Instructions:  
(1) All questions are compulsory. 
(2) Illustrate your answers with neat sketches wherever necessary. 
(3) Figures to the right indicate full marks. 
(4) Assume suitable data, if necessary.

1. Attempt any five of the following: 
   a) State the applications of MOSFET (any two).
   b) Draw the V-I characteristics of power transistor.
   c) Draw the symbol of GTO and TRIAC.
   d) Define triggering. List the type of triggering.
   e) Define commutation. Give the types of commutation.
   f) Define transfer time and back up time of UPS.
   g) State the applications of power electronics.

   Marks 10

2. Attempt any three of the following: 
   a) Describe with neat sketch the construction and working principle of MOSFET.
   b) Draw construction of SCR using two transistor model. Explain its operation.
   c) Explain the operation of RC triggering circuit with neat diagram.
   d) Draw a neat diagram of 1φ half wave controlled converter with RL load. Give its operation.

   Marks 12

3. Attempt any three of the following: 
   a) Draw a neat labelling V-I characteristics of SCR and explain the region.
   b) Explain the operation of PUT relaxation oscillator with diagram.
   c) Explain with sketch the operation of single phase fully controlled midpoint configuration with R load.
   d) Give the operation of battery charger using SCR with a neat diagram.

   Marks 12
4. Attempt any three of the following:
   a) Explain the operation of snubber protection circuit with diagram.
   b) Explain the operation of opto coupler based triggering circuit with diagram.
   c) Give the concept of firing angle and conduction angle with a neat waveform.
   d) Draw the circuit diagram of DC static circuit breaker and give its operation.
   e) Describe emergency lighting system with neat diagram.

5. Attempt any two of the following:
   a) Draw a symbol and neat labelling V-I characteristics of GTO and explain its operation.
   b) Explain auxiliary commutation with a neat diagram. Also draw its waveform.
   c) Explain in detail over-voltage protection.

6. Attempt any two of the following:
   a) Give the operation of single phase full wave bridge controlled converter with RL load with a neat diagram. Also draw its waveform.
   b) Give the effect of source impedance on converter operation.
   c) Explain the operation of UPS with a neat block diagram.