Code No: R05010204 **R05** **Set No. 2**

I B.Tech Examinations,December 2010
ELECTRONIC DEVICES AND CIRCUITS
Common to BME, IT, ICE, E.COMP.E, ETM, E.CONT.E, EIE, CSE, ECE, CSSE, EEE

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) What do you understand by depletion region at p-n junction? What is the effect of forward and reverse biasing of p-n junction on the depletion region? Explain with necessary diagrams.
   (b) Explain the concept of tunneling with energy band diagrams. [8+8]

2. Compare the motion and trajectories of electron when placed
   (a) Only in electric fields
   (b) Only in magnetic fields
   (c) In Combined electric & Magnetic fields. [5+5+6]

3. (a) Draw the circuit for darlington pair and derive the expressions for A_I, A_V, R_I and R_0. [8]
   (b) The figure 6 shows a CE amplifier with collector to base bias. Calculate A_I, A_V, R_I. The transistor parameters are h_{ie}=1.1K, h_{fe}=50, h_{oe}=25$\times$ 10^{-6}A/V, h_{re}=2.5 $\times$ 10^{-4}. [8]

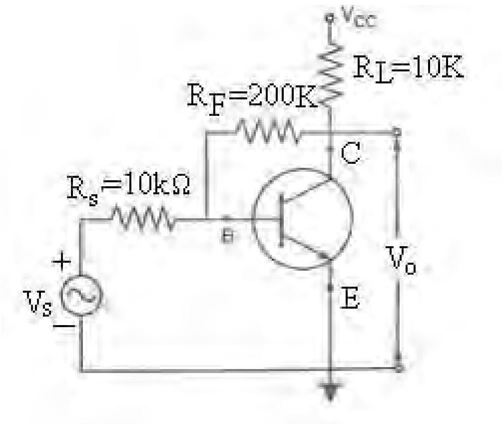

Figure 6

4. (a) Draw the circuit diagram of a RC phase shift oscillator using BJT. Derive the expression for frequency of oscillations.
   (b) Classify different type of oscillators based on frequency range.
   (c) Why RC oscillators are not suitable for high frequency applications. [8+4+4]

5.(a) Draw the circuit diagram of current series feed back amplifier and derive expressions for voltage gain and feed back factor.

(b) A voltage series negative feed back amplifier has a voltage gain without feedback of A = 500, input resistance R_i = 3K, output resistance R_o = 20K and feedback ratio β=0.01. Calculate the voltage gain, input resistance and output resistance of the amplifier with feedback. [8+8]

6. (a) Explain in detail about thermal runaway and thermal resistance.

(b) For the circuit shown figure 8b, determine I_E, V_C and V_{CE}. Assume V_{BE}=0.7V [8+8]

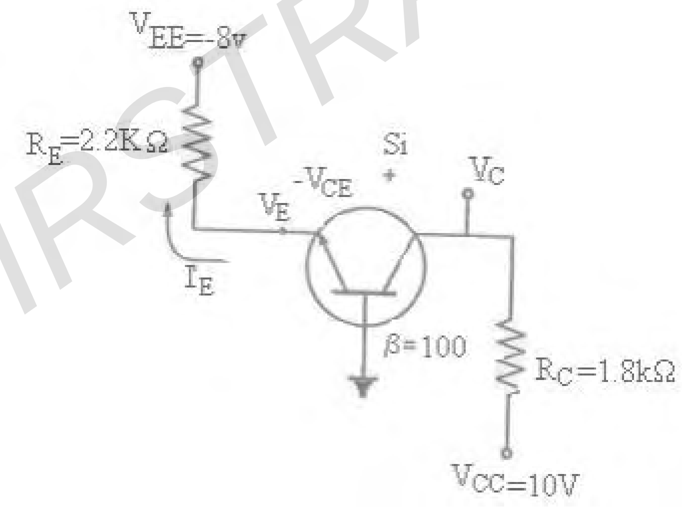

Figure 8b

7. (a) Describe the operation of UJT. Draw its equivalent circuit and hence define the intrinsic standoff ratio. Draw its characteristic curve and explain the various parameters.

(b) Calculate the values of I_E, β_{dc} and α_{dc} for a transistor with I_C=12.427μA, I_B=200mA, I_{CBO}=7μA. Also determine the new level of I_C which will result from reducing I_B to 150μA. [10+6]

8. (a) Define the following for a HWR:

i. ripple factor

ii. PIV

iii. TUF

iv. rectification efficiency.

(b) A HWR uses a 500 μF filter capacitor and a load resistor of 500 Ω. It is operated from 60 Hz supply with 100V(rms). It takes 1m sec for the capacitor to recharge during each input cycle. For what minimum value of repetitive surge current should the diode be rated? [8+8]

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Code No: R05010204 **R05** **Set No. 4**

I B.Tech Examinations,December 2010
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   iv. rectification efficiency.

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2. (a) Explain in detail about thermal runaway and thermal resistance.

   (b) For the circuit shown figure 8b, determine I_E, V_C and V_{CE}. Assume V_{BE}=0.7V [8+8]

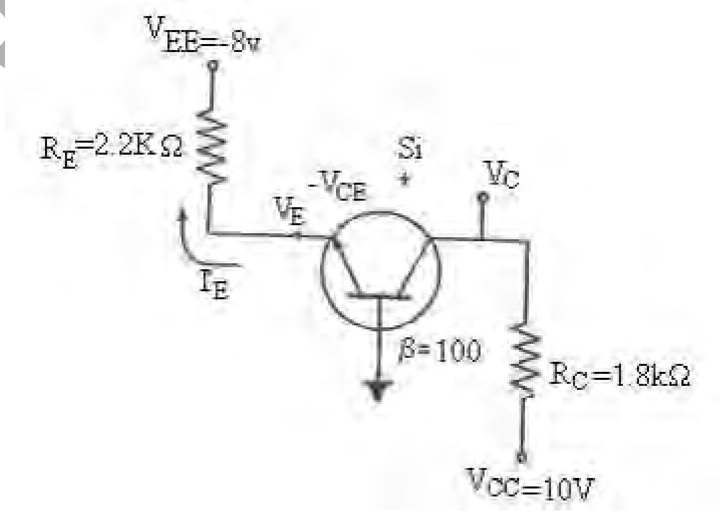

Figure 8b

3.(a) Draw the circuit diagram of current series feed back amplifier and derive expressions for voltage gain and feed back factor.

(b) A voltage series negative feed back amplifier has a voltage gain without feedback of A = 500, input resistance R_i = 3K, output resistance R_o = 20K and feedback ratio β=0.01. Calculate the voltage gain, input resistance and output resistance of the amplifier with feedback. [8+8]

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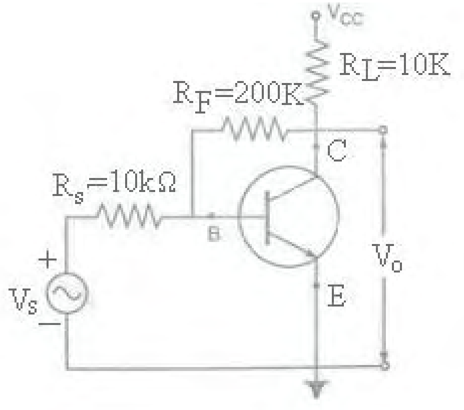

Figure 6

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Code No: R05010204 **R05** **Set No. 1**

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3. (a) Explain in detail about thermal runaway and thermal resistance.
   (b) For the circuit shown figure 8b, determine I_E, $V_C$and V_{CE}. Assume V_{BE}=0.7V [8+8]

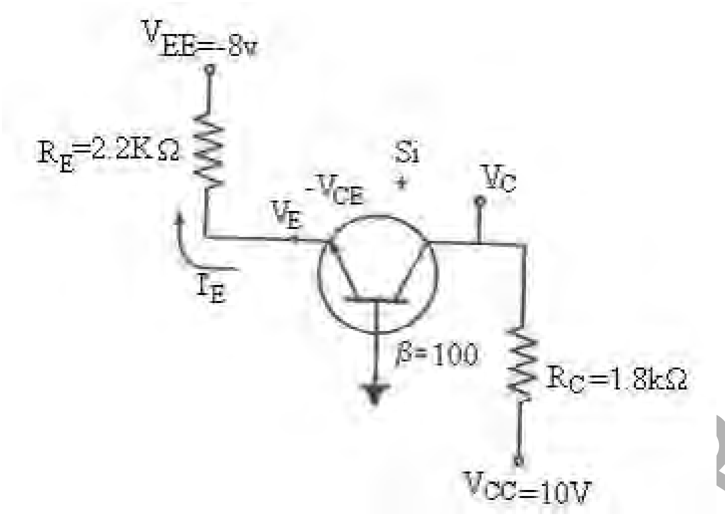

Figure 8b

4. Compare the motion and trajectories of electron when placed
   (a) Only in electric fields
   (b) Only in magnetic fields
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5. (a) Describe the operation of UJT. Draw its equivalent circuit and hence define the intrinsic standoff ratio. Draw its characteristic curve and explain the various parameters.
   (b) Calculate the values of I_E, β_{dc} and α_{dc} for a transistor with I_C=12.427μA, I_B=200mA, I_{CBO}=7μA. Also determine the new level of I_C which will result from reducing I_B to 150μA. [10+6]

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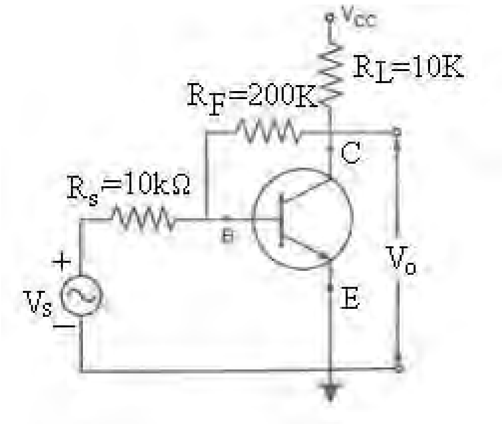

Figure 6

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Code No: R05010204 **R05** **Set No. 3**

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⋆⋆⋆⋆⋆

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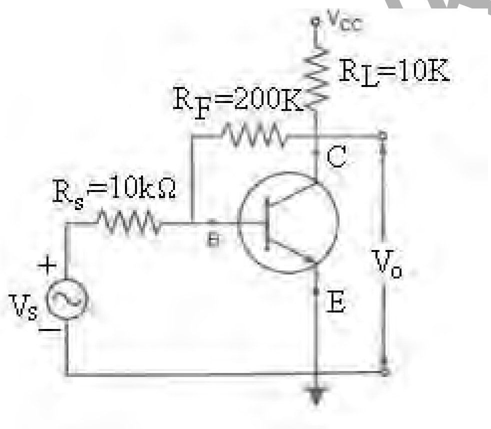

Figure 6

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   (b) Explain the concept of tunneling with energy band diagrams. [8+8]

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   (b) For the circuit shown figure 8b, determine I$_E$, V$_C$and V$_{CE}$. Assume V$_{BE}$=0.7V [8+8]

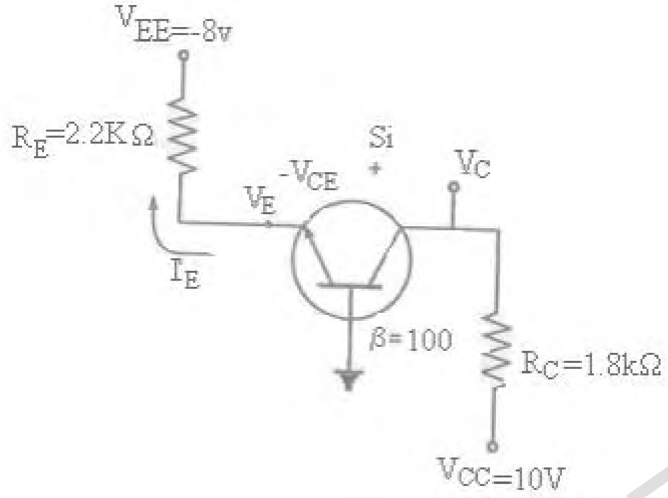

Figure 8b

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