16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

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.

Marks

1. (A) Attempt any SIX : **12**

(a) Draw neat symbol of SCR, DIAC, TRIAC, GTO.

(b) Give detail classification of inverter.

(c) Explain necessity of choppers and its working principle.

(d) List any two applications of converters.

(e) Explain concept of harmonics. Also explain sources and effects of harmonics.

(f) Draw labelled characteristics of TRIAC.

(g) Name the devices used to suppress spikes in supply voltage. (Any two)

(h) Draw neat circuit diagram of single phase fully controlled bridge converter with free wheeling diode.

(B) Attempt any ONE : **6**

(a) Draw neat circuit of single phase. Cycloconverter and explain its working with neat input & output waveforms.

(b) List different triggering methods of SCR. Explain any one method with circuit.

2. Attempt any FOUR : **16**

(a) Draw neat circuit of stepup chopper. Explain its operation with neat waveforms.

(b) With the help of neat circuit diagram and waveforms, explain working of single phase fully controlled half wave converter with R load.

(c) Draw circuit of line (Natural) commuted inverter and explain its working.

(d) Draw two transistor analogy of SCR and derive anode current equation.

(e) Draw neat circuit diagram and waveform of three phase fully controlled bridge. Converter with R load.

(f) Draw neat symbol and labelled characteristics of LASCR & IGBT.

3. Attempt any FOUR : **16**

(a) Explain working of parallel inverter with neat circuit diagram.

(b) Explain effect of source impedance on converter operation.

(c) Draw circuit of AC phase control using triac with diac as triggering device and explain its operation.

(d) Draw circuit of battery charger using SCR's and explain its working.

(e) Draw block diagram of SMPS and explain working of each block.

(f) Draw labelled characteristics of SCR and define.

(i) Holding current

(ii) Latching current

4. Attempt any THREE : **18**

(a) Draw neat circuit of single phase fully controlled bridge converter with RL load and explain its working with necessary waveforms.

(b) Draw block diagram of OFF line UPS and ON line UPS and explain the working of them.

(c) Explain working of basic series inverter with neat circuit diagram. Also draw circuit diagram of modified series inverter.

(d) List different methods of commutation of choppers and explain any one method with neat circuit diagram.

5. Attempt any FOUR : **16**

(a) List different methods of output voltage control of single phase inverter. Explain any one method in detail.

(b) Compare single phase and three phase converter on the basis of

(i) Efficiency

(ii) Ripple factor

(iii) RMS value

(iv) Average value

(c) Define commutation of SCR. Explain any one type of commutation method of SCR with neat circuit diagram.

(d) Give classification of chopper. Explain class A chopper with neat circuit.

(e) Draw circuit diagram of static DC circuit breaker and explain its working.

(f) Explain deviation in quality of power supply with respect to waveform, frequency, current and voltage level.

6. Attempt any FOUR : **16**

(a) Draw neat circuit of three phase inverter & explain its working.

(b) Draw circuit of single phase full wave controlled converter with R load and explain its working.

(c) With the help of neat circuit diagram and waveforms, explain the operation of step down chopper.

(d) Explain basic principles of SMPS and UPS.

(e) Compare MOSFET based inverters and thyristor based inverters. (any four points)

(f) Draw neat circuit diagram of Induction heating control and dielectric heating control using SCR's.

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