Code No: R05220301 **Set No. 1**

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
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) Define mean life time of a carrier.
   (b) Draw the forward and reverse bias characteristics of a p - n junction diode and explain them qualitatively.
   (c) Compare the merits and demerits of H.W. Rectifier, Full Wave Rectifier and Bridge rectifier. [2+8+6]

2. (a) Explain various current components in a PNP transistor with forward biased emitter junction and reverse biased collector junction
   (b) Draw the structure and explain the Gate and drain characteristics of n- channel J F E T [8+8]

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 the black diagram for the four basic methods of connecting the feedback signal. Compare the input and output impedances of the above four types of feedback.
   (b) State the merits and demerits of negative feedback in amplifiers. [10+6]

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) Draw the circuit required for A.C. resistance welding and explain the process of welding.
   (b) Explain the spot welding process giving necessary diagram. [8+8]

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. Write short notes on:
   (a) Ramp type A to D converter

(b) General purpose registers of 8085. [10+6]

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Code No: R05220301 **Set No. 2**

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
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) For a reverse biased diode, does the transition region increases or decreases? What happens to the junction potential? Explain.
   (b) Draw and explain Half- wave Rectifier circuit with resistance load and derive the expression for ripple factor. [6+10]

2. (a) Sketch typical output characteristics of CE configuration of a NPN transistor. Explain how β of the transistor be computed from the above characteristics.
   (b) Draw the structure of n-channel J F E T and explain the drain characteristics of it. [8+8]

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) Discuss the advantages and limitations of negative feedback in amplifiers.
   (b) An amplifier gives an output of 20V, for an input of 200mV. The amplifier introduces a harmonic distortion of 15% Calculate the feedback factor of the negative feed back to be employed to reduce the harmonic distortion in the output as 3%. Also, determine the value of modified input in order to get the output unchanged (i.e.20v.) [6+10]

5. (a) Draw the circuit of Hartley oscillator employing transistor and explain the working of it. Derive the expression for frequency of oscillation f_o.
   (b) Calculate the frequency of oscillation of a transistor Hartley oscillator having $L_1 = 25$ μH, $L_2 = 100$ μ H, Mutual Inductance M = 20 μH. and C =100 p f. [10+6]

6. (a) Draw the circuit required for A.C. resistance welding and explain the process of welding.
   (b) Explain the spot welding process giving necessary diagram. [8+8]

7. (a) Draw a neat sketch and explain the working of CR tube.
   (b) Discuss about the electrodes used in dielectric heating. Explain, when the air clearance, is permitted between the Dielectric material and one or both the electrodes used in Dielectric heating. [8+8]

8. (a) What are the arithmetic and logical operations performed in 8085 Microprocessor?

   (b) What are the different registers in 8085 Microprocessor? Discuss their functions. [8+8]

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Code No: R05220301 **Set No. 3**

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
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) Define mean life time of a carrier.
   (b) Draw the forward and reverse bias characteristics of a p - n junction diode and explain them qualitatively.
   (c) Compare the merits and demerits of H.W. Rectifier, Full Wave Rectifier and Bridge rectifier. [2+8+6]

2. (a) Draw the output characteristics of transistor in C E configuration and explain how β of the transistor can be determined from the above characteristics?
   (b) For a change of 20μ a of base current, the corresponding change in collector current is found to be 0.76 ma when the collector to emitter voltage is kept constant Determine the values of α and β of the transistor.
   (c) Draw the circuit symbol of N-channel J F E T. What do you understand by the term "channel" in a J F E T. [6+6+4]

3. (a) Give the schematic construction, circuit symbol and V-I characteristics of DIAC and explain the shape of the characteristics.
   (b) Draw the turn-off characteristics of SCR and briefly explain he mechanism of turn-off. [10+6]

4. (a) Discuss the effect of negative feedback in amplifiers on
      i. Input impedance
      ii. Stability of gain for changes in device parameters and
      iii. output impedance of the amplifier.
   (b) Calculate the gain of a negative feedback amplifier having A=500 and β =0.02. If the input impedance of the amplifier is 2 kΩ , determine the input impedance of the feedback amplifier. [8+8]

5. (a) Explain what type of feedback is employed in oscillators?
   (b) Draw the circuit of Colpitts oscillator and explain the working of it.
   (c) Give the normal frequency range of operation of Colpitts oscillators. [4+10+2]

6. (a) Give typical examples of instruments needing accurate control time.
   (b) Classify timers according to the function performed by them.
   (c) Explain the following types of resistance welding: [4+4+8]
      i. Projection welding

ii. Butt welding.

7. (a) Draw a neat sketch and explain the working of CR tube.
   (b) Discuss about the electrodes used in dielectric heating. Explain, when the air clearance, is permitted between the Dielectric material and one or both the electrodes used in Dielectric heating. [8+8]

8. Write short notes on:
   (a) Integration technique used in ADC.
   (b) Parallel comparison technique used in ADC. [8+8]

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Code No: R05220301 **Set No. 4**

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
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 the transistors are current sensitive.
   (b) Draw the circuit diagram of CB amplifier with an NPN transistor and explain the working of it.
   (c) A transistor has $\alpha = 0.98$. The transistor is connected with its emitter grounded. If the base current is changed by 0.2 ma, calculate the change in collector current. [3+8+5]

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 helps in reducing the output impedance of an amplifier. Derive an expression for the output impedance of the negative feedback amplifier in terms of the output impedance and gain of the amplifier without feedback and feedback factor.
   (b) An amplifier has a gain of 1000 and output impedance of 10 kΩ when no feedback is employed. Determine the value of feedback factor required to have an output impedance of 600Ω when negative feedback is employed. [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) Classify Electronic Timers and explain the basic principle of each of them.
   (b) What is the function of Sequence Timer? Name different circuits that are developed for use as a Sequence Timer. [10+6]

7. (a) Give the block diagram of Cathode Ray Oscilloscope (C R O) and explain each block in detail.

(b) Explain the principle of Dielectric Heating.

(c) Explain thermal effects of Ultrasonic waves. [8+4+4]

8. (a) What are the arithmetic and logical operations performed in 8085 Microprocessor?

(b) What are the different registers in 8085 Microprocessor? Discuss their functions. [8+8]

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