

315340

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) State any two advantages of STI over BJT.
- b) List any two components used in a snubber circuit.
- c) State the functions of chopper. (Any two points)
- d) State the role of MOSFET in chopper circuit.
- e) Draw neat labelled circuit of a single phase CSI.
- f) Define Variable Frequency Drive (VFD) and state necessity of VFD.
- g) State any two applications of electrical traction system.

P.T.O.

- 2. Attempt any THREE of the following: 12**
- a) Draw and explain the V-I characteristics of MCT.
 - b) Explain the function of a DC chopper with a neat block diagram.
 - c) Describe the working principle of current source inverter?
 - d) Define voltage stabilizer and state the necessity of stabilizer in electrical systems.
- 3. Attempt any THREE of the following: 12**
- a) Explain dv/dt protection using R-C snubber circuit.
 - b) Identify a suitable chopper for producing the output in first and second quadrant and explain its operation.
 - c) Explain the working principle of a servo stabilizer with neat diagram.
 - d) Draw the block diagram of a charge controller and explain.
- 4. Attempt any THREE of the following: 12**
- a) State the need of thermal protection in SCRs and define thermal resistance.
 - b) Explain the operation of a Type-c (Two quadrant Type-a) chopper with diagram.
 - c) Name two types of PWM techniques and state any two advantages of PWM in inverters.
 - d) Explain the classification of Li-Ion, NMC and NCA batteries.
 - e) Explain the block diagram of AC to AC converter using DC link in wind power generation.
- 5. Attempt any TWO of the following: 12**
- a) Classify the chopper on the basis of quadrant operation and explain second quadrant chopper.
 - b) Compare 120° conduction mode with 180° conduction mode of 3-phase VSI (Any four points).
 - c) Explain the working of an electrical traction system with neat labelled diagram.

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Marks

6. Attempt any TWO of the following:

12

- a) Explain the working of sinusoidal pulse width modulation (SPWM) with suitable waveforms.
 - b) Describe in details the specification of UPS –
 - i) Response time
 - ii) Output frequency
 - iii) Load power factor.
 - c) With neat block diagram, explain the construction and working of Plug-in Hybrid Electric Vehicle (PHEV).
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