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Question Paper Code: 53324

B.E./B.Tech. DEGREE EXAMINATION, NOV 2019

Third Semester

Chemical Engineering

15UEE324-ELECTRICAL DRIVES AND CONTROL

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The motor required for heavy starting torque is CO1- R
(a) Squirrel cage induction motor (b) Slip ring induction motor
(c) Shaded pole induction motor (d) DC shunt motor
2. The time taken by the machine to reach temperature rise to 63.2 of its CO1- U
final temperature
(a) Heating time constant (b) Motor constant
(c) Cooling time constant (d) Torque constant
3. The speed of induction motor with 4 poles and supply frequency 50Hz is CO2- U
(a) 375 RPM (b) 750 RPM (c) 1500 RPM (d) 3000 RPM
4. The condition for maximum torque is given by at a slip CO2- U
(a) $S_m = R_2$ (b) $S_m = X_2$ (c) $S_m = X_2 / R_2$ (d) $S_m = R_2 / X_2$
5. The starter is used to CO3- R
(a) Increase starting current (b) Reduce starting current
(c) Maintain load current (d) Control speed
6. Rotor resistance starter is used to start CO3- R
(a) Slip ring induction motor (b) DC shunt motor
(c) Squirrel cage induction motor (d) DC series motor

7. The equation related to field control method of speed is CO4- R
 (a) Speed N directly proportional to ϕ (b) Speed N directly proportional to V
 (c) Speed N indirectly proportional to $1 / \phi$ (d) Speed N directly proportional to I_a
8. The device used to convert DC to DC is CO4- R
 (a) Converter (b) Inverter (c) Rectifier (d) Chopper
9. The synchronous speed equation is given by CO5- U
 (a) $N_s = 120p / f$ (b) $N_s = 120f / p$ (c) $N_s = 60f / p$ (d) $N_s = f / p$
10. The inverter is used to convert CO5- R
 (a) DC to AC (b) DC to DC (c) AC to DC (d) AC to AC

PART – B (5 x 2= 10 Marks)

11. List the types of electric drives. CO1- R
12. Why DC series motor never started on no load? CO2- U
13. What is the need for starter in DC motor? CO3- U
14. State the different methods of speed control of DC series motor. CO4- R
15. Mention the advantages of variable frequency induction motor drive. CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) Explain the different classes of motor duty with neat sketch. CO1-U (16)
- Or
- (b) Describe in detail the various factors influencing the selection of electric drive industrial application. CO1-U (16)
17. (a) State and explain the important features of various braking methods used for DC motors. CO2- U (16)
- Or
- (b) Draw and explain the torque-speed characteristics of three phase induction motor with necessary equations. CO2- U (16)
18. (a) Explain with diagram for four point starter and mention its advantages. CO3- U (16)

Or

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|-----|--|--------|------|
| (b) | Explain the following starters with neat diagram | CO3- U | (8) |
| | (i) Star-Delta Starter | | |
| | (ii) Rotor Resistance Starter | CO3- U | (8) |
| 19. | (a) Sketch the necessary circuits for the following methods of speed control for DC shunt motor and explain | CO4- U | (8) |
| | (i) Armature control | | |
| | (ii) Field control | CO4- U | (8) |
| | Or | | |
| (b) | Describe the operation of Ward Leonard speed control method with neat sketch. | CO4- U | (16) |
| 20. | (a) Explain any two speed control techniques of squirrel cage three phase induction motor. | CO5- U | (16) |
| | Or | | |
| (b) | Explain any one method of slip power recovery schemes to control speed of three phase slip ring induction motor. | CO5- U | (16) |

