Register No.: ☐

282

April 2023

N.B. 1. Answer all questions under Part-A. Each question carries 3 marks.

2. Answer all the questions either (A) or (B) in Part-B. Each question carries 14 marks.

PART – A

1. Derive an equation for the equivalent capacitance of two capacitors connected in parallel.

2. State Ohm's law.

3. How a Thevenin's circuit can be obtained from Norton's form?

4. Define node.

5. Define Impedance and Admittance.

6. Define (i) Conductance (ii) Susceptance (iii) Admittance.

7. Prove that 3 phase power is given by $\sqrt{3}$ VI cosφ in balanced star connection.

8. What is the necessity of three phase system?

9. List the active materials used in Nickel Cadmium cell.

10. Define AH efficiency.

PART – B

11. (a) (i) Three capacitors 5mfd, 10mfd and 15mfd are connected in parallel across 250V supply. Find the energy stored. (7)

(ii) A resistor of R Ω is connected in series with a parallel circuit consisting of 12 Ω and 8 Ω. The total power in the circuit is 80 Watts when the applied voltage is 20V. Calculate the value of R. (7)

(Or)

(b) (i) Three capacitors have capacitance of 1mfd, 2mfd and 6mfd respectively. Find the total capacitance when they are connected in (a) Parallel (b) Series. (7)

(ii) Derive equivalent resistance of 3 resistors connected in parallel. (7)

12. (a) Find the current through 8 ΩΩ resistor and its direction for the network shown below using super position theorem.
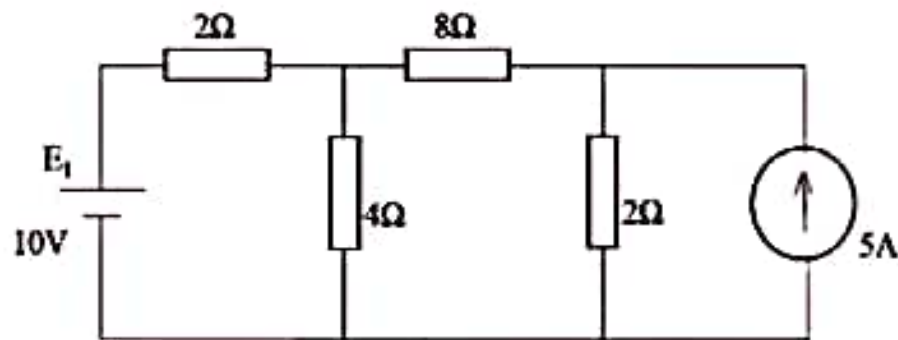
(Or)

(b) (i) Discuss mesh current analysis with an example. (7)

(ii) Calculate the value of load resistance for maximum power transferred from the circuit shown below. Also find the value of that maximum power.(7)
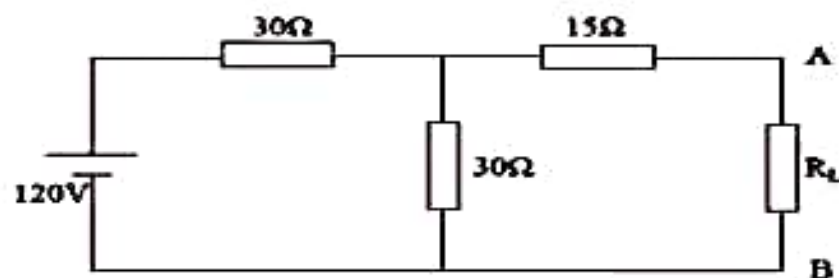
13. (a) (i) A coil of resistance of 8 Ω, an inductance of 0.1 H and a capacitance of 75 mfd across a 230 V, 50 Hz supply. Find (a) current in the circuit (b) power factor (c) power and (d) voltage across coil & capacitor. (7)

        (ii) Show that the power in an R-L-C series circuit is P= V.I.cosϕ Watts. (7)

(Or)

(b) (i) A two element series circuit of Resistance 10Ω and 15Ω has an effective voltage of 230V at 50Hz. Determine the active power, apparent power and reactive power. (7)

        (ii) Draw impedance triangle and phasor diagram for RC series circuit. (7)

14. (a) A balanced three phase load consists of three coils each of resistance 6 Ω and an inductive reactance of 8 Ω. Determine the line current and power absorbed when the coils are delta connected across a 400V 3 phase supply.

(Or)

(b) A load in each branch of delta connected balanced 3 phase circuit consists of an inductance of 0.0318H in series with a resistance of 10 Ohms. The line voltage is 400V at 50Hz. Calculate (i) the line current and (ii) the total power in the circuit.

15. (a) Explain the construction and working of nickel cadmium cell.

(Or)

(b) Explain the chemical reactions and physical changes during discharging and charging of nickel iron battery.