

22326

21819

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 answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
  - (8) Use of steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

1. Attempt any FIVE of the following :

10

- (a) Give the applications of IGBT.
- (b) What is the need of UPS ?
- (c) Draw a neat circuit diagram of class F commutation.
- (d) Define :
  - (i) Firing angle
  - (ii) Conduction angle
- (e) How GTO is advantages over SCR ?
- (f) State the main difference between PUT & UJT.
- (g) Write the function of Freewheeling diode.

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P.T.O.

- 2. Attempt any THREE of the following : 12**
- (a) Describe triggering of SCR using UJT relaxation oscillator.
  - (b) Draw the I-V characteristics of power transistor. Show all regions.
  - (c) With neat circuit diagram explain working of emergency light system.
  - (d) Compare SCR & TRIAC (any four).
- 3. Attempt any THREE of the following : 12**
- (a) Explain with neat circuit diagram operation of temperature controller using SCR.
  - (b) Draw the circuit diagram of class-D commutation & explain its working.
  - (c) With neat constructional diagram write operating principle of PUT.
  - (d) Explain with circuit diagram of  $1\phi$  mid-point controlled rectifier with R-load.
- 4. Attempt any THREE of the following : 12**
- (a) Draw a neat labelled I-V characteristics of SCR.  
Define :
    - (i) Latching
    - (ii) Holding current
  - (b) Differentiate between Natural and Forced commutation (any four).
  - (c) Draw construction of IGBT. State any two applications of it.
  - (d) Explain with circuit diagram the working of  $1\phi$  halfwave controlled rectifier with R-L load.
  - (e) Draw a suitable circuit to control the speed of the motor using TRIAC and also give its operation.

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

- (a) Draw a structure of TRIAC with doping levels. Write operating principle and give two applications of it.
- (b) Draw the circuit diagram & waveforms of class A commutation. Explain its working.
- (c) Draw & explain the working of  $1\phi$  mid-point controlled rectifier with RL-Load. Also Draw input-output waveforms of it.

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

- (a) Draw full bridge & half bridge configuration with common cathode.
  - (b) Explain working of AC circuit breaker using SCR with circuit diagram.
  - (c) Draw symbol & V-I characteristics of
    - (i) LASCR
    - (ii) DIAC &
    - (iii) TRIAC
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