



17444

11819

3 Hours / 100 Marks

Seat No.

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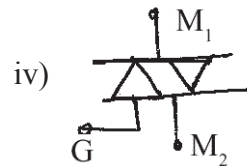
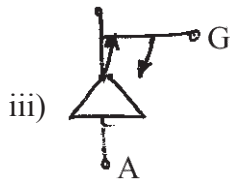
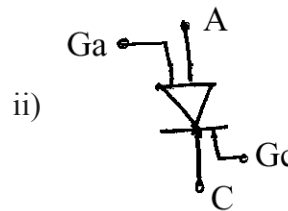
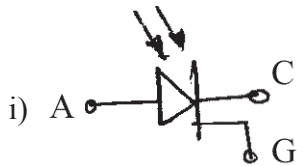
- Instructions :**
- (1) All questions are **compulsory**.
 - (2) Attempt **6** questions including Question No. **1** which is **compulsory**.
 - (3) Illustrate your answers with neat sketches **wherever** necessary.
 - (4) Figures to the **right** indicate **full** marks.
 - (5) Assume suitable data, if **necessary**.
 - (6) Use of Non-programmable Electronic Pocket Calculator is **permissible**.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are **not permissible** in Examination Hall.

Marks

1. A) Attempt **any six** of the following.

12

- a) Name four layer Thyristor family devices (Any two devices).
- b) List any two uses of IGBT.
- c) Identify the given symbols of Thyristor family devices :



- d) List any two applications of inverter.
- e) Draw resistance triggering circuit of SCR.
- f) Define chopper. Classify.
- g) State any two applications of controlled rectifiers.
- h) List any two advantages of SMPS.

P.T.O.



B) Attempt **any two** of the following.

- a) Compare single phase halfwave controlled rectifier and single phase full wave controlled rectifier (any four points).
- b) State four performance parameters of inverter.
- c) Draw the neat circuit diagram of emergency light system and write its working.

2. Attempt **any four** of the following.

16

- a) Why the controlled rectifiers are called phase controlled rectifiers ? Justify with neat sketch.
- b) Describe working of step-down chopper with neat diagram and waveforms.
- c) Draw the labelled circuit diagram of Battery charger using SCR.
- d) Define the following terms with respect to SCR :
 - i) Latching current
 - ii) Holding current
 - iii) On state voltage (V_{BO})
 - iv) Reverse Breakdown voltage (V_{BR}).
- e) Draw the circuit diagram of PWT relaxation oscillator and explain its operation.
- f) Explain working of step-up chopper with neat diagram.

3. Attempt **any four** of the following.

16

- a) Differentiate TRIAC and DIAC with respect to (1) symbol (2) layered diagram (3) application (4) breakdown voltage.
- b) Describe working of half wave controlled rectifier with Resistive load. Draw circuit diagram and waveforms.
- c) Define terms of GTO : (1) Turn off gain and (2) Maximum controllable I_A .
- d) Draw the construction of enhancement type power MOSFET and describe its working.
- e) Write the effect of inductive load and significance of free wheeling diode in 1ϕ bridge type full wave rectifier.
- f) A single phase full wave controlled rectifier is supplied with voltage $v = 210 \sin 314 t$. Find average output voltage and current. If firing angle is 50° and load resistance is 100Ω .

4. Attempt **any four** of the following.

16

- a) Describe working of $1 - \phi$ half bridge inverter with neat sketch.
- b) Explain four modes of operation of a TRIAC.
- c) With the help of circuit diagram explain speed control of fan using TRIAC – DIAC.
- d) Describe working of complementary symmetry commutation circuit with neat diagram.
- e) Draw the block diagram of UPS and explain function of each block.
- f) Compare step-up chopper and step-down chopper (any four points).



[3]

17444

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16

5. Attempt **any four** of the following.

- a) Draw the neat circuit diagram of low power dc flasher and describe its working.
- b) With the help of construction and equivalent circuit explain working of LASCR.
- c) State the need of polyphase rectifier.
- d) Draw circuit diagram of synchronized UJT triggering circuit and explain its working.
- e) Draw neat labeled VI characteristics of power transistor.
- f) Draw circuit diagram of centre tapped full wave controlled rectifier with RL load. Draw load voltage waveform for firing angle $\alpha = 30^\circ$.

6. Attempt **any four** of the following.

16

- a) Describe working of Temperature Controller with neat diagram.
 - b) Draw circuit diagram input and output waveforms of 3ϕ halfwave uncontrolled rectifier.
 - c) Compare natural commutation and forced commutation (any 4 points).
 - d) Draw constructional details of SCR. Why silicon is used as the intrinsic semiconductor for manufacturing the SCR ?
 - e) Compare between power MOSFET and IGBT (any four points).
 - f) Classify the commutation methods of thyristor. Draw class A commutation circuit.
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