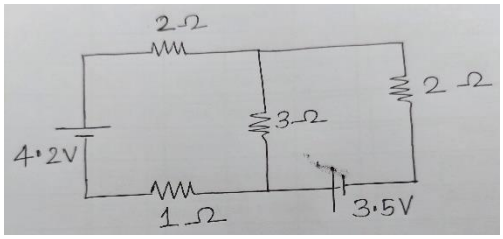
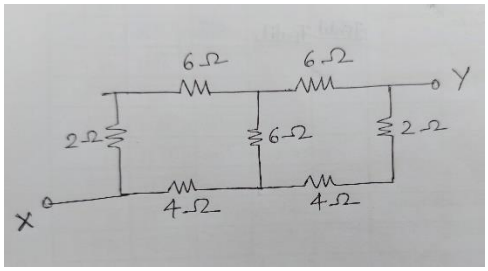
Question Bank for Unit Test III

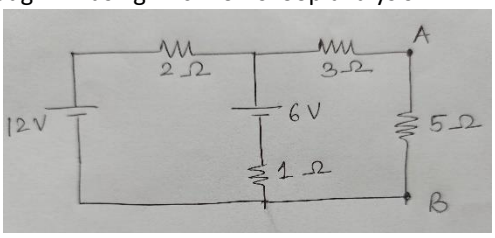
1. State and Explain Kirchhoff's Current and Voltage Law with the help of suitable diagram.
2. Define : i) Active and passive networks ii) linear and non-linear network iii) unilateral and bilateral network
3. Define ideal and practical voltage source & explain it by means of i) Symbol of representation ii) Value of internal resistance iii) Graphs between V and I.
4. Derive the equation for conversion of star to delta and delta to star
5. State Thevenin's Theorem and Explain the steps to solve thevenin's theorem
6. Differentiate between series and parallel circuit.
7. Using Superposition theorem calculate current through 3Ω and verify the same with Kirchhoff's voltage law



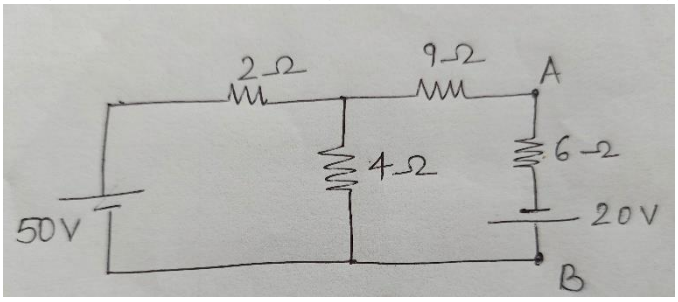
8. Calculate Equivalent resistance between X and Y



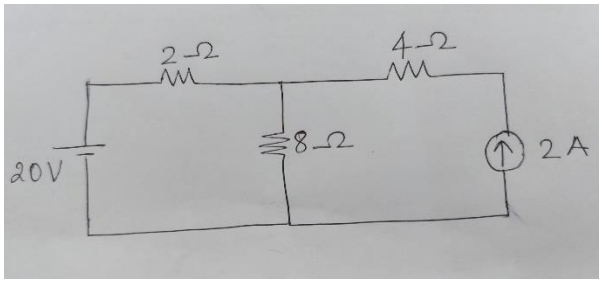
9. Find the current flowing through AB using Kirchhoff's loop analysis.



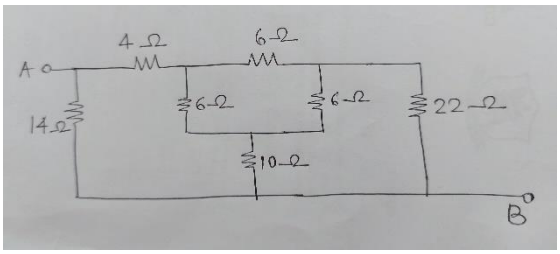
10. Calculate current flowing through branch AB using thevenin's theorem and verify same using KVL



11. Find the current flowing through 8Ω resistance by superposition theorem



12. Determine the effective resistance between A and B



13. Define resistivity of the material and factors on what it depends
14. Define Resistance , resistivity , conductance , conductivity and insulation resistance
15. Define temperature coefficient of resistance & state the factors on which it depends.
16. State the effect of temperature on resistance of i) metal ii) Insulator iii) Alloys
17. Derive an expression for insulation resistance of a single core cable. Draw the necessary diagram. Also comment on insulation resistance when i) Two cables are connected in series and ii) In parallel
18. If $\alpha 1$ and $\alpha 2$ are the RTC of a conducting material at $t_1\,^0C$ and $t_2\,^0C$ respectively prove that

$$\alpha_2 = \frac{\alpha_1}{1+\alpha_1 (t_2-t_1)}$$

19. A water pump lifts 12000 litre of water to a height of 15 m per minute. The efficiency of motor and pump is 75% & 80% respectively. Calculate i) Input power to motor in kW

    ii) Daily energy consumption if pump is used 04 hrs. a day

    iii) Monthly electricity bill as per above daily uses for the month of 30 days at the rate of 10 Rs/unit.

20. Compare Lead Acid battery and lithium ion battery (6 points)
21. Explain construction and working principle of Lithium Ion battery state its chemical reactions during charging and discharging and also state it's any two applications.
22. An electric motor runs at 600 rpm and produces a torque of 210 N-m. The motor efficiency is 88%. Find motor input power and current drawn when motor is fed at 400 V Dc supply.
23. A coil of insulated copper wire has a resistance of 150Ω at 20°C, When the coil is connected across 240 supply the current after several hours is 1.25 A. Calculate the temperature of the coil assuming the temperature coefficient of resistance of copper at 20 °C to be 0.0036 per °C
24. The electrical load of a bungalow is as follows Find i) daily energy consumption in kWh
    ii) Monthly electricity bill for a month of 30 days at the rate of Rs 6/unit

a)	Tubes	40 W --- 06 nos ------ 6hrs / day
b)	Fans	60 W --- 04 nos ------ 10hrs / day
c)	Washing Machine	2 kW --- 01 nos ------ 01 hr / day
d)	Geyser	2 kW --- 01 nos ------ 02 hrs / day
e)	TV	100 W --- 01 nos ------ 06 hrs / day