Code No: RR312202 **Set No.1**

III B.Tech. I Semester Supplementary Examinations, May -2005
INDUSTRIAL ELECTRONICS
(Instrumentation & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain the DC amplifier using cathodeemitter follower as the 1st stage and derive the expression for its gain using its equivalent circuit.
   (b) Explain the cathodeemitter drift compensation technique in DC amplifiers.
2. (a) What is the disadvantage of single transistor SMPS and how it can be eliminated using bridge type of configuration?
   (b) A single transistor, fly back SMPS operating at 16 kHz is supplying a mean load power of 120W at a mean voltage of 80 V from a dc source of 110 V. Estimate the mark/ space ratio of the output voltage and the value of inductance required in the circuit.
3. (a) Define the short-period and long-period accuracy of a stabilizer.
   (b) Draw the basic voltage stabilizer circuit using nonlinear voltage divider and explain it.
4. (a) Explain the thermal and power ratings of SCR.
   (b) Explain the methods of measurement of the following SCR parameters.
      i. Holding and latching current
      ii. Turn-off time
      iii. dV/dt and di/dt
5. (a) Draw the SCR protection circuit and explain how over current protection is possible from that circuit.
   (b) A circuit having a prospective fault current 1 kA is protected by a fuse with I^2t rating of 100 A^2 sec on a 50-Hz basis. The faulted circuit is opened in 5 msec. Calculate the peak value of the fault current.
6. Explain the operation of self-commutated inverter circuit and give all the voltage and current waveforms and give its applications.
7. Draw and explain the simple heat control circuit for resistance welding with the help of its voltage waveforms.
8. (a) What are the properties of materials used in dielectric heating?
   (b) Explain various methods of coupling electrodes to RF generator in dielectric heating applications.

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR312202 **Set No.2**

III B.Tech. I Semester Supplementary Examinations, May -2005
INDUSTRIAL ELECTRONICS
(Instrumentation & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain the operation of a two stage D.C amplifier using Miller compensation technique.
   (b) List out the specifications of a D.C amplifier.
2. (a) Tabulate the differences between linear mode power supply and SMPS.
   (b) Explain the different types of SMPS.
   (c) What is a switching regulator? Why it is called so? Enumerate and explain its advantages.
3. (a) Draw the monolithic IC regulator with variable output and current limiting features and explain it in detail.
   (b) List fixed and variable IC voltage regulators.
4. (a) Which thyristor rating is in danger of being exceeded when a load is inductive, and what is the conventional limiting technique?
   (b) What are the different signals which can be used for turning on an SCR by gate control? Compare them.
5. Explain the operation of three-phase , half-wave controlled converter with inductive load. Sketch the associated waveforms and derive expressions for the average voltage output.
6. Design a snubber circuit and explain its operation and give its applications.
7. (a) Explain the resistance welding process.
   (b) Draw the basic circuit of ac resistance welding and explain it.
8. (a) List the merits of Induction Heating.
   (b) Explain the main principle behind induction heating.

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR312202 **Set No.3**

III B.Tech. I Semester Supplementary Examinations, May -2005
INDUSTRIAL ELECTRONICS
(Instrumentation & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What are Non-linear bias circuits? Why do we need this circuit?
   (b) Explain any one Non-linear biasing circuit.
2. (a) Compare series and short voltage regulator circuits in all respects.
   (b) Design a series voltage regulator with the following specifications V_o=20volts, V_in=22-30 volts, I_load(max)=50mA.
3. (a) How is short-circuit current protection provided for an IC regulator? Draw and explain the circuit diagram.
   (b) Explain voltage regulator system using LM 105 IC and with an external pass transistor.
4. (a) List the advantages of thyristor as compared to BJT for switching applications.
   (b) An SCR has a V_g -I_g characteristics given as $V_g = 1.5 + 8\ I_g$. In a certain application, the gate voltage consists of rectangular pulses of 12 V and of duration 50microsec with the duty cycle 0.2. Find the value of R_g series resistor in gate circuit to limit the peak power dissipation in the gate to 5 watts. And also calculate average power dissipation in the gate.
   (c) Define the Nonrepetitive and Repetitive peak reverse and forward voltage ratings of SCR.
5. Explain the operation of three-phase , half-wave controlled converter with resistive load. Sketch the associated waveforms and derive expressions for the average voltage output.
6. Draw and explain the operation of the time-sharing inverter circuit and give its related current and voltage waveforms.
7. Explain the AC operated timer and draw its voltage and current waveforms.
8. (a) Explain the concept of pulsed echo ultrasonic flaw detector using its block diagram.
   (b) Explain the techniques of soldering and welding by ultrasonics.

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR312202 **Set No.4**

III B.Tech. I Semester Supplementary Examinations, May -2005
INDUSTRIAL ELECTRONICS
(Instrumentation & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain the DC amplifier using cathodeemitter follower as the 1st stage and derive the expression for its gain using its equivalent circuit.
   (b) Explain the cathodeemitter drift compensation technique in DC amplifiers.
2. (a) What is the disadvantage of single transistor SMPS and how it can be eliminated using bridge type of configuration?
   (b) A single transistor, fly back SMPS operating at 16 kHz is supplying a mean load power of 120W at a mean voltage of 80 V from a dc source of 110 V. Estimate the mark/ space ratio of the output voltage and the value of inductance required in the circuit.
3. (a) How is short-circuit current protection provided for an IC regulator? Draw and explain the circuit diagram.
   (b) Explain voltage regulator system using LM 105 IC and with an external pass transistor.
4. (a) What are dv/dt and di/dt ratings of SCRs. What happens if these rating are exceeded? Explain?
   (b) What are the different methods of turning off an SCR. Explain all methods in detail.
5. (a) Explain SCR as a static switch.
   (b) Draw the general SCR phase control circuit and draw its waveforms.
6. Design a snubber circuit and explain its operation and give its applications.
7. (a) Explain the resistance welding process.
   (b) Draw the basic circuit of ac resistance welding and explain it.
8. (a) Explain the theory and principle of dielectric heating.
   (b) List various Industrial applications of dielectric heating.

⋆ ⋆ ⋆ ⋆ ⋆