

Time: 3 Hours

Marks: 80

- Note:-
1. Question No. 1 is compulsory
  2. Attempt any **three** questions out of remaining **five** questions
  3. Figures to the right indicates marks
  4. Assumptions made should be clearly stated

- Qu.1 (a) Draw the block diagram of Electric drive. State the function of power modulator. [5]
- (b) Explain the following terms 1) Intermittent periodic duty. (2) Continuous duty with starting & breaking. [5]
- (c) Explain plugging operation in DC motor drives. [5]
- (d) Differentiate scalar control & Vector control Schemes. [5]
- Qu.2 (a) A constant speed motor has the following duty cycle.  
 (a) load rising linearly from 200 to 500 KW for 4 min.  
 (b) Uniform load of 400 KW for 2 min.  
 (c) Regenerative power returned to the supply reducing linearly from 400 KW to zero for 3 min. [10]  
 (d) Remains ideal for 4 min.  
 Determine the power rating of the motor assuming loss to be proportional to (power)<sup>2</sup>
- (b) Explain V/F method of speed control of 3 phase induction motor [05]
- (c) How slip power wasted in rotor circuit resistance of IM can be recovered using static Scherbius drives. Explain? [05]
- Qu.3 (a) Explain AC dynamic braking of an induction motor with two lead connections. [10]
- (b) Explain the operation of chopper control separately excited dc motor in motoring & regenerative braking mode. [10]
- Qu.4 (a) Explain the multi-quadrant operation of a motor driving a hoist load with suitable diagram. [10]
- (b) Discuss the operation of single phase fully controlled converter fed dc motor separately excited motor in continuous mode along with its speed torque characteristics of drive [10]
- Qu.5 (a) Explain with neat block diagram direct vector control scheme of induction motor. [10]
- (b) Explain the closed loop speed control scheme with inner current control loop [05]
- (c) Derive the temperature expression for the thermal model of motor for heating & draw its characteristics with time. [05]
- Qu.6 (a) Draw the circuit diagram of switched reluctance motor & explain its working. [10]
- (b) Write a short note on stepper motor drive. [10]