21. (3)

22. (1)

23. (2)

As $R = \frac{V}{I} = \frac{W}{ql}$

$\therefore [R] = \frac{[ML^2T^{-2}]}{[AT][A]} = [ML^2T^{-3}A^{-2}]$

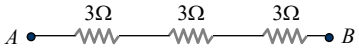
24. (2)

Current through each arm DAC and DBC = 1A

$V_D - V_A = 2$ and $V_D - V_B = 3 \Rightarrow V_A - V_B = +1V$

25. (4)

The network can be redrawn as follows



$\Rightarrow R_{eq} = 9\Omega$

26. (1)

27. (2)

The circuit is a balanced Wheatstone bridge, because

$\frac{2\Omega}{2\Omega} = \frac{4\Omega}{4\Omega}$

The 7Ω resistance is ineffective

$\therefore$ Resistance of the upper arms = 2 + 2 = 4Ω

Resistance of the lower arms = 4 + 4 = 8 Ω

These two resistances are in parallel

$\therefore R_{AB} = \frac{4\times 8}{4+8} = \frac{32}{12} = \frac{8}{3}\Omega$

28. (4)

$S = \left(\frac{100-l}{l}\right).R$

Initially, $30 = \left(\frac{100-l}{l}\right)\times 10 \Rightarrow l = 25cm$

Finally, $10 = \left(\frac{100-l}{l}\right)\times 30 \Rightarrow l = 75cm$ So, shift = 50cm.

29. (3)

Here $\varepsilon = 3$ V, $\varepsilon_1 = 1.08$ V, $l_1 = 216$ cm, $l = ?$

As $\frac{\varepsilon}{\varepsilon_1} = \frac{l}{l_1}$ $\therefore l = \frac{\varepsilon}{\varepsilon_1}\times l_1 = \frac{3\times 216}{1.08} = 600$ cm

30. (2)

Order of drift velocity

$= 10^{-4}$ m / sec $= 10^{-2}$ cm / sec