Ref. No.: EX/CSE/ET/T/123A/81/2016

B. CSE 1ST YR 2ND SEM. EXM.2016

Subject: BASIC ELECTRONICS Time: 3hrs. Full Marks: 100

Answer any five questions

1. How a p-n junction diode can act as a switch and mention its advantage over conventional mechanical switches. Draw the circuit of a bridge rectifier and explain its operation. Calculate the efficiency and ripple factor of a bridge rectifier. Also make a comparison between different rectifier circuits. [4+6+8+2]

2. (a) With a neat circuit using p-n junction diode explain the operation of a voltage tripler. Write down condition for satisfactory operation of the circuit.

   (b) Explain with proper circuit that how clipping can be done at both ends of a sinusoidal wave.

   (c) Draw a neat circuit to explain the operation of a diode clamping circuit. What happens at the output of the circuit when amplitude of input voltage suddenly increases and then decreases? Draw its input output waveforms.

   [6+4+10]

3. (a) Make a comparison between a class A, class B, and class C amplifiers. Explain with a neat schematic the operation of a class A power amplifier and calculate its efficiency.

   (b) How can we classify feedback in amplifiers? How negative feedback increases the gain stability and input impedance of an amplifier? [(3+4+3)+(2+8)]

4. Explain with a neat circuit the operation of a class B push pull amplifier and prove that its theoretical efficiency is 78.5%. Mention some advantage and disadvantages of this amplifier. How one can overcome disadvantages? [4+8+4+4]

5. Write down condition for oscillation in an oscillator circuit. How oscillator circuits can be classified? Draw the circuit of Wien bridge oscillator and explain its operation. Find out expression for its frequency of operation and condition for sustaining oscillation. Write down some advantage and disadvantages of Wien-bridge oscillator. [2+2+5+8+3]

6. Make a comparison between Bipolar Junction Transistor (BJT) and a Field Effect Transistor (FET). Draw the structure of a p-channel JFET and explain its operation. Draw its voltage-current characteristics and from it explain how drain resistance (r_d), mutual conductance (g_m) and amplification factor (μ) can find out. Also write down the relationship between these three parameters. [5+5+8+2]

7. Explain the operation of an n-channel MOSFET with its structure. Make a comparison between a MOSFET and a JFET. Why gate protection of MOSFET is essential? With a neat circuit explain the operation of complementary MOSFET (CMOS). Write its advantage and mention its operation. [5+4+3+6+1+1]

8. Write short notes on any two of the following: [2 × 5 = 10]

   (a) Regulated dc power supply,

   (b) R-C phase shift oscillator

   (c) Different types of display devices.