

Scheme-G

## Sample Test Paper- I

Course Name :- Diploma in Electronics Engineering Group

Course Code :- ET/EN/EX/EJ/ED/EI/IS/IC/IE/IU

**17444**

Semester :-Fourth

Subject Title :- Power Electronics

Marks :- 25

Time:- 1 hour

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### 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.

### Q1. Answer any THREE

(09 Marks)

- a) Why germanium is not suitable for control rectification ?
- b) Draw the symbol of
  - i) TRIAC
  - ii) PUT
  - iii) SBS
  - iv) GTO
  - v) SCS
  - vi) LASCR
- c) List out triggering and commutation methods for SCR
- d) State the phenomenon of breakdown in NPN power transistor with proper output characteristics.

### Q 2) Answer any TWO

(08 Marks)

- a) State name of triggering method using UJT? Draw its diagram & write its frequency formulae.
- b) State any two advantages of IGBT. Draw its layer diagram.
- c) Show the effect of gate current on break over voltage of TRIAC with neat sketch.

### Q 3) Answer any TWO

(08 Marks)

- a) Draw V-I characteristics of SCR Define latching current and holding current.
- b) Show the effect of resistance variations on firing and conduction angle with waveform in RC triggering.
- c) Differentiate power transistor with power MOSFET with respect to layer diagram and application

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## Sample Test Paper- II

Course Name :- Diploma in Electronics Engineering Group

Course Code :- ET/EN/EX/EJ/ED/EI/IS/IC/IE/IU

**17444**

Semester :-Fourth

Subject Title :- Power Electronics

Marks :- 25

Time:- 1 hour

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### 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.

### Q1. Answer any THREE

(09 Marks)

- a) State the need of polyphase rectifier.
- b) Draw labeled circuit of Electronic timer using SCR.
- c) Define any two performance parameter of inverter.
- d) Define chopper & State its classification.

### Q2. Answer any TWO

(08 Marks)

- a) Draw the temperature controller using SCR. Explain How temperature is controlled?
- b) Draw circuit diagram of step up chopper and Why it is called as step up ?
- c) Draw single phase half wave controlled rectifier with R load & its waveforms of supply & load voltage.

### Q3. Answer any TWO

(08 Marks)

- a) Differentiate controlled & Un-controlled rectifier with respect to device used, firing circuit, phase angle control & applications.
- b) Draw the circuit of speed control of fan using TRIAC. Why DIAC is used ?
- c) Draw single phase half bridge inverter with R-load & State its operation.

Scheme-G

## Sample Question Paper

Course Name :- Diploma in Electronics Engineering Group

Course Code :- ET/EN/EX/EJ/ED/EI/IS/IC/IE/IU

# 17444

Semester :-Fourth

Subject Title :- Power Electronics

Marks :- 100

Time:- 3 hour

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### 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

### Q1.A Answer any SIX

(12 Marks)

- a. Draw the symbol of 1) GTO 2) LASCR
- b. State any two advantages of IGBT
- c. Name any two triggering devices used for SCR.
- d. Write classification of chopper.
- e. Define force communication and natural communication
- f. Define inverter and classify it.
- g. State any two advantages of poly phase rectifier.
- h. Draw labeled basic block diagram of UPS.

### Q1.B Answer any TWO

(08 Marks)

- a. Compare controlled & uncontrolled rectifier with respect to following parameters.  
a) Device used    b) Need of firing circuit    c) control of output voltage    d) applications
- b. Define Distortion factor and lowest order harmonics with respect to Inverter.
- c. Draw the labeled circuit diagram of battery charger using SCR.

**Q2. Answer any FOUR****(16 Marks)**

- a. Draw the circuit diagram and input & output voltage waveforms of 3 $\Phi$  half wave rectifier with resistive load.
- b. Draw & write working principle of step up chopper with waveforms.
- c. Describe the working of DC flasher circuit using SCR with neat diagram.
- d. Draw V-I characteristics of SCR & define i) Holding current ii) Latching current
- e. What is class c- commutation ? . State its working principle with circuit diagram.
- f. Sketch the diagram of single phase half bridge inverter. Why it is called as half bridge inverter.

**Q3. Answer any FOUR****(16 Marks)**

- a. Differentiate SCR and TRIAC with respect to 1)Symbol 2) Layered diagram 3) operating quadrant 4)Application
- b. Draw single phase center tapped controlled rectifier with resistive load and its load voltage waveform.
- c. Sketch equivalent circuit of SCR using BJT and Justify it.
- d. State different operating regions of power transistor. What is primary and secondary break-down?
- e. Draw the neat circuit diagram of single phase half wave controlled rectifier with RL load & describe its working.
- f. A single phase Full wave controlled rectifier is supplied with a voltage  $V = 230\sin(314t)$  find average output DC voltage and current if firing angle is  $45^\circ$  & load resistance is  $100\Omega$ .

**Q4. Answer any FOUR****(16 Marks)**

- a. Draw the neat circuit diagram of class B chopper & draw its input and output voltage waveforms.
- b. Draw constructional diagram of GTO and State its merits over SCR.
- c. Draw light dimmer circuit using DIAC & TRIAC.
- d. State different trigger methods & describe RC triggering method for SCR with circuit diagram.
- e. Draw circuit diagram & write the working of emergency light system.

- f. Show the effect of change of duty cycle on the output voltage of chopper with proper waveforms.

**Q5. Answer any FOUR**

**(16 Marks)**

- a. Draw the neat circuit diagram of emergency lighting system using SCR & describe its working.
- b. Draw V-I characteristics of UJT & describe its different operating regions.
- c. What is the poly phase rectifier? State its need.
- d. Why pulse transformer is used for triggering. Draw the triggering circuit using it.
- e. Draw the labeled constructional diagram of N-channel IGBT.
- f. State the expression of average output voltage and current of 1- $\Phi$  half wave controlled rectifier. State the effect of freewheel diode on output

**Q6. Answer any FOUR**

**(16 Marks)**

- a. Draw block diagram of SMPS & describe its working.
- b. State the effect of freewheeling diode with suitable waveforms in controlled rectifier.
- c. Draw the series resonant commutation circuit for SCR & describe its working.
- d. Draw constructional diagram for SUS and describe its working principle.
- e. Compare power transistor & power MOSFET with respect to
  - 1) symbol
  - 2) switching speed
  - 3) SiO<sub>2</sub> layer
  - 4) On state losses
- f. List various commutation methods for SCR & draw class B commutation circuit.