PHYSICS

NEET

CRASH COURSE

CURRENT ELECTRICITY

SMART ACHIEVERS

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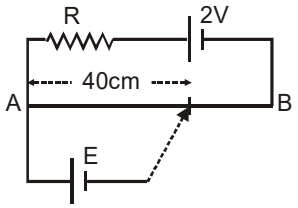
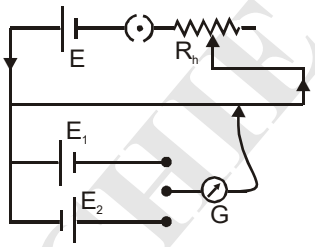
CURRENT ELECTRICITY

Q.1 AB is a potentiometer wire of length 100 cm and its resistance is 10 ohm. It is connected in series with a resistance R = 40 ohm and a battery of e.m.f. 2V and negligible internal resistance. If a source of unknown e.m.f. E is balanced by 40 cm length of the potentiometer wire, the value of E is:



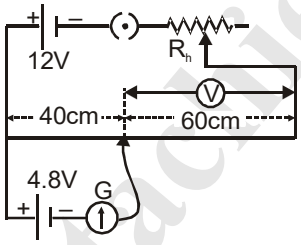
(1) 0.8 V (2) 1.6 V (3) 0.08 V (4) 0.16 V

Q.2 The following diagram shows the circuit for the comparision of e.m.f. of the cells. The circuit can be corrected by :–



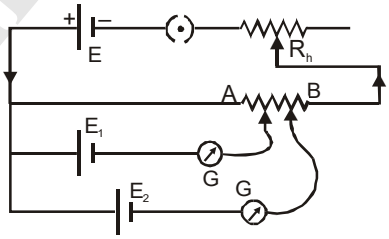
(1) Reversing the terminals of E
(2) Reversing the terminals of E_1
(3) Reversing the terminals of E_2
(4) Reversing the current in Rh.

Q.3 In the following circuit, the reading of the voltmeter will be :–
(in volt)



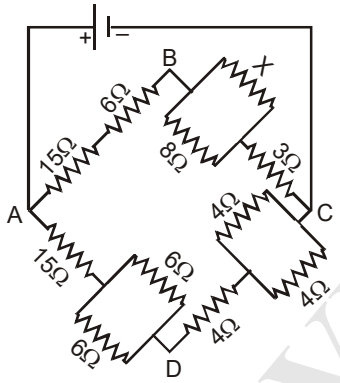
(1) 7.2 (2) 4.8 (3) 6 (4) 4

Q.4 In the following diagram, the deflection in the galvanometer in a potentiometer circuit is zero, then :–



(1) $E_1 > E_2$ (2) $E_2 > E_1$ (3) $E_1 = E_2$ (4) $E_1 + E_2 = E$

Q.5 In the following circuit diagram the value of resistance X for the potential difference between B and D is zero :–



(1) 4 ohm (2) 6 ohm (3) 8 ohm (4) 9 ohm

Q.6 The no. of electrons passing through a heater wire in one minute, if it carries a current of 8 ampere, will be–

(1) 2×10^{20} (2) 2×10^{21} (3) 3×10^{20} (4) 3×10^{21}

Q.7 A current of 5 amp. is passing through metallic wire of cross–sectional area 4×10^{-6} m^2, the drift speed of electrons will be (in m/sec) (density of electron per unit volume is 5×10^{26})

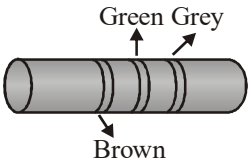
(1) 1.56×10^{-2} (2) 1.6×10^{-19} (3) 1.56×10^{2} m/sec (4) 1.6×10^{19}

Q.8 The resistance of wire is 20Ω. The wire is stretched to three times its length. Then the resistance will now be –

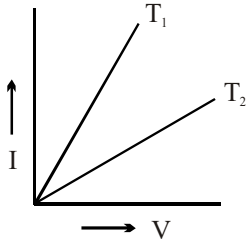
(1) 6.67 Ω (2) 60 Ω (3) 120 Ω (4) 180 Ω

Q.9 Value of resistance shown in the figure is

(1) 1500 mega ohms
(2) 150 mega ohms
(3) 15000 mega ohms
(4) 15 mega ohms



Q.10 The current (I) and voltage (V) graphs for a given metallic wire at two different temperature (T_1) and (T_2) are shown in fig. It is concluded that

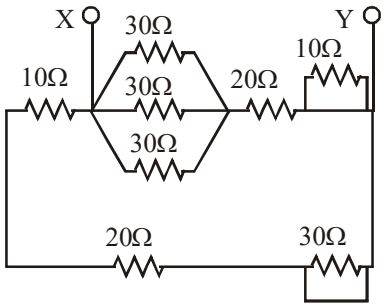


(1) $T_1 > T_2$ (2) $T_1 < T_2$ (3) $T_1 = T_2$ (4) $T_1 = 2T_2$

Q.11 The resistance of wire is 5 ohm at 50ºC and 6 ohm at 100ºC. The resistance of the wire at 0ºC will be

(1) 2 ohm (2) 1 ohm (3) 4 ohm (4) 3 ohm

Q.12 Net resistance between X and Y is –



(1) 5 Ω (2) 10 Ω (3) 15 Ω (4) 60 Ω

Q.13 Three resistances each of 4 Ω are connected in the form of an equilateral triangle. The effective resistance between two corners is

(1) 8 Ω (2) 12 Ω (3) $\frac{3}{8}\Omega$ (4) $\frac{8}{3}\Omega$

Q.14 The resistors of resistances 2Ω, 4Ω and 8Ω are connected in parallel, then the equivalent resistance of the combination will be

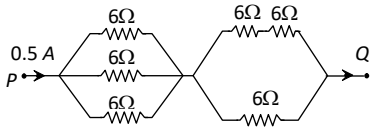
(1) $\frac{8}{7}\Omega$ (2) $\frac{7}{8}\Omega$ (3) $\frac{7}{4}\Omega$ (4) $\frac{4}{9}\Omega$

Q.15 A wire of resistance R is cut into 'n' equal parts. These parts are then connected in parallel. The equivalent resistance of the combination will be

(1) nR (2) $\frac{R}{n}$ (3) $\frac{n}{R}$ (4) $\frac{R}{n^2}$

Q.16 Resistances of 6 ohm each are connected in the manner shown in adjoining figure. With the current 0.5 ampere as shown in figure, the potential difference $V_P - V_Q$ is

(1) 3.6 V
(2) 6.0 V
(3) 3.0 V
(4) 7.2 V

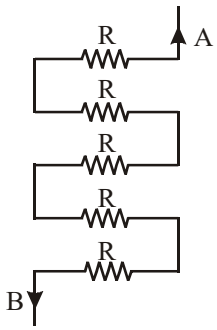


Q.17 When n identical resistances of value 'r' each are connected in parallel, the equivalent resistance is x. The resultant resistance when they are connected in series is-

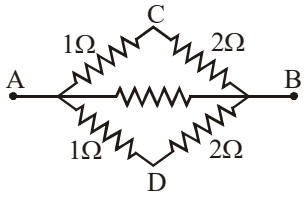
(1) nx (2) n^2x (3) r.n.x (4) r^2 x/n

Q.18 Five identical resistance are connected as shown in fig. The equivalent resistance between point (A) and (B) is –

(1) R
(2) 5R
(3) R/5
(4) 2R/5

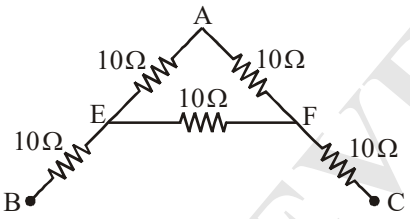


Q.19 The equivalent resistance between points (A) and (B) in the adjoining fig. is one ohm. What is the value of middle resistance-



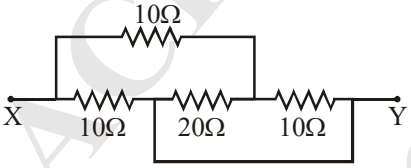
(1) 9Ω (2) 1Ω
(3) 6Ω (4) 3Ω

Q.20 The effective resistance (in Ω) between (B) and (C) of letter (A) , containing resistance as shown in fig. as



(1) 60 (2) 40 (3) 80/3 (4) 160/9

Q.21 Five resistances are combined according to the figure. The equivalent resistance between the point X and Y will be



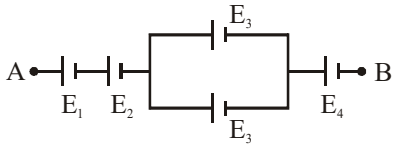
(1) 10 Ω (2) 22 Ω (3) 20 Ω (4) 50 Ω

Q.22 Emf of a cell is 1.25 V and its internal resistance is 2Ω. Number of such cells are connected in series with a resistance of 30Ω, so that current in the circuit is 0.5 A is

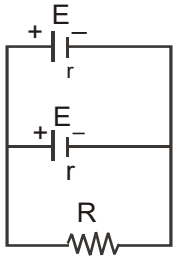
(1) 30 (2) 60 (3) 45 (4) 20

Q.23 In the following circuit the resultant emf between AB is –

(1) $E_1 + E_2 + E_3 + E_4$
(2) $E_1 + E_2 + 2E_3 + E_4$
(3) $E_1 + E_2 + (E_3/2) + E_4$
(4) $E_1 + E_2 + (E_3/4) + E_4$

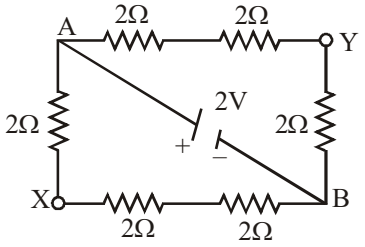


Q.24 Two cells of same emf E and internal resistance r are connected in parallel with a resistance of R. To get maximum power in the external circuit, the value of R is –



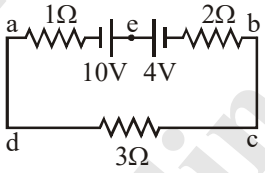
(1) $R = \frac{r}{2}$ (2) R = r (3) R = 2 r (4) R = 4r

Q.25 For the following circuits, the potential difference between X and Y in volt is –



(1) $\frac{2}{3}$ (2) $\frac{4}{3}$ (3) $\frac{8}{9}$ (4) $\frac{5}{3}$

Q.26 The magnitude and direction of the current in the circuit shown will be



(1) $\frac{7}{3}$ A From a to b through e

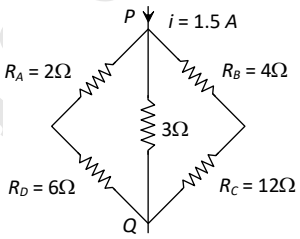
(2) $\frac{7}{3}$ A From b and a through e

(3) 1.0 A from b to a through e

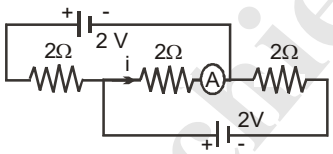
(4) 1.0 A from a to b through e

Q.27 Potential difference between the points P and Q in the electric circuit shown is

(1) 4.5 V
(2) 1.1 V
(3) 2.4 V
(4) 2.88 V



Q.28 Reading of ammeter is-



(1) 1 (2) 2 (3) $\frac{2}{3}$ (4) 3

Q.29 A cell of e.m.f (E) and internal resistance (r) is connected in series with an external resistance (nr.) then the ratio of the terminal p.d. to E.M.F is

(1) 1/n (2) 1/(n+1) (3) n/(n+1) (4) (n+1)/n

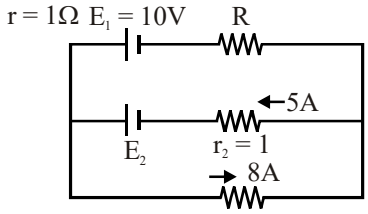
Q.30 Two electric bulbs whose resistances are in the ratio of 1 : 2 are connected in parallel to a constant voltage source. The power dissipated in them have the ratio

(1) 1 : 2 (2) 1 : 1 (3) 2 : 1 (4) 1 : 4

Q.31 The internal resistance of cell is 0.1Ω and its emf is 2V. When a current of 2A is being drawn from it, the potential difference across its terminals will be

(1) more than 2V (2) 2V
(3) 1.8V (4) none of the above

Q.32 In fig the current through resistance (R) is



(1) 3A (2) 13A (3) 6.5 A (4) 9A

Q.33 In a meter bridge with standard resistance of 5 Ω in the left gap the ratio of balancing lengths of meter bridge wire is 2 : 3. The unknown resistance is
(1) 1 Ω (2) 15 Ω (3) 7.5 Ω (4) 3.3 Ω

Q.34 A battery of 6 volts is connected to the terminals of a three metre long wire of uniform thickness and resistance of the order 100. The difference of potential between two points separated by 50 cm on the wire will be
(1) 1 V (2) 1.5 V (3) 2 V (4) 3 V

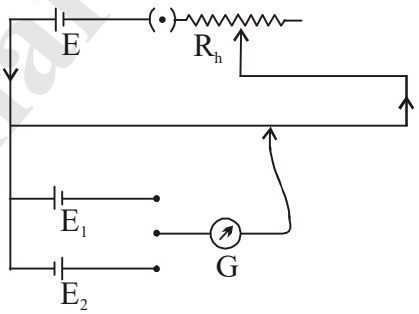
Q.35 A potentiometer consist of a wire of length 4 m and resistance 10 Ω . It is connected to a cell of emf 2V. The potential difference per unit length of the wire will be
(1) 0.5 V/m (2) 2 V/m (3) 5 V/m (4) 10 V/m

Q.36 The resistance of a ideal voltmeter is
(1) Zero (2) Very low (3) Very large (4) Infinite

Q.37 In a potentiometer circuit there is a cell of emf 2 volt, a resistance of 5 ohm and a wire of uniform thickness of length 1000 cm and resistance 15 ohm. The potential gradient in the wire is

(1) $\frac{1}{500}$ V / cm (2) $\frac{3}{2000}$ V/cm (3) $\frac{3}{5000}$ V / cm (4) $\frac{1}{1000}$ V / cm

Q.38 The following diagram shows the circuit for the comparision of e.m.f. of the cells. The circuit can be corrected by :

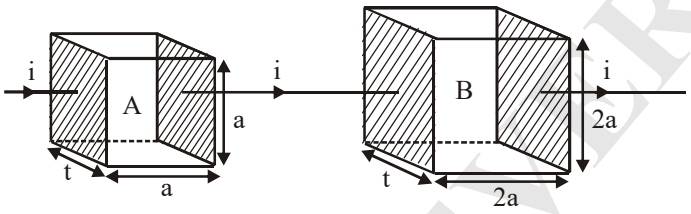


(1) Reversing the terminals of E
(2) Reversing the terminals of E_1
(3) Reversing the terminals of E_2
(4) Reversing the terminals in Rh

Q.39 In potentiometer experiment when terminals of the cell is at distance of 52 cm, then no current flows through it. When 5Ω shunt resistance is connected in it then balance length is at 40 cm. The internal resistance of the cell is :

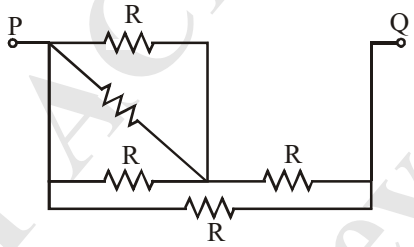
(1) 5 (2) $\frac{200}{52}$ (3) $\frac{52}{8}$ (4) 1.5

Q.40 In the following diagram two parallelopipedA and B are of the same thickness. The arm of B is double that of A. Compare these resistances and find out the value of R_A/R_B is –



(1) 1 (2) 2 (3) $\frac{1}{2}$ (4) 4

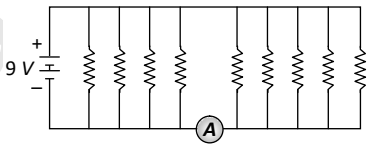
Q.41 The equivalent resistance between the terminal point P and Q is 4Ω in the given circuit, then find out the resistance of R in ohms –



(1) 7 (2) 4 (3) 2 (4) 5

Q.42 If each resistance in the figure is of 9 Ω then reading of ammeter is

(1) 5 A
(2) 8 A
(3) 2 A
(4) 9 A



Q.43 Twelve wires of equal resistance (R) are connected to form a cube. The effective resistance between two diagonal ends will be

(1) 5/6 R (2) 6/5 R (3) 3R (4) 12 R

Q.44 Five cells each of e.m.f (E) and internal resistance (r) are connected in series. If due to oversight one cell is connected wrongly ,then the equivalent e.m.f and internal resistance of the combination is

(1) 5E and 5r (2) 3E and 3r (3) 3E and 5r (4) 5E and 4r

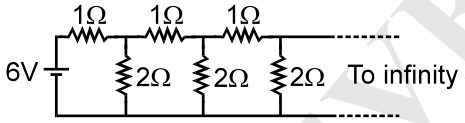
Q.45 A resistance coil of 60 Ω is immersed in 42 kg of water. A current of 7 A is passed through it. The rise in temperature of water per minutes is :

(1) 4ºC (2) 8ºC (3) 1ºC (4) 12ºC

Q.46 An electric current is established in a hydrogen gas discharge tube when a high voltage is applied across the two electrodes in the tube. The gas is ionised. Electrons move towards the positive terminal and the positive ions towards the negative terminal. The magnitude of the current in the tube in which 3.1×10^{18} electrons and 1.1×10^{18} protons move past a cross-sectional area of the tube each second will be -

(1) 1.6 A (2) 3.2 A (3) 0.16 A (4) 0.672 A

Q.47 An infinite ladder network of resistance is constructed with 1Ω and 2Ω resistance. The 6V battery between A and B has negligible internal resistance. The current that passes through 2Ω resistance nearest to the battery is -



(1) 1A (2) 1.5 A (3) 2 A (4) 2.5 A

Q.48 A bulb rated 220 V, 100 W is connected across 160 V line. The power dissipated will be -

(1) 100 W (2) 75 W (3) 52 W (4) 26 W

Direction for following questions.

A. Both Assertion and Reason are true, and Reason is the correct explanation of Assertion.
B. Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
C. Assertion is true but Reason is false.
D. Assertion and Reason both are false.

Q.49 **Assertion :** A battery always has some internal resistance.
Reason : Potential difference across the terminals of a battery is always less than its emf.

(1) A (2) B (3) C (4) D

Q.50 **Assertion :** Electric field is directed from positive to negative electrode inside a battery.
Reason : When a battery is supplying power to a circuit, work done by electrostatic forces on electrolyte ions inside the battery is positive.

(1) A (2) B (3) C (4) D

Q.51 **Assertion:**Conductivity of a metallic conductor decreases with increase in temperature.
Reason: On increasing temperature the number of free electrons in the metallic conductor decreases.

(1) A (2) B (3) C (4) D

Q.52 **Assertion :** In series combination of electrical bulbs of lower power emits more light than that of higher power bulb.
Reason : The lower power bulb in series gets more current than the higher power bulb.

(1) A (2) B (3) C (4) D

Q.53 **Assertion :** The current density $\vec{j}$ at any point in ohmic resistor is in direction of electric field $\vec{E}$ at that point.
Reason : A point charge when released from rest in a region having only electrostatic field always moves along electric lines of force.

(1) A (2) B (3) C (4) D

Q.54 **Asseration :** The connecting wires are made of copper.

Reason : The electrical conductivity of copper is copper is high

(1) A (2) B (3) C (4) D

Q.55 **Assertion :** A voltmeter must be connected in parallel in a circuit and it should have a high resistance.
Reason : The voltmeter in the circuit must not affect the P.D. it is to measure.

(1) A (2) B (3) C (4) D

Q.56 **Assertion :** When identical cells are connected in parallel to the external load, the effective e.m.f. increases.
Reason : All the cells will be sending unequal current to the external load in the same direction.

(1) A (2) B (3) C (4) D

Q.57 **Assertion :** The potentiometer wire is made of manganin.
Reason : For manganin, the temperature coefficient of resistance is almost zero and its resistivity very less.

(1) A (2) B (3) C (4) D

ANSWER KEY

Q.1	4	Q.2	3	Q.3	1	Q.4	2	Q.5	3
Q.6	4	Q.7	3	Q.8	4	Q.9	1	Q.10	2
Q.11	3	Q.12	3	Q.13	4	Q.14	1	Q.15	4
Q.16	3	Q.17	2	Q.18	2	Q.19	4	Q.20	3
Q.21	1	Q.22	2	Q.23	1	Q.24	1	Q.25	1
Q.26	4	Q.27	4	Q.28	3	Q.29	3	Q.30	3
Q.31	3	Q.32	1	Q.33	3	Q.34	1	Q.35	1
Q.36	4	Q.37	2	Q.38	3	Q.39	4	Q.40	1
Q.41	1	Q.42	1	Q.43	1	Q.44	3	Q.45	3
Q.46	4	Q.47	2	Q.48	3	Q.49	3	Q.50	3
Q.51	3	Q.52	3	Q.53	3	Q.54	1	Q.55	1
Q.56	4	Q.57	1						