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Question Paper Code : 77126

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Third Semester

Mechanical Engineering

EE 6351 — ELECTRICAL DRIVES AND CONTROLS

(Common to Mechanical and Automation Engineering, Production Engineering, Manufacturing Engineering, Petrochemical Engineering, Chemical Engineering and Petrochemical Technology)

(Regulation 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is an individual electric drive? Give some examples.

2. How heating occurs in motor drives?

3. Why DC shunt motor is termed as a constant speed motor?

4. What are the different types of electric braking?

5. Why starters are required?

6. What is the objective of rotor resistance starter?

7. Give the Limitation of field control.

8. What are the main applications of Ward-Leonard system?

9. What is the function of an inverter?

10. What are the advantages of static Kramer system, over static scherbius system?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What is an electrical drive system? How are electric drive classified? List its advantage and disadvantages.   (8)

       (ii) Explain Heating and cooling curves of an electric drive.   (8)

Or

    (b) What are the factors that influence the choice of electrical drives?   (16)

12. (a) List out the advantages and disadvantages of electrical braking over mechanical braking. Discuss any one method of electrical braking of DC Machines. (16)

Or

(b) (i) Explain the Speed-Torque characteristics of three phase induction motor with neat diagrams. (6)

(ii) Explain about the quadrantal diagram of speed-torque characteristics for a motor driving hoist load. (10)

13. (a) Explain the theory of three point and four point starters. (16)

Or

(b) Explain DOL, auto transformer, star-delta starters for AC motors. (16)

14. (a) (i) Discuss the Ward-Leonard speed control system with a neat diagram. Also mention its advantages and disadvantages. (8)

(ii) Explain the single phase half wave converter drive speed control for DC drive with waveforms. (8)

Or

(b) A 220V, 70A dc series motor has combined resistance of armature and field resistance of 0.12 ohm. Running on no load with field winding connected to a separate source it gave the following Magnetization characteristics at 600 rpm:

I_f A	10	20	30	40	50	60	70	80
V_t V	64	118	150	170	184	194	202	210

Motor is controlled by chopper with a source voltage = 220 V.

Calculate

(i) Motor speed for a duty ratio of 0.6 and motor current of 60A

(ii) Torque for a speed of 400 rpm and duty ratio of 0.65. (16)

15. (a) Explain the pole changing, stator frequency variation methods for controlling the speed of AC motor. (16)

Or

(b) Explain the slip power recovery control of slip ring induction motor. (16)

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