

**III B.Tech I Semester Supplementary Examinations, November 2006**  
**BASIC ELECTRONICS**  
**(Mechanical 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) Draw a simple transistor amplifier circuit and explain the working of it.  
(b) Draw the equivalent diagram of SCR with two transistors and hence explain the operation of SCR. [8+8]
3. (a) Derive an expression to illustrate that the voltage gain in an amplifier circuit with negative feedback is some what stable even if the  $\beta$  of the transistor changes due to aging or due to its replacement.  
(b) Draw the circuit diagram of a phase shift oscillator using BJT. Explain why we cannot have phase shift oscillator which uses only two RC networks instead of three for obtaining a phase shift of  $180^\circ$ . [8+8]
4. (a) Draw the circuit and explain the operation of Magnetic energy storage welder  
(b) What are the types of resistance welding and explain each of them. [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) Draw the block diagram of CRO and explain the function of each block.  
(b) Derive the expression for the electro-static deflection sensitivity of a cathode ray tube. [8+8]
7. (a) Explain clearly with neat sketch the working principle of LVDT accelerometer.  
(b) How Bi-metallic thermometers can be used to measure temperature. [10+6]
8. (a) What is the phenomenon of Magnetostriction effect?  
(b) Explain the method of generation of ultrasonic waves using magnetostriction generators.

(c) Explain the use of ultra sonics in communication system

[5+5+6]

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