Code No: R05220301

Set No. 1

II B.Tech II Semester Regular Examinations, Apr/May 2008
BASIC ELECTRONICS
(Common to Mechanical Engineering and Production Engineering)

Time: 3 hours
Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain why a semi conductor acts as an insulator at 0° k and why its con-
      ductivity increases with increase of temperature.
   (b) Draw the circuit of Bridge rectifier and explain the working of it. Give its
      merits and de-merits. [4+12]

2. (a) Explain why CE configuration is commonly used in amplifier circuits.
   (b) Draw the structure of J F E T and explain in detail the effect of gate-source
      voltage on the channel when [4+12]
        i. No bias
        ii. small reverse bias and
        iii. large reverse bias such that pinch-off occurs.

3. (a) Draw the basic circuit for obtaining the static V-I characteristics of thyristor.
   (b) Draw the V-I characteristics of SCR and account for the shape of the charac-
      teristics [6+10]

4. (a) Explain how negative feedback improves the stability of gain of the amplifier
      for changes in power supply voltage or change in the parameters of the active
      device. What is the condition to achieve the stability of the gain.
   (b) Calculate the gain of a negative feedback amplifier with internal gain A =
      500 and feed- back factor $\beta = 0.01$. If the output impedance of the internal
      amplifier is 80 k Ω, determine the output impedance of the feedback amplifier.
      [8+8]

5. (a) Classify oscillators based on
        i. output waveform
        ii. operating frequencies.
   (b) Draw the circuit of Colpitts Oscillator using transistor and explain the working
      of it. [6+10]

6. (a) Explain the following type of Timers
        i. Electro-mechanical Timers.
        ii. Electronic Timers.
   (b) List different welding circuits
   (c) Explain Projection Welding process. [8+4+4]

Set No. 1

7. (a) List different applications of Ultrasonic Waves and explain the principle and working of Pulsed-echo Ultrasonic Flow Detector.

   (b) Explain the principle of Dielectric heating. [10+6]

8. (a) List various characteristics of A-to-D converter.

   (b) Compare three A-to-D conversion techniques. [8+8]

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Set No. 2

II B.Tech II Semester Regular Examinations, Apr/May 2008
BASIC ELECTRONICS
(Common to Mechanical Engineering and Production Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
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1. (a) Explain the concept of " hole" in a semi conductor.

   (b) Explain the difference between Ideal Diode and commercial diode with the help of V-I Characteristics .

   (c) Draw the circuit of Half wave rectifier with L- section filter and explain the working of it.   [4+4+8]

2. (a) Explain why CE configuration is commonly used in amplifier circuits.

   (b) Draw the structure of J F E T and explain in detail the effect of gate-source voltage on the channel when   [4+12]

       i. No bias
      ii. small reverse bias and
     iii. large reverse bias such that pinch-off occurs.

3. (a) Name different methods of turning-on of SCR.

   (b) What are the important points to be noted while designing the gate-control circuit of SCR.

   (c) Draw and explain the V-I characteristics of SCR.   [2+6+8]

4. (a) Explain how the negative feedback increases the input impedance and reduces the output impedance and derive the expressions for input and output impedance of the feedback amplifier.

   (b) An amplifier without feedback has a gain of 1200, input impedance of 1.5 k Ω. and output impedance of 50 k Ω. Determine the values of input and output impedances of feedback amplifier with a feedback factor β of 0.01.   [10+6]

5. (a) Why phase shift through the R-C feed back network of R-C phase shift oscillator is to be 180^0? Explain.

   (b) What are the limitations of R C-Phase shift oscillators?

   (c) Draw the circuit of Colpitts Oscillator and explain the working of it. [5+3+8]

6. (a) Name principal types of resistance welding processes and briefly explain them.

   (b) Briefly explain the principle of working of any one type of Thermal Timers.
                                                                              [12+4]

7. (a) Giving basic set up, explain the principle of Induction heating.

(b) Draw and explain piezo electric generator circuit using Hartley oscillator for generation of Ultrasonic waves. [8+8]

8. (a) Explain the operation of counter type A-to-D converter using D-to-A converter.

(b) Explain various status flags provided in 8085. [10+6]

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$$\boxed{\textbf{Set No. 3}}$$

II B.Tech II Semester Regular Examinations, Apr/May 2008
BASIC ELECTRONICS
(Common to Mechanical Engineering and Production Engineering)
Time: 3 hours   Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain why a semi conductor acts as an insulator at 0° k and why its conductivity increases with increase of temperature.
   (b) Draw the circuit of Bridge rectifier and explain the working of it. Give its merits and de-merits. [4+12]

2. (a) Explain why CE configuration is commonly used in amplifier circuits.
   (b) Draw the structure of J F E T and explain in detail the effect of gate-source voltage on the channel when [4+12]
      i. No bias
      ii. small reverse bias and
      iii. large reverse bias such that pinch-off occurs.

3. (a) Name different methods of turning-on of SCR.
   (b) What are the important points to be noted while designing the gate-control circuit of SCR.
   (c) Draw and explain the V-I characteristics of SCR. [2+6+8]

4. (a) Draw block diagrams and briefly explain the four types of feedbacks in amplifiers.
   (b) An amplifier without feedback has A = 5000, lower cut-off frequency f_L = 2.5 Hz, upper cut-off frequency f_H= 100 kHz, output resistance R_0=2000Ω. If negative feed- back in applied to make the output resistance $R_{0f} = 600$Ω, calculate the value of β, voltage gain and half power frequencies of the feedback amplifier. [8+8]

5. (a) Classify oscillators based on
      i. output waveform
      ii. operating frequencies.
   (b) Draw the circuit of Colpitts Oscillator using transistor and explain the working of it. [6+10]

6. (a) Draw and explain the heat control circuit for resistance welding.
   (b) Compare and contrast the following timers: [8+8]
      i. Thermal Timers
      ii. Electro-mechanical Timers

iii. Electronic Timers.

7. (a) Explain the application of Induction Heating for

   i. Brazing and

   ii. Annealing of Brass and Bronze items .

   (b) Explain the construction and working of a C R tube with neat diagram [8+8]

8. (a) Explain the operation of counter type A-to-D converter using D-to-A converter.

   (b) Explain various status flags provided in 8085. [10+6]

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$$\boxed{\textbf{Set No. 4}}$$

II B.Tech II Semester Regular Examinations, Apr/May 2008
BASIC ELECTRONICS
(Common to Mechanical Engineering and Production Engineering)
Time: 3 hours
Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain what is meant by mobility of a charge carrier in a solid. Derive an expression for the conductivity of a semiconductor, containing both free electrons and holes, in terms of the concentrations n and p and the mobilities.

   (b) Draw the circuit of Bridge rectifier and explain the working of it. [8+8]

2. (a) Explain why CE configuration is commonly used in amplifier circuits.

   (b) Draw the structure of J F E T and explain in detail the effect of gate-source voltage on the channel when [4+12]

      i. No bias
      ii. small reverse bias and
      iii. large reverse bias such that pinch-off occurs.

3. (a) Name different methods of turning-on of SCR.

   (b) What are the important points to be noted while designing the gate-control circuit of SCR.

   (c) Draw and explain the V-I characteristics of SCR. [2+6+8]

4. (a) Explain the effect of negative feedback on distortion, gain, band-width and input and output impedances of the amplifier.

   (b) In an amplifier an output of 60 V, is obtained for an input signal of 0.6V. This circuit is now connected to a negative feedback networks such that 20% of the output voltage goes back to the input side. Calculate the increased value of input, if we want the same output from the circuit (i.e. 60 V). [8+8]

5. (a) Draw the circuit of transistor Colpitts Oscillator and briefly explain the working of it. Derive the expression for frequency of oscillation f_o.

   (b) Calculate the frequency of oscillation of a transistor Colpitts Oscillator having $C_1 = 0.02\ \mu$F, $C_2 = 0.2\ \mu$F and L = 10 μH. [10+6]

6. (a) Briefly explain "Thermal Expansion timers".

   (b) Draw sequence Timer Welding Circuit and explain its operation. [6+10]

7. (a) Explain the principle of Dielectric heating and List the applications of Dielectric heating.

   (b) Explain the use of Ultrasonic waves in Degassing of liquids.

   (c) Explain the methods of measurement of frequency using C R O. [6+4+6]

Set No. 4

8. (a) What are the functional units of central processing unit in 8085. Briefly explain each of them.

(b) What is stack in 8085? What are its functions? [8+8]

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