F.E. Semester – II (RC) Examination, November/December 2015
BASIC ELECTRONICS ENGINEERING

Duration : 3 Hours | Total Marks :100

Instructions : *1) Answer **any five** questions selecting atleast **one** from **each** Module.*
*2) Make suitable assumption, **if required**.*

MODULE – I

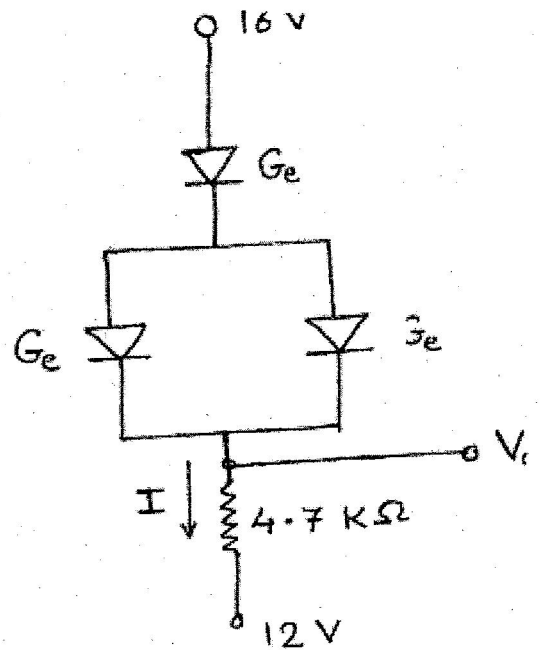
1. a) Draw a forward biased Pn junction and explain the following terms :
   i) Potential Barrier
   ii) Reverse saturation current. **6**

   b) Draw the V-I characteristics of a Pn junction diode and show how the dynamic resistance of the diode can be determined. **4**

   c) Explain the piecewire linear equivalent circuit of a diode and draw its corresponding V-I characteristics. **5**

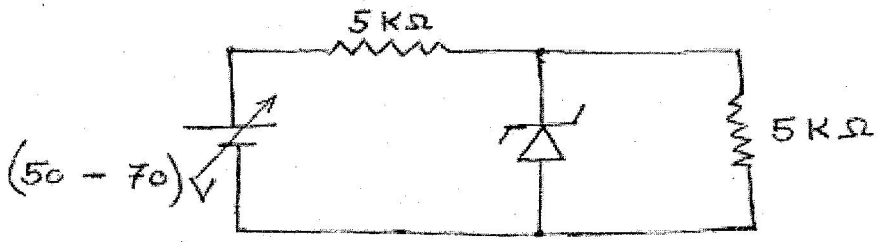
   d) What is transition capacitance of a diode ? Give its application. **5**

2. a) Find V_0 and I for the given network. **3**

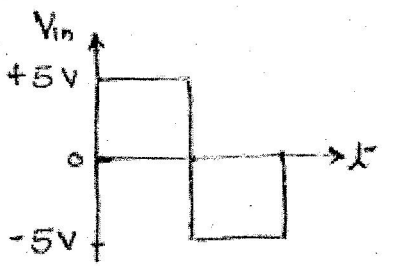


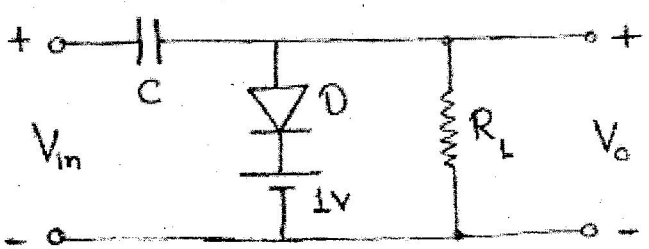
   b) Derive the rms voltage of a Centre-tapped full wave rectifier. **3**

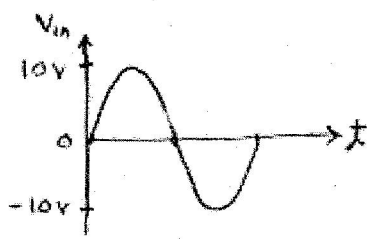
c) Determine the maximum and minimum values of zener diode current for the circuit shown below if zener has $V_z = 20$ V. 5

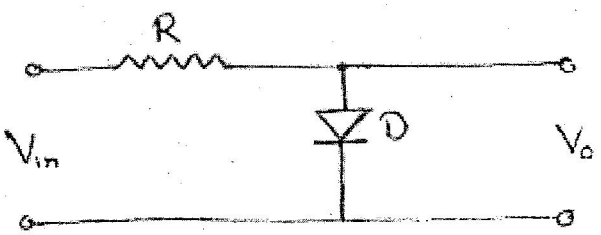


d) Analyse the circuits given in the figures below and draw output waveforms. (Assume Ideal diodes and large R_L) 6









e) Draw diagram and waveform of fullwave voltage doubler. 3

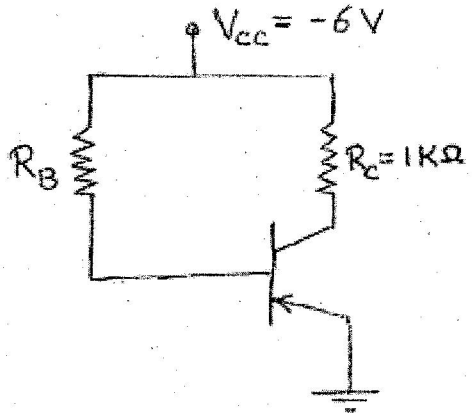
MODULE – II

3. a) Explain the construction and various operating regions for a typical BJT. In which region should a transistor be operated in order to function as an amplifier ? Draw the circuit of a CE amplifier with input and output waveforms. 10

b) Sketch typical CB input characteristics of a transistor and calculate the input dynamic resistance of the transistor from these curves. 5

c) Why are limits of operation required in a transistor ? What are the necessary conditions required to be fulfilled for the proper operation of a CE transistor ? 5

4. a) In the following biasing circuit, a supply of 6V and a load resistance of 1 KΩ is used.
   i) Find the value of R_B so that a Ge transistor with $\beta = 20$ and $I_{CBO} = 2\ \mu A$ draws an Ic of 1mA.
   ii) What Ic is drawn if the transistor parameters change to $\beta = 25$ and $I_{CBO} = 10\ \mu A$ due to rise in temperature ? **6**



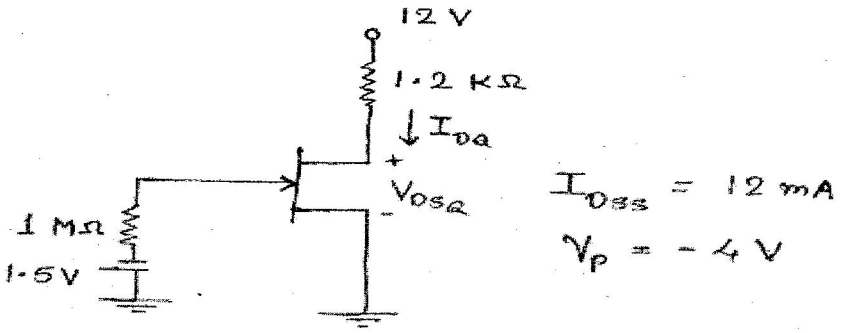
   b) Show how the emitter bias circuit helps in stabilizing the Q – point with respect to temperature and β variations. **8**

   c) Prove mathematically that the operating point in a potential divider biasing circuit is independent of β. **6**

MODULE – III

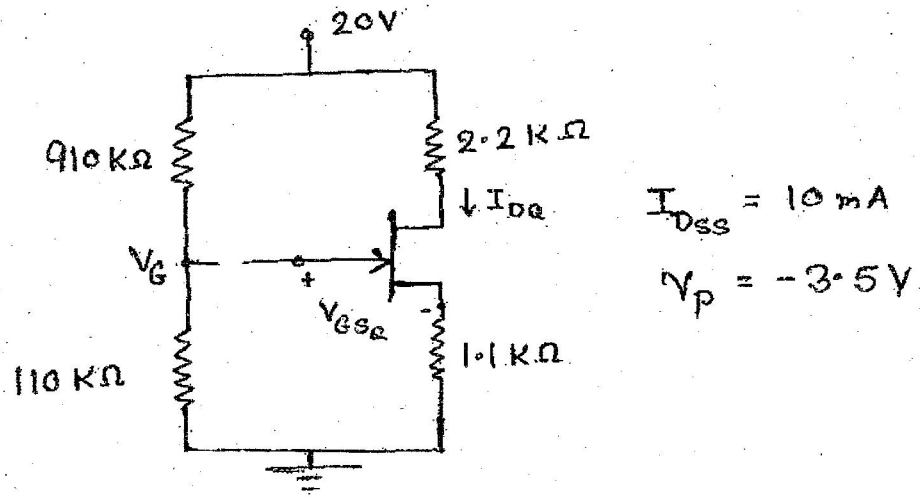
5. a) Explain the basic construction of a n-channel JFET.
   Apply the proper drain to source voltage and sketch the depletion region for $V_{GS} = 0$ and V_{DS} at some positive voltage. **7**

   b) For fixed biased configuration given below, determine I_{DQ}, V_{DS} and V_{GSQ}. **6**



c) With neat diagrams and set of equations explain the self bias configuration of JFET. 7

6. a) Determine I_{DQ}, V_{GSQ} and V_{DS} for the network shown below : 8



b) Draw and explain output characteristics and transfer characteristic curve for P – channel depletion type MOSFET. Show how can transfer characteristics be obtained from output characteristics. 7

c) Explain with neat diagram the basic CMOS operation. 5

MODULE – IV

7. a) Describe various methods of transistor fabrication. 6

b) Describe the OPAMP operation for double ended output with single ended input. 6

c) Draw a Wein Bridge Oscillator and write the expression for frequency of oscillation. 3

d) Explain the feedback concept with a simple block diagram. 5

8. a) With a neat sketch explain IR Emitters. List any four applications of IR emitters. 6

b) Explain reflective type LCD. 6

c) Explain the working of SCR.
Draw characteristics.
Define the terms holding current and latching current. 8