Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

CBCS SCHEME

USN | | | | | | | | | | |

15ELE15/25

First/Second Semester B.E. Degree Examination, Jan./Feb. 2021
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 and explain Kirchoff's laws with diagram. **(05 Marks)**

b. For the circuit shown in Fig.Q1(b), find the value of R with 20V of supply.

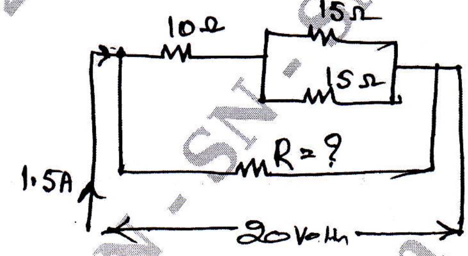

Fig.Q1(b) **(06 Marks)**

c. Define dynamically induced emf and derive its equation. **(05 Marks)**

OR

2 a. State ohm's law and mention its limitation. **(04 Marks)**

b. An air cored solenoid of 500 turns has a mean length of 50cm and a diameter of 2cm. Determine energy stored in inductor, if the current rises from 0 to 10 Amps in 50m sec. **(06 Marks)**

c. Find the current in all the branches of circuit shown in Fig.Q2(c).

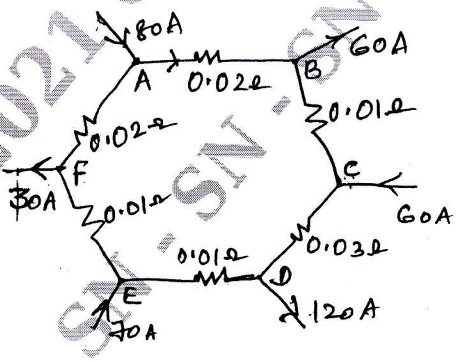

Fig.Q2(c) **(06 Marks)**

Module-2

3 a. Explain with the help of neat diagram, principle of operation of DC machine. **(05 Marks)**

b. Explain with help of neat diagram, the constructional features and operation of an induction type single phase energy meter. **(06 Marks)**

c. A 4 pole DC motor has lap connected armature winding, the flux per pole is 30mWb. The number of armature conductor is 250. When connected 230V DC supply it draws an armature current of 40A. Calculate the back emf and the speed with which motor is running. Assume armature resistance is 0.6Ω. **(05 Marks)**

OR

4 a. Derive the emf equation of a DC generator. **(06 Marks)**
b. Explain the necessity of starters for DC motor. **(05 Marks)**
c. Explain the dynamometer type wattmeter along with a neat sketch. **(05 Marks)**

Module-3

5 a. Develop an expression for RMS and average value of an alternating quantity. **(06 Marks)**
b. A 50Hz, 230V is applied to a 100Ω resistor write the time equations for voltage, current and find the power consumed by the resistor. **(05 Marks)**
c. Explain any one type of earthing with neat figure. **(05 Marks)**

OR

6 a. Define real power, reactive power and apparent power in an AC supply. **(04 Marks)**
b. Show that the power consumed in a pure inductance is zero. Draw the neat waveform for voltage, current and power. **(06 Marks)**
c. Explain two way control of lamps with trunk table and connection diagram. **(06 Marks)**

Module-4

7 a. Mention the advantages of three phase system over single phase system. **(05 Marks)**
b. An armature of three phase alternators has 120 slots. The alternators has 8 poles. Calculate its distribution factor. **(05 Marks)**
c. Show that 2 wattmeters are sufficient to measure power in 3 phase 3 wire system. **(06 Marks)**

OR

8 a. Derive an emf equation of a 3 phase synchronous generator. **(05 Marks)**
b. A 6 pole, 3-phase star connected alternators has 90 slots and 8 conductors per slot and rotates at 1000rpm the flux per pole is 50mWb. Find the induced emf across the lines, by considering the winding factor of 0.97. **(05 Marks)**
c. With the aid of phasor diagram obtain the relationship between the line and phase values of voltages in a 3 phase star connected system. **(06 Marks)**

Module-5

9 a. What are the losses in a transformer and how they vary with load? Deduce a condition for maximum efficiency? **(06 Marks)**
b. A single phase transformer has 400 primary tens and 1000 secondary turns 2ac net cross sectional area of the core is 60cm^2, the supply is 500V at 50Hz. Calculate : i) peak value of flux density ii) the voltage induced in the secondary iii) the number of secondary turns to induced a voltage of 2500V. **(06 Marks)**
c. Explain in brief the concept of rotating magnetic field. **(04 Marks)**

OR

10 a. Compare the ship ring and squirrel cage rotor of an induction motor. **(06 Marks)**
b. A single phase transformer working at unity power factor has an efficiency of 90% at both one half load and at full load of 500W. Determine the efficiency at three fourth full load unity power factors. **(05 Marks)**
c. With a neat diagram, explain the working principle of 3 phase induction motor. **(05 Marks)**

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