## **FACULTY OF ENGINEERING**

B.E. I-Semester (AICTE) (New) (Main) Examination, July 2021

## Subject: Basic Electrical Engineering

Time: 2 hours

Max. Marks: 70

Note: i) First Question is compulsory. Answer any three questions from the remaining six questions.

- ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
- III) Missing data, if any, may suitably be assumed.

Answer any four questions from the following.

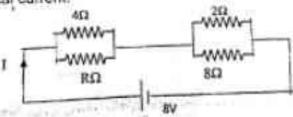
(4 x 4 = 16 Marks)

- (a) Explain Ohm's law and its limitations.
  - (b) Draw the power triangle of RC circuit and explain in detail.
  - (c) What is meant by slip of an Inductor motor and why it must be present for motor action?
  - (d) The primary winding of an electric train transformer has 400 turns and the secondary has 50. If the input voltage is 120V (rms) what is the output voltage?
- (e) Why is there phase difference between voltage and current in an a.c. circuit? Explain the concept of power factor.
  - What are the advantages of 3 phase circuits over single phase circuits?
  - (g) List the applications of DC shunt motor.

(3 x 18 = 54 Marks)

(a) Explain the mesh analysis of solving a network with an example:

The total power consumed by the given network is 16W. Find the value of R, power dissipated in R & total current.



3 (a) The current in an inductive circuit is given by 0.3 in (200t – 40°)A. Write the equation for the voltage across it if the inductance is 40 mH.

(b) A 440V, 3 phase. 50 Hz supply is fed to three coils, star connected each having a resistance of 25Ω & an inductive reactance of 20Ω. Calculate (i) line current (k) power factor (iii) power supplied

(c) Mention any three advantages of AC over DC.

4 (a) Describe the operation of single phase transformation explaining clearly the functions of the different parts. Why cores are laminated?

(b) A 3 phase, 460V, 100 H.P. 60Hz 4 pole Induction machine delivers rated output power at a slip of 0.05. Determine the (i) synchronous speed (ii) motor speed (iii) frequency of rotor current (iv) slip speed.

- (a) Explain what is meant by back emf. Derive the torque equation of DC motor from the fundamentals.
  - (b) Which type of motor is used for following applications? (i) sewing machines (ii) mixer (iii) dishwasher (iv) washing machine
  - (c) Explain the open circuit characteristics of DC Generator and significance of critical resistance.
- (a) In a house, there are 5 lamps 25 Watt used 14 hours per day, a 200 Watt refrigerator used 24 hours per day, and 125 Watt water pump used 8 hours per day. How much electrical energy used for a month (30 days).
  - b) List the different methods to improve p.f. & explain any one of them.
  - (c) What is the significance of CB and what are its basic requirements?

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- (a) A 50KVA, 3300/220V, 50Hz single phase transformer is builtion the core having an effective cross section of 150 cm2. It has 80 turns in low voltage winding. Calculate:
  - (i) maximum flux density
  - (ii) number of turns in high voltage winding and
  - (iii) full load currents in both low and high voltage windings.
  - (b) A straight metal wire crosses a maggetics field of flux 4mWb in a time 0.4s. Find the magnitude of the emf induced in the wire.
  - (c) Give an illustration of determining direction of induced current by using Lenz's law.

