

**II B.Tech. I Semester Regular Examinations, November -2005**  
**BASIC ELECTRONICS**  
**( Common to Mechanical Engineering, Production Engineering and**  
**Automobile Engineering)**

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

**Answer any FIVE Questions**  
**All Questions carry equal marks**

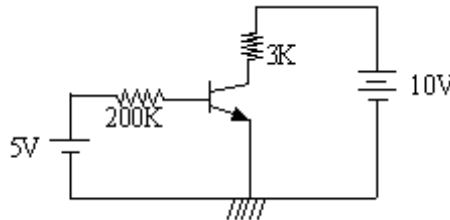
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1. (a) Draw the atomic structure for P and N type semiconductors. Explain about minority and majority carriers.  
 (b) Draw Bridge rectifier circuit and explain the working of it. What are the advantages of it over the full wave rectifier with centre tapped transformer?

[8+8]

2. (a) Show that in a transistor in C B configuration  $I_C = -\alpha I_E + I_{CO}$   
 (b) Find the transistor currents in the following circuit. A silicon transistor with  $\beta = 100$  and  $I_{co} = 20\text{na}$  is under consideration.

[8+8]



3. (a) What is meant by feed back? Discuss the general characteristics of negative feedback amplifier.  
 (b) Draw the circuit diagram of RC oscillator and explain its principle of operation.

[8+8]

4. (a) Explain the operations of spring loaded bimetal thermal timer and thermal delay relay timer.  
 (b) What are the applications of timing circuits.

[8+8]

5. (a) Give the principle of Induction heating. What are the merits of Induction heating.  
 (b) Explain the application of Induction heating for

- i. surface hardening of steel.
- ii. Annealing of brass and iron.

[8+8]

6. (a) Explain magnetic deflection system employed for deflecting the beam in CRO. Derive the expression for magnetic deflection sensitivity.

- (b) Explain the need of coating the screen with fluorescent materials and list different fluorescent materials commonly used. [8+8]
7. (a) What is a Microprocessor?
- (b) Explain about various addressing modes of microprocessor with suitable examples. [8+8]
8. Explain the operation of counter type A-to-D converter using D-to-A converter. [16]

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1. (a) Draw the atomic structure for P and N type semiconductors. Explain about minority and majority carriers.  
(b) Draw Bridge rectifier circuit and explain the working of it. What are the advantages of it over the full wave rectifier with centre tapped transformer?  
[8+8]
2. (a) Explain how the transistor acts as an amplifier  
(b) Define
  - i. Emitter efficiency
  - ii. Transport factor
  - iii. Large signal current gain and
  - iv. Emitter resistance.[6+10]
3. (a) Draw a JFET RC phase shift oscillator and derive the expression for the frequency of the oscillation.  
(b) Draw the emitter follower circuit. What is the feedback employed in the emitter follower. Explain the effect of this feed back on input and output impedances.  
[8+8]
4. (a) Explain the operations of spring loaded bimetal thermal timer and thermal delay relay timer.  
(b) What are the applications of timing circuits.  
[8+8]
5. (a) Explain the principle of dielectric heating.  
(b) Explain the application of dielectric heating for
  - i. Pre-heating of plastic preforms and
  - ii. Food processing.[8+8]
6. (a) Explain magnetic deflection system employed for deflecting the beam in CRO. Derive the expression for magnetic deflection sensitivity.  
(b) Explain the need of coating the screen with fluorescent materials and list different fluorescent materials commonly used.  
[8+8]
7. (a) What are the various general purpose registers? Explain.

- (b) What are the functions of the accumulator and program counter?
- (c) What are various flags in 8085 microprocessor? [6+5+5]
8. Explain the operation of counter type A-to-D converter using D-to-A converter. [16]

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1. (a) Define
  - i. Drift current
  - ii. Diffusion current
  - iii. Diffusion capacitance and
  - iv. Transition capacitance as applied to semi conductor diodes.(b) Draw half wave rectifier circuit with inductor filter and explain its operation.

[8+8]
2. (a) Explain how the transistor acts as an amplifier  
(b) Define
  - i. Emitter efficiency
  - ii. Transport factor
  - iii. Large signal current gain and
  - iv. Emitter resistance.

[6+10]
3. (a) Draw a JFET RC phase shift oscillator and derive the expression for the frequency of the oscillation.  
(b) Draw the emitter follower circuit. What is the feedback employed in the emitter follower. Explain the effect of this feed back on input and output impedances.

[8+8]
4. (a) Draw the functional block diagram of 555 I C timer and briefly explain its operation.  
(b) Explain sequence timer operation.

[8+8]
5. (a) Give the principle of Induction heating. What are the merits of Induction heating.  
(b) Explain the application of Induction heating for
  - i. surface hardening of steel.
  - ii. Annealing of brass and iron.

[8+8]
6. (a) Explain the working and construction of a CRT with neat sketch. Give the detailed description of all parts in a CRT.  
(b) What is a time base? State the need for time base in CRO.

[8+8]

7. What are the various types of data formats for microprocessor instructions? Give examples for each type of data format. [16]
8. Explain the operation of counter type A-to-D converter using D-to-A converter. [16]

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1. (a) Draw and explain the energy band diagrams of conductor, semiconductor and insulator.  
(b) Draw the V- I characteristics of an ideal diode. Distinguish between avalanche and zener break down. [8+8]
2. (a) Explain the various current components in a p-n-p transistor with forward biased emitter junction and reverse biased collector junction.  
(b) Explain the V- I characteristics of SCR. [8+8]
3. (a) Draw the voltage series, voltage shunt, current series and current shunt feed back amplifiers with discrete components. What is the effect of feed back on input and output impedances on each of the above topologies?  
(b) Draw a transistor amplifier using self bias (CE configuration) and explain the operation. What is the type of feed back in the presence of emitter resistance? [8+8]
4. (a) Explain the operation of I C 555 timer as a mono stable multivibrator and astable multivibrator. Draw necessary circuit diagram and wave forms.  
(b) Draw the basic circuit for A.C resistance welding and briefly explain its operation. [8+8]
5. (a) Discuss important applications of induction heating.  
(b) Briefly explain the principle of dielectric heating? Explain what is loss factor. [8+8]
6. (a) Give main constituents of cathode ray oscilloscope.  
(b) What are the defects of deflection in C R O. Explain them in detail. [8+8]
7. (a) What are the functions of temporary register and instruction register? Explain.  
(b) What are the functions of stack? What are the stack operations? Explain. [8+8]
8. (a) Derive an expression for an output voltage of inverted R-2R ladder DAC.  
(b) The digital input for a 4-bit DAC is 0110. Calculate its final output voltage.

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