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B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2009.

Third Semester

(Regulation 2004)

Textile Technology

TT 1201 — ELECTRICAL ENGINEERING

(Common to Textile Technology (Textile Chemistry) and
Textile Technology (Fashion Technology))

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Two resistors of 6 ohm and 12 ohm are connected in parallel. Find their equivalent resistance.

2. State Lenz's law.

3. Define RMS and Average value.

4. What are the advantages of three-phase system over single-phase system?

5. Draw the magnetization characteristic of a separately excited DC generator.

6. Explain DC series motors should not be started on no-load.

7. Why is the transformer efficiency the highest among all other electrical machines?

8. Define slip of an induction motor.

9. Discuss why moving iron instrument has non-uniform scale.

10. What is creeping experienced in energy meter?

PART B — (5 × 16 = 80 marks)

11. (a) (i) State and explain kirchhoff's voltage and current law. (6)

    (ii) The total current drawn by three resistors connected in parallel is 22 A from 110 V DC supply. One resistor is 22 ohm and another is 50 ohm. Find the value of the third resistor, its current and power. (6)

    (iii) Three resistors of 30 ohm, 12 ohm and 20 ohm are connected in star. Find the value of resistors in an equivalent delta connection. (4)

Or

    (b) (i) State Faraday's laws of electromagnetic induction. (4)

    (ii) Derive the equation for self-inductance of a coil. (6)

    (iii) A coil consisting of 120 turns is placed in the magnetic field of 0.8 mWb. Calculate the average emf induced in the coil when it is moved in 0.08 sec from the given field to the field of 0.3 mWb. If the resistance of the coil is 200 ohms, find the induced current in the coil. (6)

12. (a) Calculate the average and RMS value of a periodic current wave having the following values for equal time intervals, changing suddenly from one value to the next: 0, 40, 60, 80, 100, 80, 60, 40, 0, –40, –60, –80, –100, –80, –60, –40, 0 A. What would be the average and RMS value of a sine wave having the same peak value? (16)

Or

    (b) (i) An RLC series circuit having R= 8 Ω, L= 10 mH and C= 15 μF is connected to 230 V, 50 Hz single phase AC supply. Find the impedance, current, power and power factor. (10)

    (ii) Derive an expression for the resonance frequency of a series RLC circuit. (6)

13. (a) (i) Derive from first principles, an expression for the emf generated in the armature winding of a DC machine. (8)

    (ii) Draw and explain the load characteristics of DC shunt and series generators. (8)

Or

    (b) (i) Draw a neat sketch of a three point starter for a DC shunt motor and explain how the motor is protected against overloads and loss of supply voltage. (10)

    (ii) Explain the speed control of DC shunt motor by flux control method. (6)

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14. (a) Draw the circuit diagram for conducting OC and SC tests on a single-phase transformer. Also explain how the efficiency and regulation can be estimated by these tests. (16)

Or

(b) (i) Explain the principle of operation of a three-phase induction motor. (8)

(ii) Define voltage regulation of an alternator. Explain how it will vary with load current for lagging pf, UPF and leading pf. (8)

15. (a) (i) Draw neat sketches of various methods of damping provided in indicating instruments and explain. (6)

(ii) With the help of a neat sketch, explain the principle of operation of a permanent magnet moving coil instrument. (10)

Or

(b) (i) Explain the construction and operation of a repulsion type moving iron instrument. (8)

(ii) Explain the principle of working of induction type energy meter with a neat sketch. (8)

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