22430

21819

3 Hours / 70 Marks Seat No. | | | | | | | | |

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

(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) State the difference between single phase and three phase controlled rectifiers (any two points).

b) Enlist the name of any two triggering circuit for phase controlled rectifiers.

c) Define chopper and state its classification.

d) State the applications of inverter (any four)

e) State any four thyristor ratings.

f) Draw the neat sketch of SCR stud mounting technique.

g) Sketch the neat circuit diagram and waveform of single phase Cycloconverter.

Marks

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

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

b) Explain with neat sketch the working of three phase half wave controlled rectifier with resistive load.

c) Draw circuit diagram of three phase bridge inverter.

d) Describe with neat sketches the operation of firing circuits using logic gates.

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

a) Draw a neat circuit diagram of single phase full bridge inverter with waveform and give its operation.

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

c) Describe the use of PLL in triggering circuit.

d) Explain with circuit diagram of Mc Murray half bridge inverter.

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

a) Describe the operation of basic parallel inverter with waveforms.

b) Explain the three phase fully controlled bridge converter with resistive load with neat sketch and waveform.

c) Describe with neat sketch pulse triggering of phase controlled rectifier with waveforms.

d) Explain with operation of four quadrant chopper with quadrant diagram.

Marks

e) Identify the circuit and draw output waveforms across load. Kindly refer Figure No. 1

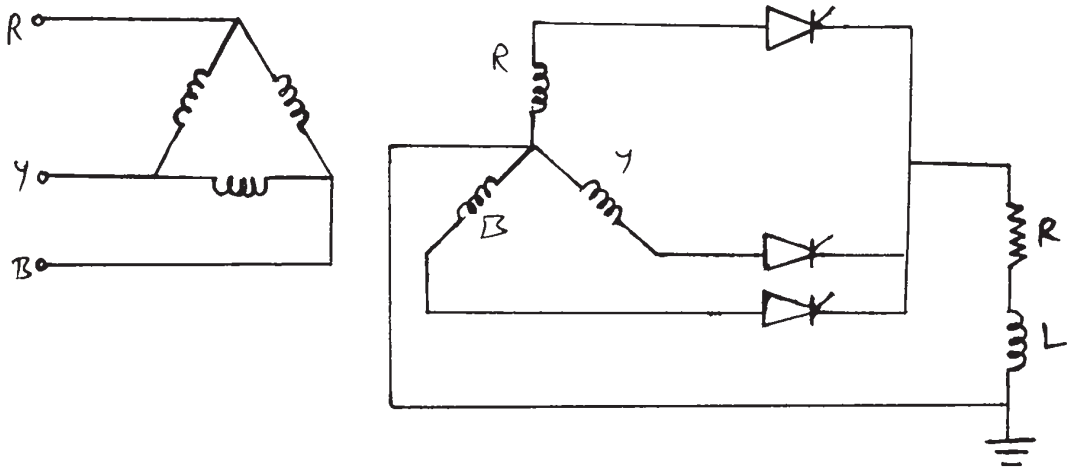

Fig. No. 1

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

a) Draw circuit of single phase to three phase cycloconverter and explain its operation with waveforms.

b) Three phase fully controlled rectifier is connected to three phase ac supply of 230V, 50Hz. Load current is continuous and negligible ripple. If average load current I_{dc} = 100 A and commutating inductance Lc = 0.1 mH. Determine the overlap angle with $\alpha = 25°$.

c) Explain the function of step-up chopper using MOSFET with circuit diagram and waveforms.

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

a) State types of heat sink used in power electronics application and explain any one.

b) Explain the working of Jones Chopper with its waveform.

c) A Mc Murray inverter uses a commutation circuit consisting of C = 25μF and L= 25μH the source voltage E_{DC} = 230 Vdc. The load current varies from 100 to 150 A at the instant of commutation. Find the value turn off time E_{dc} minimum is 20% of E_{dc}.