BASIC ELECTRONICS

Full Marks-70
Time-3Hours

Answer SIX questions including Q.No.1 which is compulsory
Figures in the right-hand margin indicate marks

1.
   a. Explain how zener diode is used as voltage redulator.   2x10
   b. Explain the fuction of negative clipper ciruit.
   c. Explain how transistor acts as a switch.
   d. Draw non-inverting amplifier? Derive expression for its gain.
   e. Convert (10001.0010) to octal
   f. Explain 1's complement subtraction with an example.
   g. Draw block diagram of CRO.
   h. List the advantage of modulation.
   i. Differentiate between the amplitude modulation and frequency modulation.
   j. Convert JK fliplop to SR flipflop.

2. a) Explain the characteristics of Photo diode.
   b) Explain the operation of LED and Zener diode with neat diagrams.   5+5

3. a) Explain how MOSFET works with neat diagram.
   b) Determine the value of Rs and its transconductance gm required to self-bias an n-channel JFET
   with IDSS = 25mA. VGS(off) = -10V, VGS = -5V.   5+5

4. a) Draw half-wave rectifier circuit and derive expression for ripple factor.
   b) A full-wave bridge rectifier circuit with a 1kohm load operates from a 120V (rms) 60Hz
   household supply through 10-to-1 step-down transformer having a single secondary winding. It
   uses four diodes, each of which can be modeled to have a 0.7V drop for any current. What is the
   peak value of the rectified voltage across the load? For what fraction of the cycle does each
   diode conduct (assume ideal diode model for this estimation)? What is the average current
   through the load?
                                                                               5+5

5. a) Illustrate the effect of negative feedback on amplifier.
   b) Prove that the gain of the amplifier used in a wein-bridge oscillator must be   greater than 3
   for sustained oscillations.
                                                                               5+5

6. a) Subtract 26 from 75 using 2's complement method.
   b) Prove that AB+BC+A'C =AB + A'C.
                                                                               5+5

7. a) Explain the operation of SR flipflop.
   b) Realize the following expression using universal gates.
   A'B+CD'E+B'CD.
                                                                               5+5

8. a) Explain the operation of CRT.
   b) List the applications of CRO.
                                                                               5+5