

313335

12526

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) 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.

Marks

- 1. Attempt any FIVE of the following: 10**
- a) Give the need for power electronic system. (Any two)
- b) Compare R triggering and RC triggering with respect to :-
- i) Firing angle
- ii) Average output voltage.
- c) Define commutation.
- d) List the names of methods used for chopper output control purpose.
- e) List the applications of chopper. (Any two)
- f) List the application of AC to AC converter using DC link in wind power generation. (Any two)
- g) Draw the block diagram of Solar System with Solar charge controller.
- P.T.O.

- 2. Attempt any THREE of the following: 12**
- a) Draw and explain the working of IGBT with +ve V_{GS} supply.
 - b) State the need for SCR protection. List SCR protection methods name.
 - c) List SCR turn on methods and explain light triggering method.
 - d) Explain the operation of class F commutation with proper circuit diagram.
- 3. Attempt any THREE of the following: 12**
- a) Draw and explain the operation for Class A commutation methods for SCR.
 - b) Draw and explain working for one phase half wave control rectifier with 'R' load.
 - c) Draw and explain operation of fully control bridge rectifier with 'R' load.
 - d) Draw and explain operation for Half Bridge Inverter with 'R'. load.
- 4. Attempt any THREE of the following: 12**
- a) Draw the circuit diagram and waveform of 3 $^{\circ}$ phase full wave control bridge rectifier with 'R' load at $\alpha = 30^{\circ}$.
 - b) State the need for pulse width modulation used in inverter and list its types.
 - c) Draw and explain the operation for step down chopper.
 - d) Explain the function of the converter station in HVDC with circuit diagram.
 - e) Explain the speed control of ceiling fan using TRIAC.

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

- a) Draw only V-I characteristic for SCR, and shows $I_{g1} > I_{g2}$ current effect and liable I_H , I_L , (E_H - Folding current, I_L - latching current).
- b) Draw and explain the working for 'R' firing circuit. When POT 'R' at maximum position with waveform.
- c) Draw and explain the operation for 1 phase full wave bridge inverter with wave form at 'R' load.

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

- a) Draw the symbol for N channel E-type power MOSFET. and explain the working with +ve gate supply. (Only N-Channel)
 - b) Draw and explain the working of half wave control rectifier with 'RL' load and shows the effect of freewheeling diode at output waveform.
 - c) Describe the working with step-up chopper and list output voltage formula for step up chopper.
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