

II B.Tech I Semester Supplementary Examinations, November 2006
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

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) Explain about the construction of a transistor using Epitaxial Planar type.
(b) Explain why the output characteristics of a transistor in CE configuration have more slope than in CB configuration. [8+8]
3. (a) Write short notes on “Frequency stability in Oscillator”.
(b) Draw the circuit of RC phase shift Oscillator using transistor. Derive an expression for frequency of Oscillation. [6+10]
4. (a) Classify the timers according to the function and the technique used to achieve the industrial timing.
(b) List the electronic welding controls used in 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. What are the various types of data formats for microprocessor instructions? Give examples for each type of data format. [16]
8. (a) Explain the principle of operation R -2R type D-to-A converter.
(b) What are its advantages? [8+8]

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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) What is “Early effect” phenomenon in a transistor and explain its consequences.
(b) Draw and explain the input and output characteristics of n-p-n transistor in C- B configuration.
[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) Compare transistor timer with relay load control and SCR delay timer.
(b) Draw the circuit diagram of asynchronous welding control system and explain.
[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) Explain how the diode works as a switch.
 (b) With the help of neat circuit diagram explain the operation of bridge rectifier. Give two advantages of the bridge rectifier over 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 shown in figure 2b. A silicon transistor with $\beta = 100$ and $I_{co} = 20\text{na}$ is under consideration. [8+8]

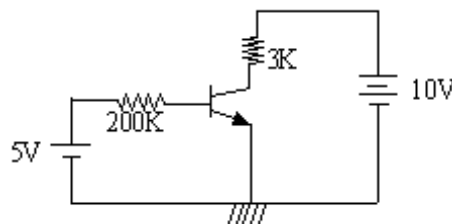


Figure 2b

3. (a) With a neat diagram, explain what type of feedback is employed in emitter follower and obtain an expression for voltage gain.
 (b) Explain the working of a Wein Bridge oscillator circuit, and derive the expression for frequency of oscillation. [8+8]
4. (a) Draw the circuit and explain the operation of sequence timer.
 (b) Draw the circuit and explain the operation of capacitor energy storage welder and briefly explain the operation of it. [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) 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) What is a Microprocessor?
(b) Explain about various addressing modes of microprocessor with suitable examples. [8+8]
8. (a) List various A-to-D conversion techniques.
(b) Explain the operation of flash A-to D converter. [8+8]

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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) 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) Write short notes on “Frequency stability in Oscillator”.
(b) Draw the circuit of RC phase shift Oscillator using transistor. Derive an expression for frequency of Oscillation. [6+10]
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) Discuss important applications of induction heating.
(b) Briefly explain the principle of dielectric heating? Explain what is loss factor. [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. (a) What is a Microprocessor?

- (b) Explain about various addressing modes of microprocessor with suitable examples. [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. [8+8]
