

**II B.Tech II Semester Supplementary Examinations,
November/December 2005
BASIC ELECTRONICS**

(Metallurgy & Material Technology)

Time: 3 hours

Max Marks: 80

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

1. (a) From the V-I characteristics of a diode, explain the terms dynamic resistance and static resistance
(b) Draw Half-wave rectifier with capacitor filter and explain its operation [8+8]
2. (a) Discuss the potential variation and variation of minority carrier concentration in p-n-p transistor biased in the active region
(b) Draw and explain a simple SCR circuit for speed control of a motor. [8+8]
3. (a) Distinguish between class A, class B, Class C operations of an amplifier.
(b) Compare the various types of feedback amplifiers in respect of input and output impedances. [8+8]
4. (a) Compare and contrast the following timers
 - i. Thermal Timers
 - ii. Electromechanical Timers
 - iii. Mechanical Timers
 - iv. Electrochemical Timers
(b) Explain
 - i. Bimetal strip timers
 - ii. Thermal expansion timers [8+8]
5. (a) Give the merits of induction heating as compared to conventional methods of heating in industry. What are the drawbacks of induction heating.
(b) Explain the principle of dielectric heating. List the applications of dielectric heating. [8+8]
6. (a) What is the necessity of time base in cathode ray oscilloscope? Draw any one type of time base circuits employed in CRO and explain how it produces the saw-tooth wave
(b) List the applications of C R O. [8+8]
7. (a) Explain with necessary sketch how bellows are used to measure the pressure.
(b) List out the advantages and disadvantages of Thermistor and Thermocouple. [8+8]

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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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) 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) Compare and contrast the following timers
 - i. Thermal Timers
 - ii. Electromechanical Timers
 - iii. Mechanical Timers
 - iv. Electrochemical Timers(b) Explain
 - i. Bimetal strip timers
 - ii. Thermal expansion timers[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) Discuss briefly

- i. Electrostatic focusing and
 - ii. Magnetostatic focusing methods used in cathode ray tube and compare their merits.
- (b) Explain the need of ion trap in cathode ray tube [10+6]
7. (a) Explain with necessary sketch how bellows are used to measure the pressure.
- (b) List out the advantages and disadvantages of Thermistor and Thermocouple. [8+8]
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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1. (a) Draw the V- I characteristics of a zener diode. Explain the operation of regulator circuit using zener diode
(b) Explain the operation of full wave rectifier with resistance load and calculate the value of ripple factor of it. [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) Derive an expression to illustrate that the voltage gain in an amplifier circuit with negative feedback is some what stable even if the β 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° . [8+8]
4. (a) Draw the block diagram of timer system. Briefly explain the constituents of industrial timing circuits.
(b) Briefly explain all types of resistance welding. [8+8]
5. (a) Explain the theory of induction heating by taking an example of cylindrical metal piece. Draw the Graph showing the variation of eddy current density with distance from the metal surface
(b) Discuss different types of losses observed in dielectric heating. [10+6]
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. (a) What is Thermistor? Draw and explain the construction details and different forms of Thermistors.
(b) Explain the resistance-temperature characteristics of Thermistor and also list out the salient features of Thermistor. [8+8]
8. (a) Explain the method of generating ultrasonic waves by mechanical generators.
(b) Give the application of ultra sonic waves in industry

(c) Explain the method of “Automatic Testing of welded seams” [5+5+6]

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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) What are the advantages and disadvantages of negative feed back in amplifiers.
(b) Explain the effects of Negative feedback in an amplifier on,
 i. Distortion,
 ii. Stability of transfer function. [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) 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 C R O. 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 Poisson ratio? Draw and explain the various types of bonded strain gauges.
(b) Explain with neat diagram the working principle of oscillation transducer to measure the pressure. [8+8]
8. (a) Explain Piezo-electric effect in crystals.

- (b) Explain the method of generating ultra sonic waves using Piezo- electric generator.
- (c) Explain the application of ultrasonic waves in dispersing metals. [5+5+6]

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