Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91638

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Third Semester

Mechanical Engineering

ME 2205/ME 36/EE 1205 A/080120013/10122 ME 306 — ELECTRICAL DRIVES AND CONTROL

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

(Regulation 2008/2010)

(Also common to 10122 ME 306 — Electrical Drives and Control for B.E. (Part-Time) Second Semester — Mechanical Engineering — Regulation 2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name the types of Electric Drives.

2. Write the expression for thermal overload factor.

3. What is the necessity of braking?

4. What is meant by plugging?

5. What are the different types of D.C. Motor starters?

6. What are the methods of starting three phase squirrel cage Induction Motor?

7. Name the basic methods of speed control of D.C. Motor.

8. What is the advantage of D.C. Chopper Drives?

9. Draw a neat sketch of Torque–Speed characteristics of Induction Motor with V/f control.

10. What is the main use of Voltage Regulators?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the factors that influence the choice of Electric Drives. (8)

(ii) What is called Heating time constant? Graphically determine it. (8)

Or

(b) Explain various classes of Motor duties. (16)

12. (a) With neat diagrams and derivations, construct the speed – torque characteristics of D.C. Shunt Motors. (16)

Or

(b) With necessary diagrams and derivations, explain the Dynamic or rheostatic braking of an Induction Motor. (16)

13. (a) What is the necessity of a starter? Explain. What are the different types of D.C. Motor starters? With neat diagram, explain the working of a three point starter. (16)

Or

(b) With neat diagram, explain the rotor – resistance starter for three phase Induction Motor. (16)

14. (a) (i) A 220V D.C. Shunt Motor takes 5A on no – load and runs at 750 rpm. The resistances of the armature and shunt field windings are 0.2 ohm and 110 ohms respectively. Calculate the speed when motor is loaded and taking a current of 50 A. Assume the armature reaction weakens the field by 3%. (8)

(ii) Explain the working of a Ward–Leonard speed control system with a neat diagram. (8)

Or

(b) Explain with neat sketch the operation of chopper fed D.C. series motor drive. Also derive the expression for average motor current. (16)

15. (a) With a schematic diagram, explain a slip—power recovery scheme for a three phase Induction Motor. (16)

Or

(b) With a necessary diagram, explain the voltage source inverter method of speed control of three phase Induction Motor. (16)

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