FACULTY OF ENGINEERING

B.E. (EEE/EIE/CSE/CME/DS) II - Semester (AICTE) (Main & Backlog) (New) Examination, September /October 2023

Subject: Basic Electrical Engineering

Time: 3 Hours   Max. Marks: 70

Note: (i) First question is compulsory and answer any four questions from the
remaining six questions. Each questions carries 14 Marks.
(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 be suitably assumed.

1. a) Derive energy stored in inductor.
   b) Calculate the **equivalent resistance** between the terminals A & B for the circuit.
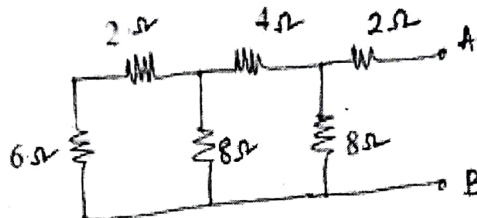
   c) An alternating circuit takes a power of 17.6 kVA at a power factor of 0.85 lagging.
      Find (i) active power and (ii) reactive power
   d) State (i) Faraday's Law (ii) Lenz's Law
   e) What are the types of 3-Φ induction motor and write it's applications?
   f) What is residual magnetism? and draw O.C.C. of separately excited DC generator?
   g) A consumer uses 12kW geezer, 4kW electric furnace, and five 60W bulbs for 12hours.
      How many units (kWh) of electric energy have been used? And What is total cost of
      energy consumption? (1kWh = Rs.3.5/-)

2. a) Find the current passing through 6Ω using mesh analysis.
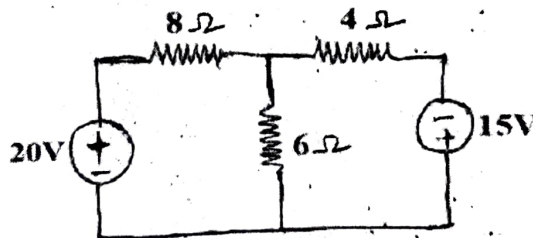
   b) Find the current I_x using super position theorem.
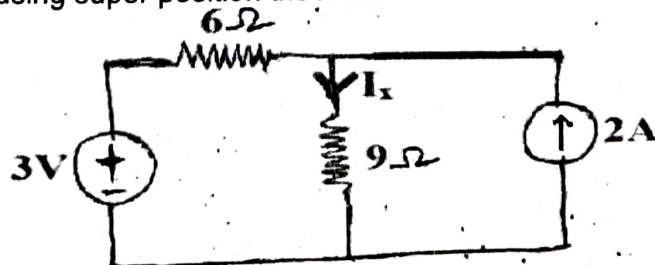
3. a) A 1-phase supply of 230 V, 50 Hz is connected across a circuit consisting of 15Ω resistance in series with 120μF capacitance. Find (i) reactance (ii) impedance (iii) current (iv) voltage drop across resistance & capacitance.
   b) What is star connected system? Derive the relationship between line/phase values of voltage and current of star connected system.

4. a) Derive emf equation of a 1-Φ transformer.
   b) Explain the concept of Rotating Magnetic Field (RMF) theory in 3-Φ induction motor.

5. a) Explain the construction, working & characteristics of single phase induction motor.
   b) A 4-pole lap wound dc shunt generator has a useful flux per pole of 0.07wb and has 440 armature conductors. Calculate the terminal voltage when running at 900rpm. [consider armature current is 50A and armature resistance 0.055Ω].

6. a) What is Earthing? Classify Earthing? And Explain any one method of Earthing with neat Diagram.
   b) Compare MCB and MCCB.

7. a) What is Auto Transformer? Explain the principle, operation & applications of Auto Transformer.
   b) Classify DC motor? And draw it's equivalent circuits and equations.

**