B.E. Sixth Semester (Electrical Engineering (Electronics & Power)) (C.B.S.)

Electrical Drives and Their Control

P. Pages : 2 **KNT/KW/16/7391**

Time : Three Hours *0121* Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) Explain the block diagram of an electrical drive. **7**

b) Explain in brief electrical characteristic of motor under starting condition. **7**

OR

2. a) Explain electrical braking with its different types and performance of various motor or drives under braking condition. **6**

b) An induction motor has a short-circuit current equal to 6-times the full-load current at normal voltage. It has a slip of 5 percent on full load. Calculate the starting torque in terms of the full-load torque if started by. **8**

a) Star-delta starter

b) An auto-transformer starter.

3. a) Derive an expression for temperature rise of motor under heating and cooling medium. **6**

b) Determine the 1 hr rating of a 15 H.P. motor having a heating time constant of 2hrs. The motor attains the temperature rise of 40ºC on continuous run at full load. Assume that losses are proportional to square of load and the motor is allowed to cool down to the ambient temperature before being load again. **7**

OR

4. a) A motor working in a coal mine has to exert power starting from zero and rising uniformly to 100 H.P in 5 min. After which it takes a constant power of 50 H.P for 10 min then at no load for 3 min. The cycle is repeated indefinitely. Estimate suitable size of the motor. **6**

b) State the factors governing selection of motor. **7**

5. a) What is PLC? What are its advantages? **6**

b) Draw the block diagram of PLC. Explain **7**

OR

6. a) Write short note on ladder diagram in PLC. **7**

b) Write short note on PLC programming. **6**

7. a) Explain the construction of dc contactors. **6**

b) Explain starting circuit and reversing circuit of dc motor. **7**

OR

8. a) Explain with the help of neat control circuit diagram, the method to achieve definite time acceleration of dc shunt motor by time delay drop-out contactors. **6**

b) Explain the fundamental difference between an ac and dc contactor. **7**

9. a) Explain starting in traction motor using series-parallel starting. **7**

b) Explain the speed-time curve of train movement. **6**

OR

10. a) Explain how ac series motors can be used for traction application. **6**

b) The supply fed to the series connection is 650V if the first motor is geared to driving wheels of radius 45 cms and other to 43 cms and if speed of first motor when connected in parallel to second motor across the main supply lines is 400 rpm. Determine speeds of motors when connected is series. Assume armature current to remain same and armature voltage drop of 10% at this current. **7**

11. a) Explain with neat block diagram the digital control of electric motors. **7**

b) Compare analog and digital control of electric drives. **7**

OR

12. a) Explain with the help of block diagram the analog control of electric motors. **6**

b) State the requirements and mention the drives commonly used in following industrial/domestic application. **8**

i) Rolling mills ii) Electric propulsion in ships.

iii) Pumps iv) Belt conveyors

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