22430

24225

3 Hours / 70 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.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

a) List types of phase controlled converter.

b) Mention the different firing circuits used for SCR.

c) Draw step up chopper and it's wave forms.

d) State the different methods used to control the output voltage of inverter.

e) State any two advantages and disadvantages of cycloconverter.

f) State the types of heat sink used in power electronics applications.

g) Sketch neat diagram of SCR stud mounting technique.

Marks

2. Attempt any THREE of the following : **12**

a) Identify the circuit given in Figure No. 1 and explain its operation.

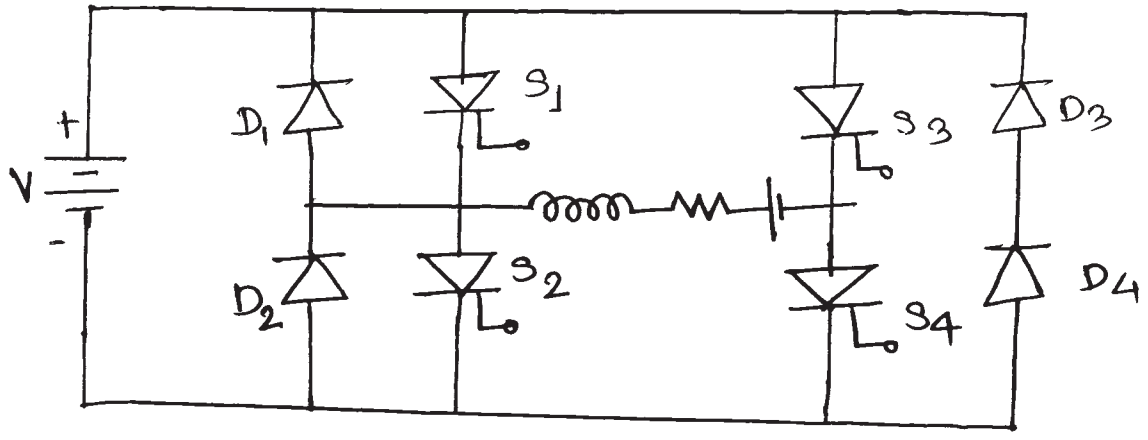

Fig. No. 1

b) Explain with neat labeled sketch the working of three phase full controlled bridge rectifier with inductive load.

c) Explain "magnetic firing circuit" method for single phase controlled rectifier.

d) Explain the effect of saturable core reactor in Morgan's chopper.

3. Attempt any THREE of the following : **12**

a) Explain with neat sketch the synchronized UJT relaxation oscillator circuit for triggering the SCR and derive the equation for frequency.

b) Describe operation of three phase cycloconverter with circuit diagram.

c) Draw neat circuit diagram of MCMurry bedford inverter and explain its operation.

d) Describe with neat sketch the working of single phase cycloconverter with R-load.

Marks

4. Attempt any THREE of the following : **12**

a) State the need of inverter. List four applications of inverter.

b) Explain 6ϕ star half-wave controlled rectifier with neat circuit diagram and waveforms.

c) Explain need and use of polyphase rectifier.

d) Describe with sketch the operation of transistorized three phase firing circuit.

e) List any four applications of phase controlled rectifier explain any one in brief.

5. Attempt any TWO of the following : **12**

a) List the factors required for selection of heatsink used for SCR.

b) Compair half bridge and full bridge inverter. (Any four points)

c) Three phase fully controlled rectifier is connected to 3 phase ac supply of 230 V 50 Hz, load current is continuous and has negligible ripple if average load current Idc = 150 A and commutating inductance L_C = 0.1 mH. Determine the overlap angle when d = 10°

6. Attempt any TWO of the following : **12**

a) Sketch stepdown chopper using MOSFET. Show how output voltage of stepdown chopper can be varied. State its output voltage expression.

b) A Mc-Murray inverter uses a commutation circuit consisting of C = 25 μF and L = 25 μH the source voltage E_{DC} = 230 vdc. The load currents varies from 50 A to 150 A at the instant of commutation. Find the value of turn ON time. E_{dc} minimum is 10% of E_{dc}.

c) State working principle of dual converter. Explain circulatory current mode dual converter with neat labeled circuit diagram.