

Roll No.

Total Pages: 3

107802

May 2019
B.Tech. VIII Semester
ELECTRIC DRIVES
(EL-404)

Time : 3 Hours]

[Max. Marks : 60

Instructions :

- (i) *Part-A is compulsory. Attempt any any four questions from Part-B*

PART-A

1. Answer the following questions in short: (2×10)
- (a) Draw the block diagram of an electrical drive. Discuss functions of different components of an electrical drive. CO1
 - (b) What are the main factors which decide the choice of electrical drive for a given application? CO1
 - (c) Why stator voltage control is suitable for speed control of induction motors in fan and pump drives? CO1
 - (d) What are the reasons for using load equalisation in an electrical drive? CO1
 - (e) What are the components of load torque? CO1

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- (f) What are the different methods of speed sensing? CO1
- (g) When varying speed by field flux control, flux must be varied in small steps only. Why? CO1
- (h) Variable frequency control of induction motor is more efficient than stator voltage control. Why? CO2
- (i) Is it possible to use regenerative braking of an induction motor at low speeds? CO2
- (j) List various advantages and disadvantages of Ward Leonard control. CO3

PART-B

2. (a) Explain the operation of a closed loop speed control scheme with inner current control loop. What are various functions of inner current control loop? (5)CO1
- (b) A motor has a heating time constant of 60 min and cooling time constant of 90 min. When run continuously on full load of 20 kW, the final temperature rise is 40°C. If it is on an intermittent load of 10 min followed by 10 min shut down, what is the maximum value of load it can supply during the on load period? (5)CO1
3. (a) Discuss multiquadrant operation with the help of operation of a hoist. (5)CO1
- (b) State and explain the important features of various braking methods of dc motors. (5)CO3

4. (a) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of ohm. It is fed from a single phase fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction, calculate : Firing angle for rated motor torque and 750 rpm. (3) CO3
- (b) Discuss chopper control of separately excited dc motor. (7) CO3
5. (a) Discuss in detail 'Static Kramer Drive'. Why has the Static Kramer Drive a low range of speed control? (5) CO2
- (b) Enlist various methods of starting of an induction motor. Discuss any *one* in detail. (5) CO2
6. (a) Discuss dynamic braking of an induction motor along with suitable diagrams. (5) CO2
- (b) A 400 V, star connected, 3 phase, 6 pole, 50 Hz induction motor has following parameters referred to stator : $R_s = R_r' = 1$ ohm, $X_s = X_r' = 2$ ohm. For regenerative braking operation of this motor determine maximum overhauling torque it can hold and range of speed for safe operation. (5) CO2
7. Write short note on :
- (a) Permanent Magnet brushless DC drive.
- (b) Switched Reluctance machine drives. (5) CO4