22430

21222

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

15 minutes extra for each hour

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) Give classification of three phase controlled rectifier.

b) List any four different triggering circuits used for phase controlled rectifiers.

c) Define chopper. List it's any two applications.

d) Differentiate voltage driven inverter and current driven inverter. (any two)

e) State the working principle of 'Dual Converter'

f) List any four Thyristor Mounting techniques.

g) Enlist any two open source simulation softwares used for power electronic circuits.

Marks

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

a) Draw a schematic of step-up chopper. Also draw voltage and current waveforms for it.

b) Compare single phase and three phase bridge controlled rectifier on the basis of No. of supply phases, power, no. of SCRs, ripple factor.

c) Draw the neat diagram of single phase inverse cosine firing circuit. State any two advantages.

d) Explain parallel capacitor inverter, with a neat schematic diagram.

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

a) Explain 'Firing circuits with logic gates' with neat sketch and waveforms.

b) Explain the working of Single phase half bridge inverter, with neat sketch. Draw associated waveforms.

c) Describe the working of circulatory current mode dual converter, with neat labelled circuit diagram.

d) Draw a neat labelled sketch of single phase to single phase mid-point cycloconverter. Also draw the output waveforms for f/3 frequency.

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

a) Explain with neat sketch, the working of Three phase half wave controlled rectifier.

b) For a three phase full controlled bridge rectifier answer the following :

(i) Draw circuit diagram

(ii) Draw output voltage waveform for $\alpha = 60$.

c) Draw the neat sketch of Three phase pulse output firing circuit using phase locked oscillator.

d) Describe six pulse half wave controlled rectifier with neat sketch.

e) Explain three phase full bridge inverter, with neat sketch.

Marks

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

a) For class C chopper answer the following

(i) Draw circuit diagram.

(ii) Interpret associated waveforms.

b) State the types of Heat sinks used in power electronics applications and explain any one.

c) Compare series and parallel inverter based on

(i) Circuit diagram

(ii) Position of commutating components

(iii) Type of commutation

(iv) Nature of output voltage waveform.

(v) Transformer

(vi) RLC circuit.

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

a) Explain the function of four-quadrant chopper with the help of quadrant diagram.

b) Describe Mc. Murry Bedford half bridge inverter with the help of associated waveforms.

c) Identify the circuit to get three phase output voltage waveform at load from a DC source. Draw circuit diagram and explain with the help of waveforms.