

CBCS SCHEME

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15ELE15/25

First/Second Semester B.E. Degree Examination, Aug./Step.2020

Basic Electrical Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define : i) Electric current ii) Potential difference iii) Resistance
iv) Self inductance v) Electric power. (05 Marks)
- b. For the circuit shown in Fig.Q1(b), find the power dissipated in the 16 ohm resistor.

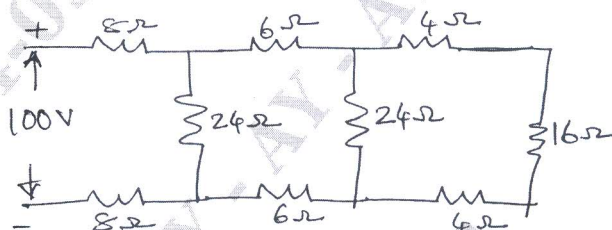


Fig.Q1(b)

(05 Marks)

- c. Find the inductance of a coil of 200 turns wound on a paper core tube of 25cm length and 5cm radius. Also calculate the energy stored in it if current rises from 0 to 5A. (06 Marks)

OR

- 2 a. Explain self induced emf and mutually induced emf. Write the expressions for self inductance and mutual inductance. (05 Marks)
- b. Two resistors are connected in parallel across a 200V supply and the total current drawn from the supply is 25A. If the power dissipated in one of the resistors is 1500w, what is the resistance of each resistor? (06 Marks)
- c. Derive an expression for the energy stored in a magnetic field. (05 Marks)

Module-2

- 3 a. With usual notations derive the EMF equation of a DC generator. (05 Marks)
- b. With a diagram, explain construction and working of single phase induction type energy meter. (06 Marks)
- c. A 4 pole DC shunt motor takes 22A from 220V supply. The armature and field resistances are respectively 0.5Ω and 100Ω respectively and the armature is lap connected with 300 conductors. If the flux/pole is 20 mwb, calculate the speed and gross torque. (05 Marks)

OR

- 4 a. Draw : i) T_a Vs I_a ii) N Vs I_a characteristics of a dc series and shunt motors. Mention their applications. (06 Marks)
- b. With a neat diagram, explain construction and principle of operation of dynamometer type wattmeter. (05 Marks)
- c. A 4 pole, 220V, lap connected, DC shunt motor has 36 slots, each slot containing 16 conductors, it draws a current of 40A from the supply. $R_a = 0.1\Omega$; $R_{sh} = 110\Omega$, The motor develops an output power of 6kW. The flux/pole is 40 mwb. Calculate :
i) The speed ii) Armature torque iii) Shaft torque. (05 Marks)

