

22430

23124

3 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) 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) Compare single phase and three phase rectifiers. (Any four points)
- b) Define firing angle and conduction angle.
- c) State the classification of chopper commutation methods.
- d) State classification of Inverter.
- e) Define cycloconverter. List two applications.
- f) List any four thyristor ratings.
- g) Sketch the neat diagram of SCR Bolt-down mounting technique.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Draw and explain a Jones chopper.
 - b) Draw a neat circuit diagram of three phase half controlled bridge rectifier with inductive load.
 - c) Draw neat circuit diagram of UJT triggering of SCR.
 - d) Draw the circuit of Morgan chopper and explain its working.
- 3. Attempt any THREE of the following:** **12**
- a) Describe the use of PLL in triggering circuit.
 - b) Explain circulatory current free mode dual converter with neat labelled circuit diagram.
 - c) Describe McMurray - Bedford inverter with circuit diagram.
 - d) Draw and explain single phase cycloconverter.
- 4. Attempt any THREE of the following:** **12**
- a) Describe three-phase bridge inverter with neat sketch.
 - b) Compare three phase half controlled and full controlled bridge rectifiers. (Any four points)
 - c) A 3ϕ half wave controlled rectifier supplied with voltage of $V_{\text{rms}} = 150\text{V}$, $\alpha = 45^\circ$ and load resistance is 10Ω find –
 - i) Average output dc voltage
 - ii) Load current
 - d) Describe Inverse cosine method with neat sketch.
 - e) Describe double star controlled rectifier with inductive load.

- 5. Attempt any TWO of the following:** **12**
- a) State types of heatsink used in power electronics application and explain any one.
 - b) Describe the operation of 1ϕ series inverter with waveform and circuit diagram.
 - c) Draw the neat diagram of three phase half wave controlled rectifier with resistive loads. Explain the working with waveforms.
- 6. Attempt any TWO of the following:** **12**
- a) With a neat circuit, explain the operation of step-up chopper with waveform.
 - b) Three phase fully controlled rectifier is connected to three phase ac supply of 230V, 50Hz. load current is continuous and has a negligible ripple. If the average load current $I_{dc} = 150$ A and the commutating inductance $L_c = 0.1$ mH. Determine the overlap angle when $\alpha = 10^\circ$.
 - c) Describe three phase cycloconverter with circuit and waveform.
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