

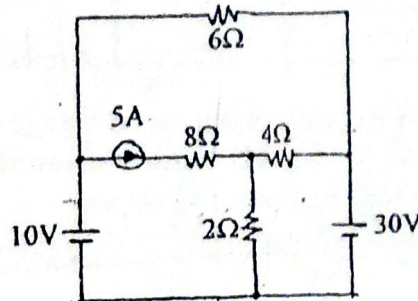
Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCE, BME, BGE	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

Subject: - Basic Electrical Engineering (EE451)

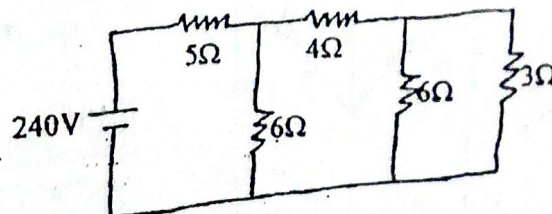
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Distinguish between series and parallel connection of resistances. Derive the equation for finding equivalent resistance of three resistances connected in (i) series (ii) Parallel. [4]

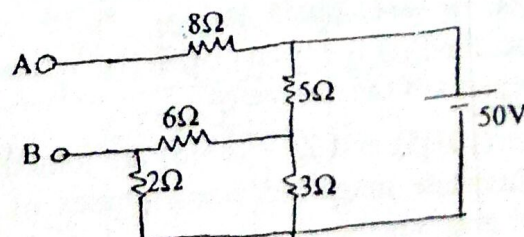
b) Find all branch currents using mesh analysis method in the following circuits. [6]



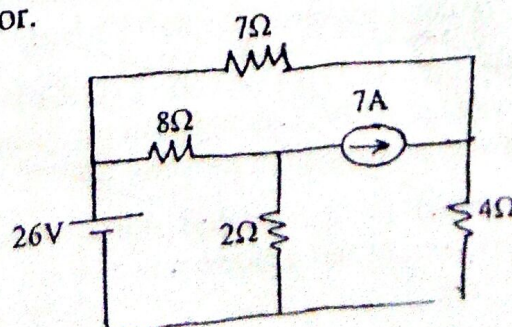
c) Find the circuit current and current through each branch using branch current method. [6]



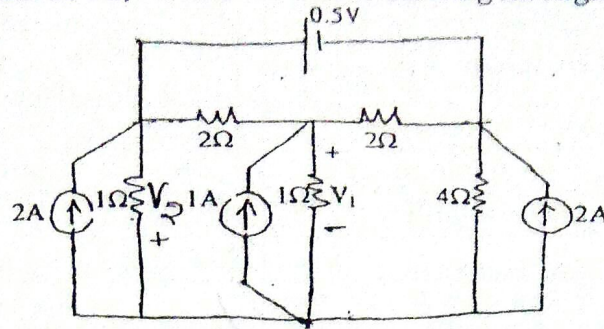
2 a) Find the Norton's equivalent resistance between the terminals A and B in the given circuit. [4]



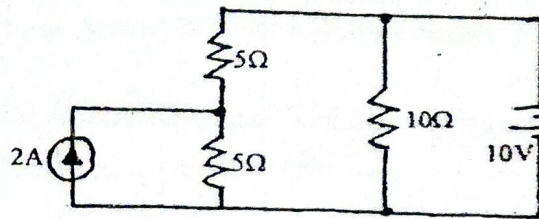
b) Use mesh analysis to find the current flowing through 2Ω resistor and the potential across the 4Ω resistor. [6]



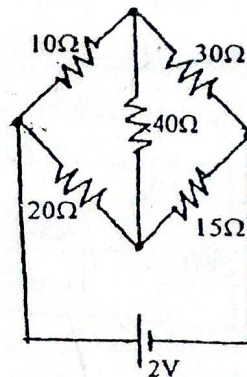
- c) Find the values of V_1 , V_2 and the current flowing through the 4Ω resistor. [6]



3. a) Using superposition theorem, determine currents in all the resistors of the following circuit. [6]



- b) The resistance of the various arms of a wheat stone bridge are shown in figure below. The battery has an emf of 2V. Using Thevenin's theorem, determine the value and direction of the current in the 40Ω resistor. [6]



- c) Derive the expression for energy stored in an inductive coil. [4]
4. a) Two currents i_1 and i_2 are given as, $i_1 = 10 \sin(314t + \pi/4)$ A and $i_2 = 8 \sin(313t - \pi/3)$ A. Find (i) $i_1 + i_2$ and (ii) $i_1 - i_2$. Write answer in sinusoidal form. Also draw phasor diagrams of the processes. [4+4]
- b) Two impedances $Z_1 = (10 + j5)$ and $Z_2 = (8 + j6)$ are joined in parallel across a voltage of $V = 200 + j0$. Calculate magnitudes and phases of circuit current and branch currents. Draw phasor diagram. [8]
5. a) An inductive load of 4 KW at a lagging power factor of 0.8 is connected across a 220V, 50Hz supply. Calculate the value of the capacitance to be connected in parallel with the load to bring the resultant power factor to 0.95 lagging. [4]
- b) Three impedances of $(10 + j10)\Omega$, $(12 + j12)\Omega$ and $(2 + j2)\Omega$ are connected in delta to a 3-phase system with line voltage 400V. Calculate all the phase currents, line currents, active powers, reactive powers and apparent powers. [8]
- c) Explain two wattmeter method for a balanced star connected load. How can this method be used for measurement of three phase power. [4]