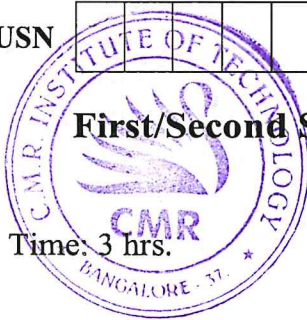


CBCS SCHEME

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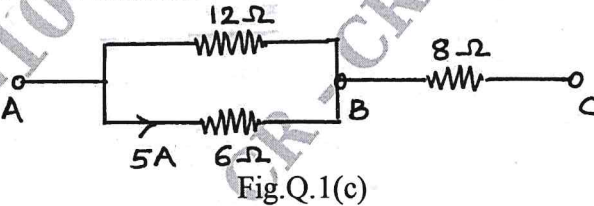
First/Second Semester B.E. Degree Examination, July/August 2021 Basic Electrical Engineering

Time: 3 hrs.

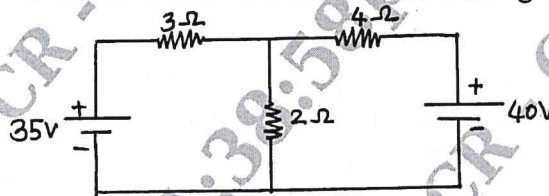
Max. Marks: 100

Note: Answer any FIVE full questions.

- State and explain: i) Ohm's law ii) Kirchoff's voltage law. (06 Marks)
 - Define: i) frequency ii) time period iii) form factor. (06 Marks)
 - Determine:
 - Current flowing through 12Ω and 8Ω resistances
 - Total power dissipated
 - Power dissipated in all resistors. (08 Marks)



- Define the RMS value of an alternating current and show that its value is proportional to maximum value. (06 Marks)
 - Apply Kirchoff's laws to calculate the current in 2Ω resistor in Fig. Q.2(b). (06 Marks)



- An alternating current 'i' is given by $i = 141.4 \sin 314t$, find: i) maximum value ii) frequency iii) time period iv) instantaneous value when $t = 3\text{ms}$. (08 Marks)
- Show that current lags the applied voltage $v = v_m \sin \omega t$ by 90° in a pure inductive A-C circuit and also power consumed is zero. (08 Marks)
 - List the advantages of 3 phase A.C system over 1 phase A.C system. (06 Marks)
 - A $318\mu\text{F}$ capacitor is connected across a 230volts, 50Hz, AC supply. Determine:
 - Capacitive reactance
 - RMS value of current
 - Voltage and current expressions. (06 Marks)
- Show that the power in a 3 phase balanced star connected load can be measured by two wattmeters with suitable circuit diagram and vector diagrams. (08 Marks)
 - Explain the following with respect to single phase A.C system:
 - Power factor
 - True power
 - Reactive power
 - Apparent power (06 Marks)
 - Three 50Ω resistors are connected in star across 400V, 3 phase, 50Hz, AC supply. Find phase current, line current and power taken from the mains. (06 Marks)

- 5 a. Explain the basic working principle of transformer and identify the applications of transformers (any two). (06 Marks)
- b. Explain the two way control of lamp with suitable diagram and working table. (06 Marks)
- c. A single phase, 50Hz, transformer has 30 primary turns and 350 secondary turns. The net cross sectional area of the core is 250cm^2 . If the primary winding is connected to a 230V, 50Hz, AC supply. Calculate:
- Peak value of flux density in the core
 - Voltage induced in the secondary winding
 - Primary current when the secondary current is 100A (Neglecting losses). (08 Marks)
- 6 a. Explain the concealed conduit wiring with a neat diagram and mention its advantages. (08 Marks)
- b. A 10KVA transformer has iron loss of 450W and full load copper loss of 650W. If the power factor of the load is 0.8 lagging. Calculate: i) Full load efficiency ii) Load at maximum η iii) Maximum efficiency at unity power factor. (06 Marks)
- c. Explain the following with respect to electric circuit i) Earthing ii) Electric shock iii) Fuse wire iv) MCB v) meter board. (06 Marks)
- 7 a. Explain the basic working principle of d.c generator with suitable diagrams. (06 Marks)
- b. What is torque? Show that the armature torque is proportional to armature current in d.c motor. (06 Marks)
- c. An 8 pole lap connected armature has 960 conductors, a flux of 40mwb per pole and a speed of 400RPM. Calculate the emf generated. If the armature were wave connected, at what speed it must be driven to generate 400V? (08 Marks)
- 8 a. How the dc generators are classified? Explain each one in brief. (06 Marks)
- b. Explain the D.C series motor characteristics with suitable plots. (06 Marks)
- c. A 250V, shunt motor takes a total current of 20A $R_{sh} = 200\Omega$, $R_a = 0.3\Omega$. Find the current in armature and back emf. (08 Marks)
- 9 a. Explain the constructional details of 3 phase synchronous generator. (06 Marks)
- b. A 3 ph, induction motor is wound for 4 poles and is supplied from 50Hz system. Calculate: i) Synchronous speed ii) Speed of motor when slip is 4% iii) rotor current frequency when motor runs at 600rpm. (08 Marks)
- c. Derive an expression to calculate the frequency of generated emf. (06 Marks)
- 10 a. Explain the basic working principle of 3 phase induction motor with suitable diagrams. (06 Marks)
- b. A 6 pole, 3 phase, 50Hz, alternator has 12 slots per pole and 4 conductors per slot. A flux of 25mWb is sinusoidally distributed along the air gap. Determine the i) Phase EMF ii) Line EMF, if the alternator is star connected. Assume pitch factor = 1 winding factor = 0.96. (06 Marks)
- c. Why the 3 phase induction motor stops at slip = 0, explain the working of star-delta starter with a neat diagram. (08 Marks)

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