



- Notes :
1. All questions carry equal marks.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.
  5. Non programmable calculator is permitted.
  6. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Draw and explain dual converter-based drives. 7  
b) Explain the multi quadrant operation of a motor driving a hoist load. 7  
**OR**
2. a) Discuss in detail the different components of electric drive. 7  
b) Compare pulse width modulated rectifiers with equal pulse width modulation, also draw and compare output waveforms. 7
3. a) What is the significance of closed loop operation and how it can be adapt to dc chopper fed drive. 7  
b) Explain steady state analysis of chopper controlled DC motor drives by averaging. 7  
**OR**
4. a) Explain the operation of a single phase fully controlled rectifier fed D.C. separately excited motor with relevant mathematical expression and characteristics. 7  
b) Perform steady state analysis for time ratio control and current limit control. 7
5. a) List the different speed control method of an induction motor. Explain in detail the speed control of induction motor by v/f method. 7  
b) Explain Model referencing control adaptive control technique. 7  
**OR**
6. a) Explain with a neat schematic diagram, the speed control of induction motor with torque and flux control. 7  
b) Draw and explain PWM with GTO based CSI. 7
7. a) Explain the construction and operation of static Scherbius drive. 7  
b) Explain the construction and operation of switched reluctance motor SRM. 7  
**OR**
8. a) Analyse the operation of constant torque mode controller in synchronous motors. 7  
b) Explain the following: i) Solar powered drives ii) Energy conservation in electric drives iii) Brushless D. C. motor iv) Traction drives. 7

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