit and derive the expression for V_{CE} and I_C. **(08 Marks)**
   b. List the characteristics of an ideal op-amp and draw the three input inverting summer circuit using an op-amp and derive an expression for output voltage. **(08 Marks)**

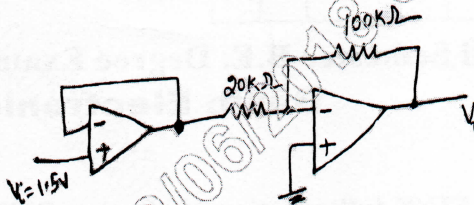c. Find the output of the op-amp circuit shown in Fig Q4(c) **(04 Marks)**

Fig Q4(c)

Module-3

5 a. Convert $(BCDE)_{16} = (\quad)_2 = (\quad)_8 = (\quad)_{10}$. **(03 Marks)**
   b. Subtract $(57)_{10}$ from $(43)_{10}$ using 2's complement form. **(05 Marks)**
   c. Simplify the following Boolean expression
      i) $Y = \overline{ABC} + \overline{AB}\overline{C} + A\overline{BC} + AB\overline{C}$
      ii) $Y = (A\overline{B} + \overline{A}C)(BC + B\overline{C})(ABC)$ **(06 Marks)**
   d. Draw the logic diagram of a full adder and also write its truth table with sum and carry expressions. **(06 Marks)**

OR

6 a. Design a logic diagram using basic gates with 3 inputs A, B, C and output Y that goes high only when A is high. **(05 Marks)**
   b. Simplify and realize the Boolean expressions, using two input NAND gates only
      i) $ABCD + A\overline{B}CD$ ii) $AB + ABC + AB\overline{C} + \overline{A}BC$ iii) $AB + ABC + AB(D + E)$ **(10 Marks)**
   c. Perform the following :
      i) $(110011)_2 - (11001)_2 = (?)_2$ – using 2's compliment.
      ii) $(11110101)_2 - (10010101)_2 = (?)_2$ – Using 1's complement. **(05 Marks)**

Module-4

7 a. With the help of logic diagram and truth table explain the working of the clocked RS Flip Flop. **(06 Marks)**
   b. List the differences between Microprocessor and Microcontroller. **(05 Marks)**
   c. What is Transducer? Distinguish between active and passive Transducers. **(04 Marks)**
   d. Explain the working of Piezoelectric Transducer. **(05 Marks)**

OR

8 a. With a neat block diagram explain architecture of 8051 microcontroller. **(10 Marks)**
   b. Explain the working of LVDT. **(06 Marks)**
   c. Explain: i) Hall effect   ii) Seeback effect. **(04 Marks)**

Module-5

9 a. Draw the block diagram of communication system and explain each element. **(08 Marks)**
   b. With a network diagram explain the working of typical switched telephone system. **(05 Marks)**
   c. Mention the advantages and applications of Optical Fibre Communications. **(07 Marks)**

OR

10 a. Define FM. Draw the FM signal. Write the expression for FM wave. **(05 Marks)**
   b. A 500W, 100KHz carrier is modulated to a depth of 60% by modulating signal frequency of 1KHz. Calculate the total power transmitted. What are the side band components of the AM wave? **(06 Marks)**
   c. Give the comparision between AM and FM. **(05 Marks)**
   d. Explain the principle of operations of mobile phones. **(04 Marks)**

* * * 2 of 2 * * *