Physicsaholics

DPP – 4 (Current Electricity)

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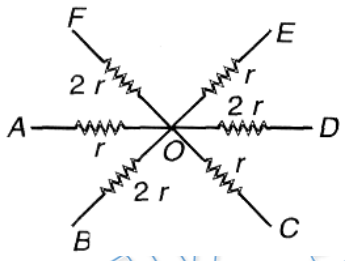
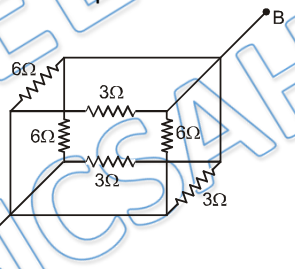
Q 1. The terminal network shown in the figure consists of 6 resistors. The points A, C and E all are at potential 20 V while points B, D and F are at potential -10 volt then potential of junction O will be



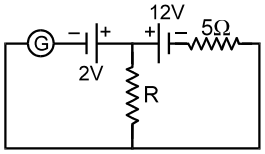
(a) Zero (b) 10 V (c)15 V (d) -5V

Q 2. Find the equivalent resistance between points A and B :



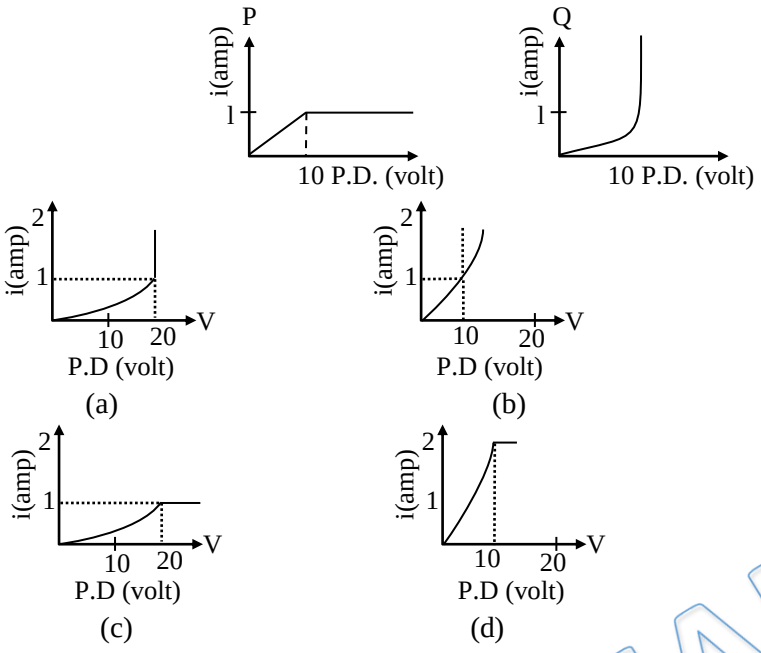
(a) 2Ω (b) $\frac{2}{3}\Omega$ (c) $\frac{3}{2}\Omega$ (d) $\frac{1}{2}\Omega$

Q 3. In the circuit shown, the galvanometer shows zero current. The value of resistance R is :

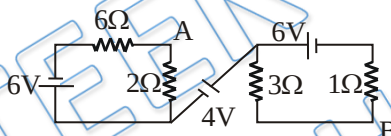


(a) 1 Ω (b) 2 Ω (c) 4 Ω (d) 9 Ω

Q 4. Two current elements P and Q have current voltage characteristics as shown below; Which of the graphs given below represents current voltage characteristics when P and Q are in series

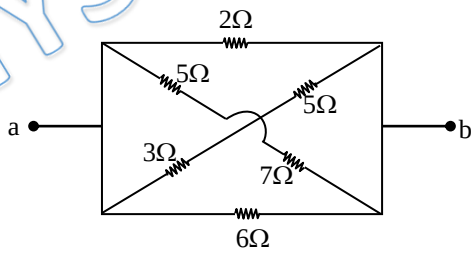


Q 5. In the network shown in the figure below, calculate the potential difference between A and B ? (V_B- V_A) =



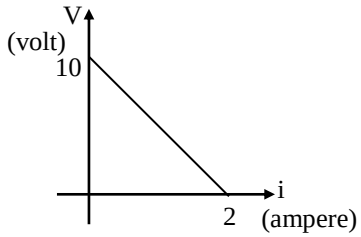
(a) 1V
(b) -1 V
(c) 2V
(d) -2V

Q 6. Find the equivalent resistance between a & b



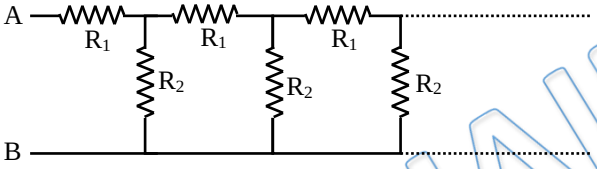
(a) $\frac{7}{8}\Omega$
(b) $\frac{8}{7}\Omega$
(c) $\frac{6}{7}\Omega$
(d) $\frac{7}{6}\Omega$

Q 7. A battery of emf E and internal resistance r is connected across a resistance R. Resistance R can be adjusted to any value greater than or equal to zero. A graph is plotted between the current (i) passing through the resistance and potential difference (V) across it. Select the correct alternative(s) –



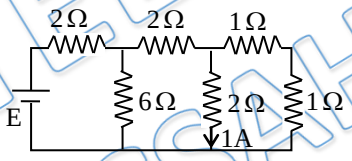
(a) internal resistance of battery is 5ohm
(b) emf of the battery is 20V
(c) maximum current which can be taken from the battery is 4A
(d) V-i graph can never be a straight line as shown in figure

Q 8. Consider an infinite ladder network. A voltage is applied between points A & B. If the voltage is halved after each section. Find the ratio R_1/R_2.



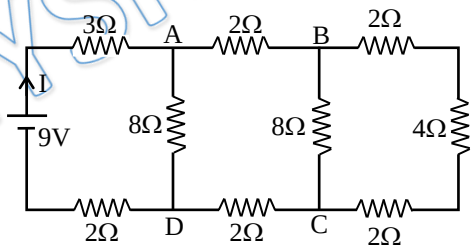
(a) 1/2
(b) 1/3
(c) 2
(d) None of these

Q 9. The emf of the battery shown in the figure is given by –



(a) 6 V (b) 12 V (c) 18 V (d) 8 V

Q 10. In the circuit shown in figure , the current through –

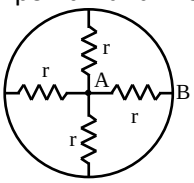


(a) the 3ohm resistor is 0.50 A
(b) the 3ohm resistor is 0.25 A
(c) the 4ohm resistor is 0.50 A
(d) the 4ohm resistor is 0.25 A

Q 11. There are two concentric spheres of radius *a* and *b* respectively. If the space between them is filled with medium of resistivity ρ, then the resistance of the inter gap between the two spheres will be

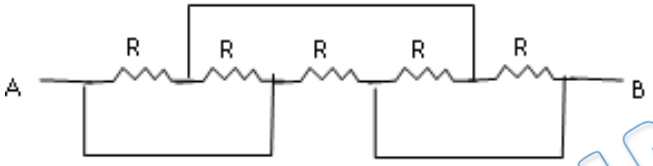
(a) $\frac{\rho}{4\pi(b+a)}$ (b) $\frac{\rho}{4\pi}\left(\frac{1}{b}+\frac{1}{a}\right)$
(c) $\frac{\rho}{4\pi}\left(\frac{1}{a^2}-\frac{1}{b^2}\right)$ (d) $\frac{\rho}{4\pi}\left(\frac{1}{a}-\frac{1}{b}\right)$

Q 12. The equivalent resistance between point A and B is -



(a) 4 r
(b) 2r
(c) r
(d) r/4

Q 13. The equivalent resistance between A and B in the given circuit

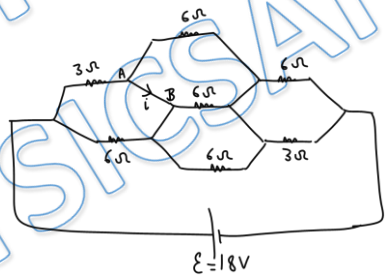


(a) R (b) R/2
(c) R/3 (d) 2R/3

Q 14. A 10 V car battery with negligible internal resistance is connected to a series combination of a 4Ωresistor that obey's Ohm's law and a thermistor that does not obey Ohm's law, but instead has a current –voltage relation $V = \alpha I + \beta I^2$ with $\alpha = 2\Omega$ and $\beta = 4\Omega/A$. The current through the 4Ω resistor is

(a) 1 A (b) 2 A (c) 2/5 A (d) 5 A

Q 15 Find current in wire AB ?



(a) 1A
(b) 2A
(c) 3A
(d) 4A

Answer Key

Q.1 b	**Q.2 b**	**Q.3 a**	**Q.4 c**	**Q.5 a**
Q.6 b	**Q.7 a**	**Q.8 a**	**Q.9 b**	**Q.10 d**
Q.11 d	**Q.12 d**	**Q.13 b**	**Q.14 a**	**Q.15 a**