

# 22430

**12425**

**03 Hours / 70 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 answer with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any FIVE of the following: **10****
- State any four advantages of  $3\phi$  rectifiers.
  - Enlist any two triggering circuits for phase controlled rectifiers.
  - Give any four applications of chopper.
  - Draw McMurray Bedford half bridge inverter.
  - Compare circulatory and Non-circulatory current mode in Dual converter. (Any two)
  - Define Latching current and Holding current of SCR.
  - List any two simulation softwares used for power electronic circuits.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Compare step-up and step-down chopper. (Any four points)
  - b) Describe working of  $3\phi$  half wave controlled rectifier with RL load.
  - c) Explain the working of Inverse cosine method for phase controlled rectifier..
  - d) Draw circuit diagram of  $3\phi$  full controlled bridge rectifier also draw Input/output waveforms for  $\alpha = 60^\circ$  and  $\alpha = 120^\circ$ .
- 3. Attempt any THREE of the following:** **12**
- a) Describe with neat sketch the operation of firing circuit using logic gates.
  - b) Explain the working of single phase Mid-point cycloconverter with neat diagram and related waveforms.
  - c) Compare series and parallel inverter (Any four points).
  - d) With the help of neat diagram explain the working of single phase Dual converter.
- 4. Attempt any THREE of the following:** **12**
- a) Describe the working of parallel capacitor inverter with the help of neat diagram and waveforms.
  - b) Compare single phase and three phase rectifiers (Any four points).
  - c) With the help of neat diagram explain working of three phase semiconverter with R load.
  - d) Describe UJT firing circuit with neat circuit diagram and waveforms.
  - e) A  $3\phi$  half wave controlled rectifier has a supply of 200V/phase. Determine average load voltage for  $\alpha = 30^\circ$  and  $60^\circ$ . Assume voltage drop across SCR is 1.2V and continuous load current.

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

- a) Draw and explain various thyristor mounting and cooling techniques used for SCR.
- b) For a three phase inverter answer the following:
  - i) Draw the circuit diagram
  - ii) Interpret with the help of waveforms for  $180^\circ$  conduction mode.
- c) Identify the types of chopper for reversible regenerative braking of DC motor. Explain its working with the help of neat circuit diagram and waveforms.

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

- a) For a Jones chopper answer the following:
    - i) Draw the circuit diagram
    - ii) Interpret with the help of waveforms
    - iii) State any two applications.
  - b) Explain the working of series inverter with the help of neat circuit diagram and associated waveforms.
  - c) Explain with neat diagram working of three phase to single phase Cycloconverter.
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