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T 3251

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Third Semester

Mechatronics Engineering

EE 1215 — ELECTRICAL MACHINES AND DRIVES

(*Regulation* 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the properties of an Ideal Transformer?

2. What is the equation for determining the number of independent loops in mesh current method?

3. Why series motor never be started without any load?

4. What is meant by hunting?

5. How a three point starter protects the motor against field failure?

6. How the speed of three phase induction motor is controlled?

7. State the essential parts of an electric drive.

8. Define heating time constant of a motor.

9. List out the advantages of slip power recovery scheme.

10. What are the advantages of solid state speed control?

PART B — (5 × 16 = 80 marks)

11. (a) Find the potential difference between node 1 and 2 for the circuit shown in Figure (1). (16)

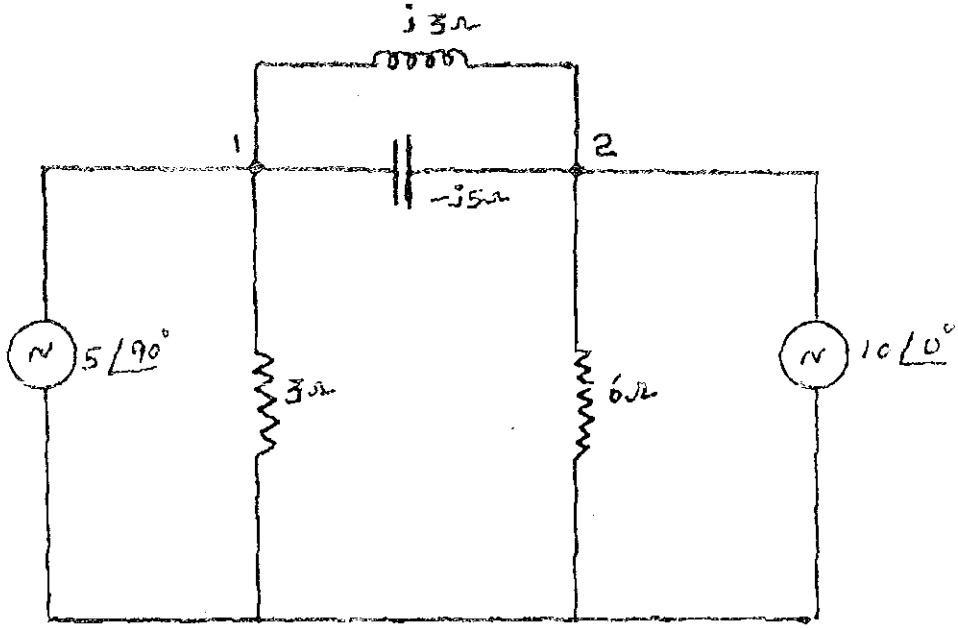

Figure (1)

Or

(b) (i) With a neat sketch, explain the working principle of a transformer. (6)

(ii) For the circuit shown in Figure (2), find the power supplied to the load. Also find voltage across the load. (10)

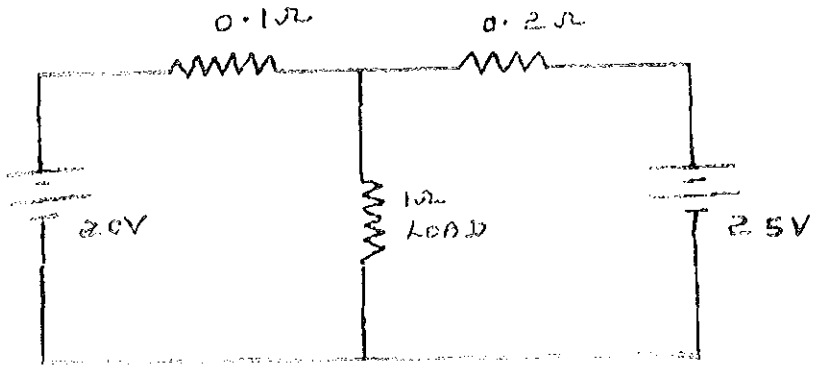

Figure (2)

12. (a) With a neat sketch, write short notes about :

(i) Universal Motor (8)

(ii) Reluctance Motor. (8)

Or

(b) (i) With a neat diagram, explain the construction and principle of operation of three phase Squirrel Cage Induction Motor. (12)

(ii) Sketch the Torque-Slip characteristics of three phase Induction Motor. (4)

13. (a) (i) What is the necessity of a starter? (4)

(ii) With a relevant diagram, explain in detail about three point starters. (12)

Or

(b) What are the different types of starters used for Induction Motors? Explain the auto transformer starter with a neat diagram. (16)

14. (a) (i) Explain different types of Drives used in Industrial applications. (6)

(ii) Discuss briefly the factors governing the selection of motors. (10)

Or

(b) Draw a typical temperature rise time curve and derive the equation for temperature rise in an electrical drive. (16)

15. (a) With a neat sketch explain how slip power is recovered in a Slip Ring Induction Motor. (16)

Or

(b) Explain how the speed control of DC Motor is obtained using Semiconverter. (16)