

Scheme – I

Sample Question Paper

Program Name : Electronics Engineering Programme Group
Program Code : DE/EJ/ET/EN/EX/EQ/IS/IC
Semester : Fourth
Course Title : Basic Power Electronics
Marks : 70

22427

Time: 3 Hrs.

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.
- (5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following:-

10 Marks (5X2)

- (a) State two applications of IGBT .
- (b) Draw labeled symbol of DIAC and SCS.
- (c) Write the types of gate triggering.
- (d) Draw neat circuit diagram of single phase half wave controlled rectifier with R load.
- (e) List the types of inverters.
- (f) Define the term Chopper.
- (g) Draw the basic block diagram of SMPS.

Q.2) Attempt any THREE of the following:-

12 Marks (3X4)

- (a) Describe with neat sketch the operation of power MOSFET .
- (b) Describe with circuit diagram the operation of emergency lighting system.
- (c) Name a suitable chopper to increase the output voltage and also explain its operation with neat circuit diagram .
- (d) Explain with circuit diagram and waveform the operation of single phase half controlled rectifier with RL load.

Q.3) Attempt any THREE of the following.

12 Marks (3X4)

- (a) Explain with circuit diagram the operation of a suitable over current protection circuit for high power transistor.

- (b) Describe the effect of freewheeling diode with respect to single phase centre tap fully controlled rectifier with RL load.
- (c) Suggest a suitable type of inverter to produce square wave output and write its operation with neat circuit diagram.
- (d) Explain with circuit diagram the operation of a suitable circuit to control the temperature of a heater.

Q.4) Attempt any THREE of the following.

12 Marks (3X4)

- (a) Explain operation with circuit diagram a suitable type of triggering circuit to control the firing angle from 0° to 180° .
- (b) A single phase fully controlled rectifier supplied with voltage $v = 100\sin 314t$, $\alpha = 30^{\circ}$ and load resistance is 50Ω , find average output DC voltage and load current.
- (c) Explain operation with sketch a suitable chopper circuit to generate inverting voltage.
- (d) If a person use one ceiling fan (80W), two tube lights (40W per tube light), two CFL (7W per CFL) simultaneously with UPS having 12V, 150AH battery. Calculate backup time of UPS battery.
- (e) State the need of protection circuit and list its types.

Q.5) Attempt any TWO of the following.

12 Marks (2X6)

- (a) Explain with sketch the operation of IGBT.
- (b) Describe the operation of synchronized UJT triggering circuit with diagram.
- (c) Explain the operation of three phase half wave controlled rectifier with circuit diagram and also sketch its input and output waveform.

Q.6) Attempt any TWO of the following.

12 Marks (2X6)

- (a) Explain with a neat circuit diagram operation of series inverter.
- (b) Suggest a suitable power device having 1st and 3rd quadrant symmetrical characteristics and describe its operation with modes.
- (c) Explain with characteristics the effect of gate current on turn ON voltage of SCR.

Scheme – I

Sample Test Paper - I

Program Name : Electronics Engineering Programme Group
Program Code : DE/EJ/ET/EN/EX/EQ/IS/IC
Semester : Fourth
Course Title : Basic Power Electronics
Marks : 20

22427

Time: 3 Hour

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.
- (5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR.

08 Marks (4X2)

- a) List out the merits of GTO over SCR.
- b) Draw the labeled characteristics of SBS.
- c) Draw two transistor equivalent circuit of SCR.
- d) Write four turn ON methods of SCR.
- e) For DC source, name any four turn OFF methods of SCR.

Q.2 Attempt any THREE.

12 Marks (3X4)

- (a) Explain with sketch the operation of SCS.
- (b) Interpret the VI characteristics of PUT.
- (c) Sketch circuit diagram of Class B commutation method. State function of each components
- (d) Justify the use of pulse transformer in SCR triggering .

Scheme – I

Sample Test Paper - II

Program Name : Electronics Engineering Programme Group
Program Code : DE/EJ/ET/EN/EX/EQ/IS/IC
Semester : Fourth
Course Title : Basic Power Electronics
Marks : 20

22427

Time: 1 Hour

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.
- (5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR.

08 Marks (4X2)

- (a) State the relation between firing angle and conduction angle with wave form.
- (b) Write the effect of free wheeling diode in controlled rectifier.
- (c) List out the types of chopper.
- (d) Sketch the circuit diagram of series inverter.
- (e) Sketch circuit diagram of light dimmer circuit based on DIAC and TRIAC.

Q.2 Attempt any THREE.

12 Marks (3X4)

- (a) A single phase fully controlled rectifier supplied with voltage $v = 200\sin 314t$, $\alpha = 40^\circ$ and load resistance is 100Ω find average output DC voltage and load current.
- (b) Explain the operation of parallel inverter with neat sketch.
- (c) Explain with neat sketch the operation of battery charger using SCR.
- (d) List out the selection factors of SMPS.