



17584

15162

3 Hours / 100 Marks

Seat No.

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- Instructions :** (1) *All questions are compulsory.*
(2) *Answer **each** next main question on a **new** page.*
(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 three** of the following : **12**
- a) Draw a symbol and VI characteristics of TRIAC. Label various points on characteristics.
 - b) Compare single phase and three phase converter w.r.t. following points
 - 1) Ripple factor
 - 2) RMS value
 - 3) Average value
 - 4) Efficiency.
 - c) Draw a neat circuit for basic series inverter, explain it.
 - d) Draw a neat circuit and explain the working of step up chopper.
- B) Attempt **any one** of the following : **6**
- a) Explain the turnoff process of SCR using suitable example.
 - b) With the help of circuit diagram, input and output waveforms. Describe the principle of operation of cyclo converter.
2. Attempt **any four** of the following : **16**
- a) List the turn on methods of SCR and explain any one of them.
 - b) What is converter ? List the types of converter. State the function of freewheeling diode in converter.
 - c) Classify inverters. State the necessity to control the output voltage of an single phase inverter.
 - d) What is commutation ? What are the different commutation method for chopper ? Explain any one of them.
 - e) Describe with the help of circuit diagram the operation of DC static circuit breaker using SCR.
 - f) With the help of block diagram explain the basic principle of operation of SMPS.

P.T.O.



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

16

- a) List and explain any four specifications and ratings of SCR.
- b) Draw a neat circuit and related waveforms of a single phase fully controlled halfwave converter with RL Load.
- c) What is meant by series inverter and parallel inverter ? Draw a neat circuit of basic parallel inverter.
- d) List various control techniques used in chopper. Explain any one of them in detail.
- e) Describe with the help of circuit diagram the principle of dielectric heating control.

4. A) Attempt **any three** of the following :

12

- a) Draw the circuit diagram and describe the operation of electric welding control using SCR.
- b) Explain deviation in quality of power supply w.r.t. waveform, frequency, voltage level and current.
- c) Define :
 - i) Firing angle ii) Conduction angle.
- d) State and explain the effect of source impedance on working of converter.

B) Attempt **any one** of the following :

6

- a) State the classification of chopper according to the direction of output voltage and current. Explain class C chopper with the help of circuit diagram and input, output waveforms.
- b) State types and applications of UPS. Describe the operation of online UPS system with the help of neat block diagram.

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

16

- a) Draw a symbol for following also label the terminals
 - i) SCR ii) DIAC iii) GTO iv) IGBT
- b) Draw a neat circuit diagram and related waveforms for three phase fully controlled bridge converter with resistive load.
- c) List the different selection criteria for the selection of single phase inverter.
- d) Compare series inverter and parallel inverter (any four points).
- e) Which devices are used to suppress spikes in supply voltage ? With the help of block diagram explain the operation of offline UPS.
- f) Write various applications of power electronics. Explain any one of them.

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

16

- a) State the principle of operation and construction of SCR.
 - b) State the necessity of converter. Also write any two applications of it.
 - c) Describe the harmonic reduction by single pulse width modulation method.
 - d) Draw a neat circuit diagram and related waveforms for single phase fully controlled bridge converter with RL load.
 - e) List the different method to control output voltage of single phase inverter. Explain any one of them.
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