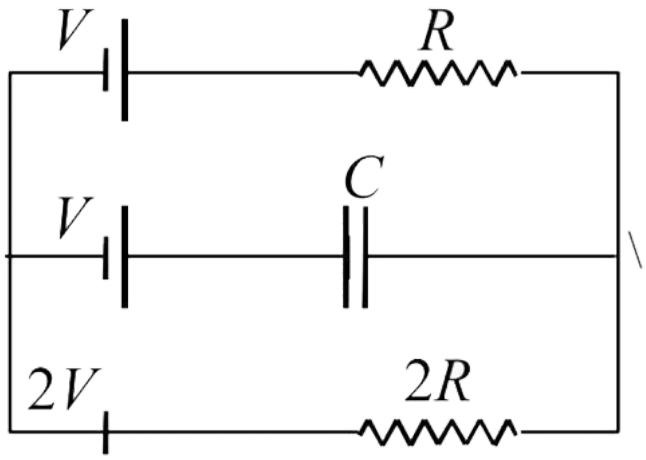
PHYSICS

BOOKS - CAREER POINT

UNIT TEST 7

Physics

1. In the given circuit, with steady current, the potential drop across the capacitor must be



A. V

B. V/2

C. V/3

D. 2V/3

Answer: C

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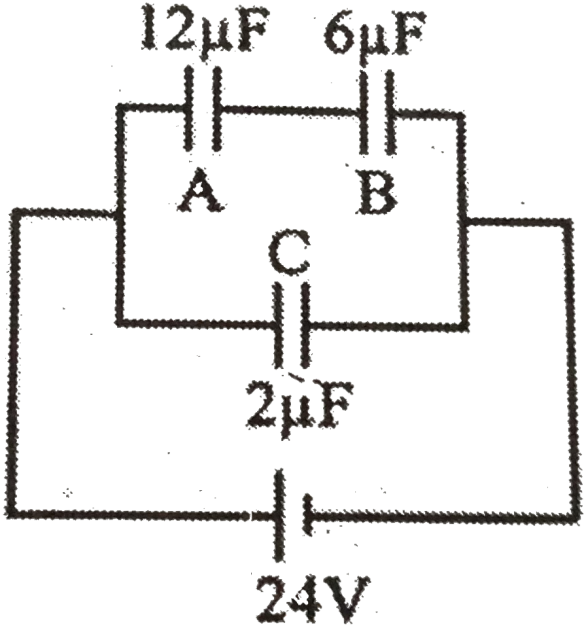
2. For the circuit shown in figure the charges on three capacitors, A, B and C are respectively



A. $96\mu C, 96\mu C,$ and $48\mu C$

B. $32\mu C, 64\mu C,$ and $48\mu C$

C. $64\mu C, 32\mu C,$ and $48\mu C$

D. $32\mu C, 32\mu C,$ and $48\mu C$

Answer: A

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3. A capacitor of $2\mu F$ is charged to a potential of 4V using a battery, and then the battery is disconnected and the changed capacior is connected to an uncjharged caspacitor of $4\mu F$ capacitance. When the equilibrium is

established the total energy stored in the capacitors is

A. $16\mu J$

B. $\frac{16}{3}\mu J$

C. $\frac{32}{3}\mu J$

D. $\frac{32}{9}\mu J$

Answer: B

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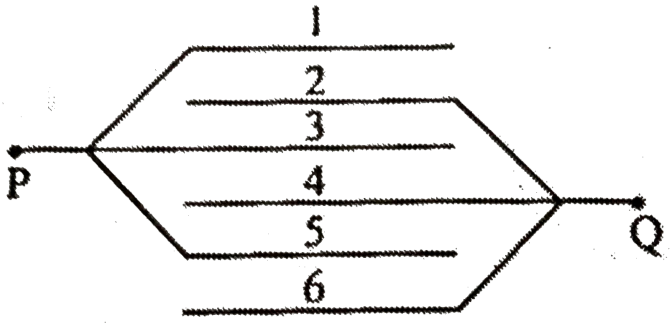
4. Six metallic plated each with a surface area of one side A. are placed at a distanced d from each other. The alternate plates are connected to points P and Q as shown in figure :



The capacitance of the system is :

A. $\varepsilon_o A / d$

B. $5\varepsilon_o A / d$

C. $6\varepsilon_o A / d$

D. $\varepsilon_o A / 5d$

Answer: B

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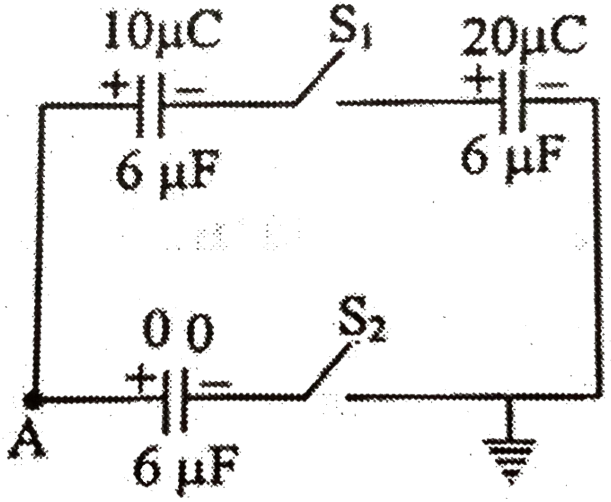
5. In the given circuit when $S_1 \& S_2$ are clossed,

The potential of point A will be



A. $\frac{5}{3}V$

B. $-\frac{5}{3}V$

C. $\frac{10}{3}V$

D. $-\frac{10}{3}V$

Answer: A

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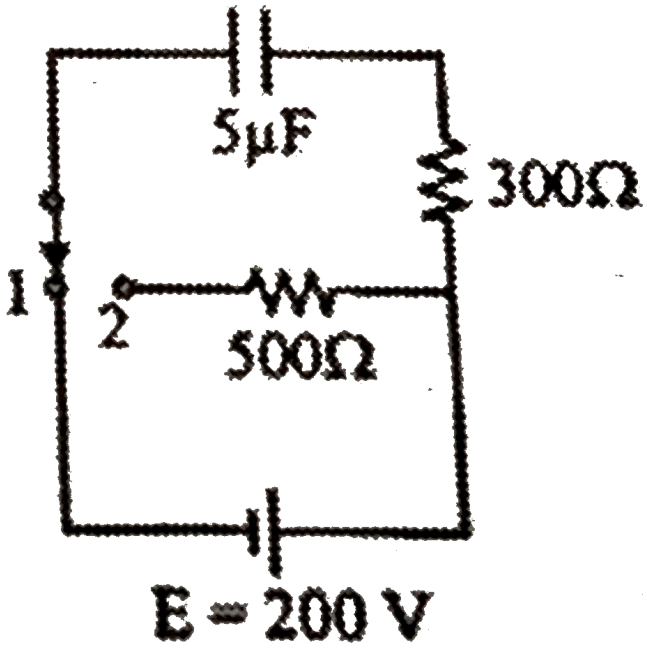
6. The amount of heat generated in 500 Ω resisttance, when the kye is thrown over from contanct 1 to 2, as shown in figure, is



A. $6.25 \times 10^{-2} J$

B. $6.25 \times 10^{-3} J$

C. $3.75 \times 10^{-3} J$

D. $3.75 \times 10^{-2} J$

Answer: A

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7. The capacity of an isolated sphere is increased n times when it is enclosed by an earthed concentric sphere. The ratio of their radii is

A. $\frac{n^2}{n-1}$

B. $\frac{n}{n-1}$

C. $\frac{2n}{n+1}$

D. $\frac{2n+1}{n+1}$

Answer: B

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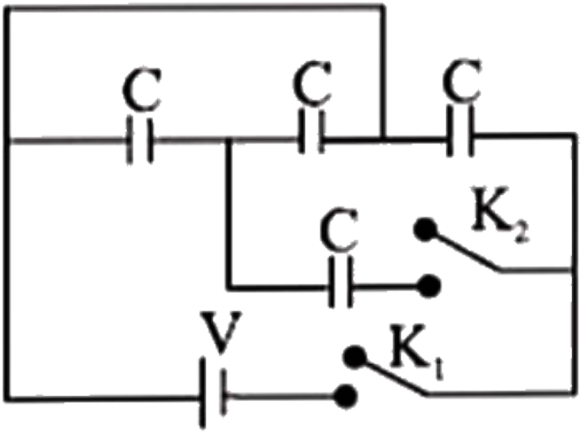
8. Initially K_1 is closed, now if K_2 is also closed, find heat dissipated in the resistances

of connecting wires



A. $\frac{1}{2}CV^2$

B. $\frac{2}{3}CV^2$

C. $\frac{1}{3}CV^2$

D. $\frac{1}{4}CV^2$

Answer: C

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9. The capacitance of a parallel plate condenser is C_0 If a dielectric of relative permittivity ε_r and thickness equal to one fourth the plate separation is placed between the plates, then its capacity becomes C. The value of $\frac{C}{C_0}$ will be -

A. $\frac{5\varepsilon_r}{4\varepsilon_r + 1}$

B. $\frac{4\varepsilon_r}{3\varepsilon_r + 1}$

C. $\frac{3\varepsilon_r}{2\varepsilon_r + 1}$

D. $\frac{2\varepsilon_r}{2\varepsilon_r + 1}$

Answer: B

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10. A fully charged capacitor has a capacitance 'C'. It is discharged through a small coil of resistance wire embedded in a thermally insulated block of specific heat capacity 's' and mass 'm'. If the temperature of the block is

raised by 'DeltaT', the potential difference 'V' across the capacitance is

A. $\sqrt{\frac{2mC\Delta T}{s}}$

B. $\frac{mC\Delta T}{s}$

C. $\frac{ms\Delta T}{C}$

D. $\sqrt{\frac{2ms\Delta T}{C}}$

Answer: D

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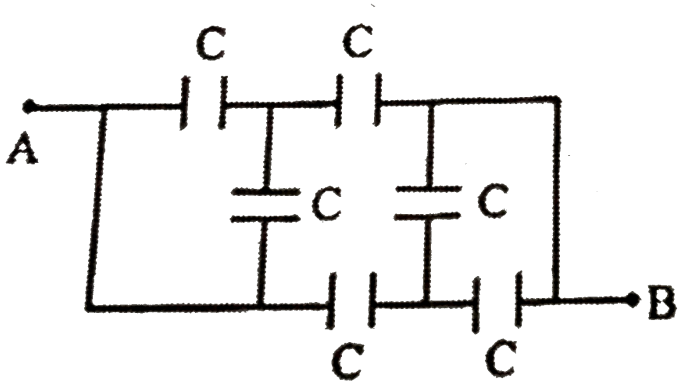
11. Find equivalent capacitance between A & B



A. $\frac{C}{4}$

B. $\frac{3G}{4}$

C. $\frac{3G}{2}$

D. $\frac{4G}{3}$

Answer: D

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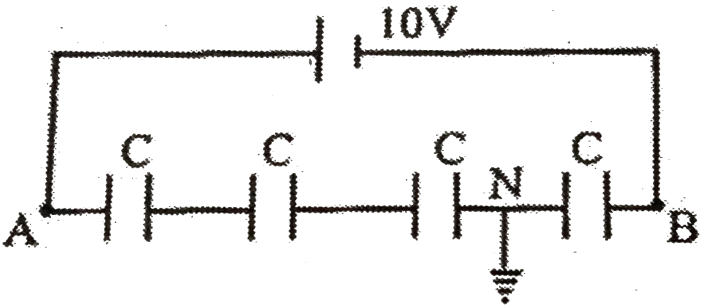
12. The potential at point A in the circuit is - (N point is grounded. Grounding menas that potential of that point is zero.)



A. 10 V

B. 7.5 V

C. 5 V

D. 2.5 V

Answer: B

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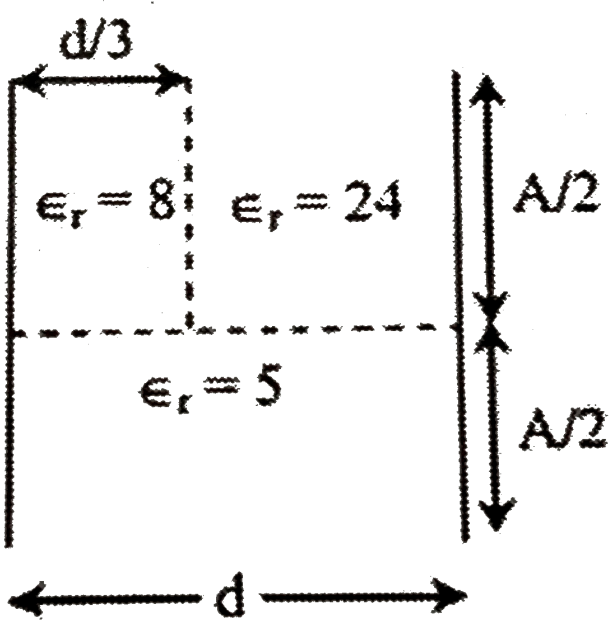
13. Equivalent dielectric constant of given arrangement is



A. 7.2

B. 9.7

C. 2.5

D. None of these

Answer: B

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14. A parallel plate capacitor having capacitance C Farad is connected with a bettery of emf V volts. Keeping the capacitor connected with the bettery, a dieletric slab of dielectric consutant K is inserted between the plates. The dimensions of the slab are such that it fills the space between the capacitor plates, consider the following sttements

(i) Potential difference between the capacitor plated remains the same

(ii) The capacitance increases by a factor K

(iii) The energy stored increases by a factor K

Then the correct statements are

A. (i),(ii)

B. (ii),(iii)

C. (i),(ii),(iii)

D. None of these

Answer: C

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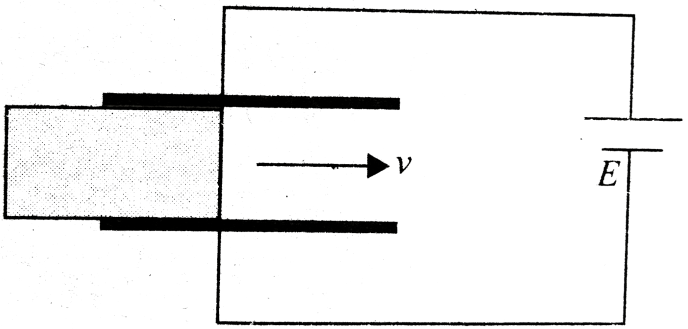
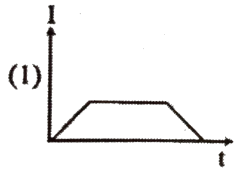
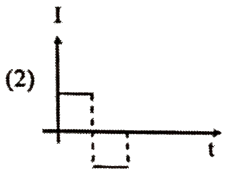
15. A dielectric slab of area A and thickness d is inderted between then plates of a capaitor of area $2A$ with constant speed v as shown in. Dustance between the plates is (d).

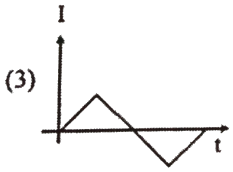


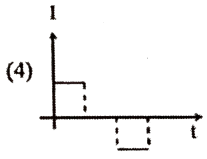
The capacitor is connected to a battery of emf E. The current in the ciruit varies with time as.

A.



B. 

C. 

D. 

Answer: D

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16. n identical cells, each of emf ε and internal resistance r, are joined in series to from a

closed circuit. One cell a is joined with reversed polarity. The potential difference across each cell, except A, is

A. $\frac{2\varepsilon}{n}$

B. $\frac{n-1}{n}\varepsilon$

C. $\frac{n-2}{n}\varepsilon$

D. $\frac{2n}{n-2}\varepsilon$

Answer: A

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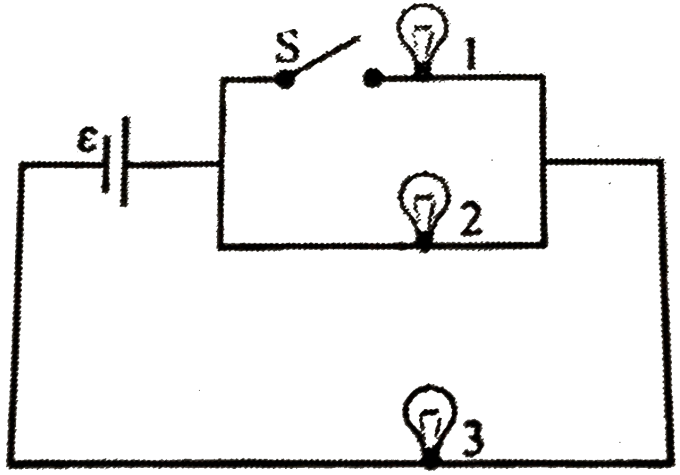
17. The three light bulbs in the circuit below are identical, and the battery has zero internal resistance, When switch S is closed to cause buil 1 to light, which of the ther two bulbs increase (s) in brightness ?



A. Neither bulb

B. Bulb 2 only

C. Bulb 3 only

D. Both bulbs

Answer: C

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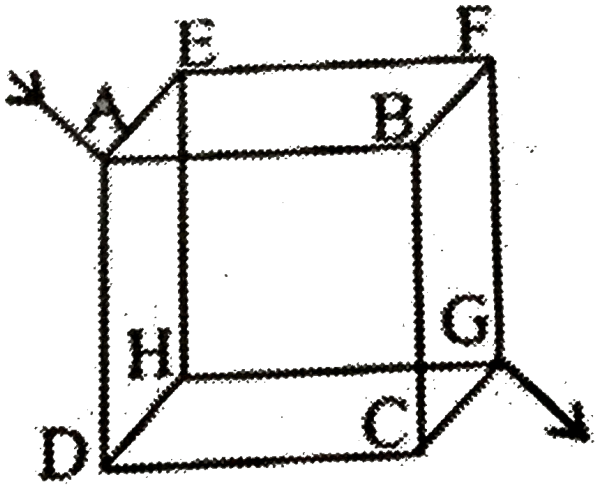
18. Twelve wires each of resistance 6Ω are connected to from a cube as shown in the adjoining figure. The current enters at a cornet A and leaves at erhe diagonally opposite corner G. The equivalent resistance

across the corners A and G is



A. 12Ω

B. 6Ω

C. 3Ω

D. 5Ω

Answer: D

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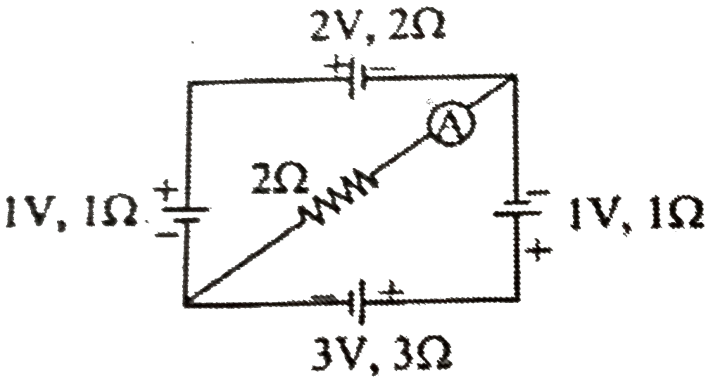
19. The reading of ammeter in the adjoining diagram will be



A. $\frac{2}{17}A$

B. $\frac{3}{11}A$

C. $\frac{1}{13}A$

D. $\frac{4}{15}A$

Answer: C

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20. If a given volume of water in a $220V$ heater is boiled in $5\ \text{min}$, then how much time will it take for the same volume of water in a $110V$ heater to be boiled?

A. 20 min

B. 30 min

C. 25 min

D. 40 min

Answer: A

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21. The temperature co-effcient of resistance of a wire is $0.00125^{\circ}C$. At 500 K, its resistance is 1Ω. The resistance of the wire will be 2Ω at

A. 1154 K

B. 1100 K

C. 1400 K

D. 1300K

Answer: D

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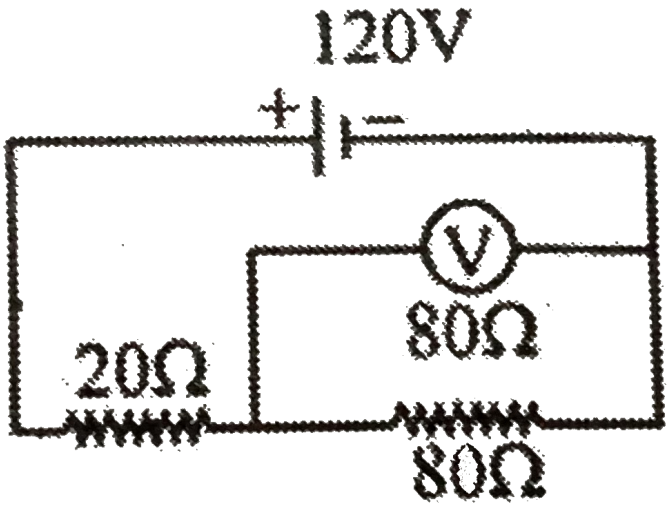
22. In figure, the e.m.f. of the cell is 120V and internal resistance is negligible. The resistance of the voltmeter is 80 ohm. The % error in

reading of voltmeter will be



A. $20\ \%$

B. $16.7\ \%$

C. $21.2\ \%$

D. $12.8\ \%$

Answer: B

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23. The charge flowing through a resistance R varies with time $tasQ = at - bt^2$. The total heat produced in R is

A. $\frac{a^3R}{6b}$

B. $\frac{a^2R}{27b}$

C. $\frac{a^3R}{3b}$

D. None of these

Answer: A

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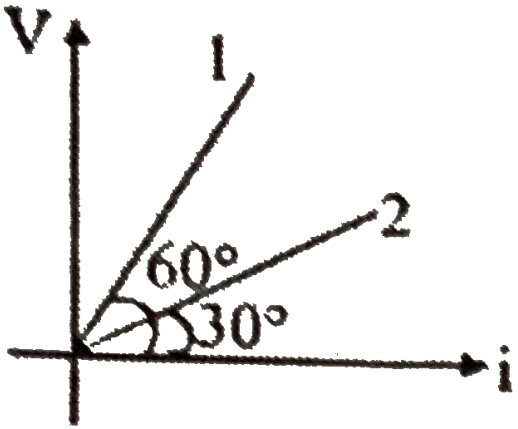
24. The V-I graph is given for two conductors of same area and length. If σ_1 and σ_2 are the cnductivities of the conductors 1 and 2 respectively, $\frac{\sigma_1}{\sigma_2} =$



A. $2:1$

B. $3:1$

C. $1:\sqrt{2}$

D. $1:3$

Answer: D

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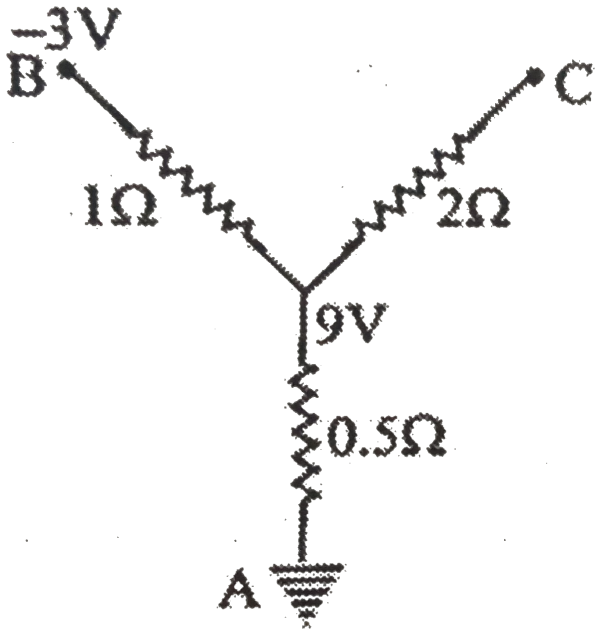
25. The potential of C is :



A. 51 V

B. 0

C. $+3V$

D. 69V

Answer: D

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26. If a copper wire is stretched so that its length increases by 20% then what is the percentage increase in its resistance (assuming its volume remaing constant) ?

A. 10%

B. $21\ \%$

C. $44\ \%$

D. $120\ \%$

Answer: C

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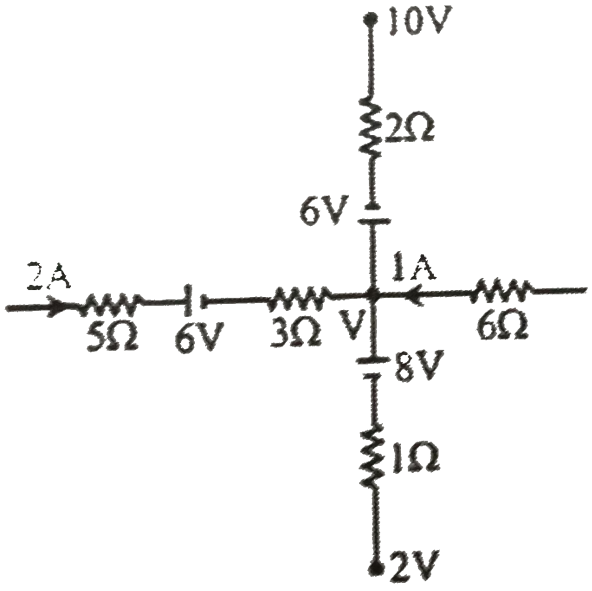
27. For the part of the circuit gives in figure, find the current following through 2Ω resistor:



A. $1A$

B. $3A$

C. $4A$

D. information insufficient

Answer: A

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28. Twelve cells each having the same e.m.f are connected in series and are kept to a closed box. Some of the cell are connected in reverse order .The battery is connected in series with an ammeter an external resistance R and two cells of the same type as an in the battery .The current when they and support each other is 3 ampere and current is 2 ampare when the two oppose each other. How many cells are connected in servese order ?

A. 4

B. 3

C. 2

D. 1

Answer: D

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29. The current density varies radical distance r as $J = ar^2$, in a cylindrical wire of radius R.

The current passing through the wire between radical distance $R/3$ and $R/2$ is,

A. $\frac{65\pi aR^4}{2592}$

B. $\frac{25\pi aR^4}{72}$

C. $\frac{65\pi a^2R^3}{2938}$

D. None of these

Answer: A

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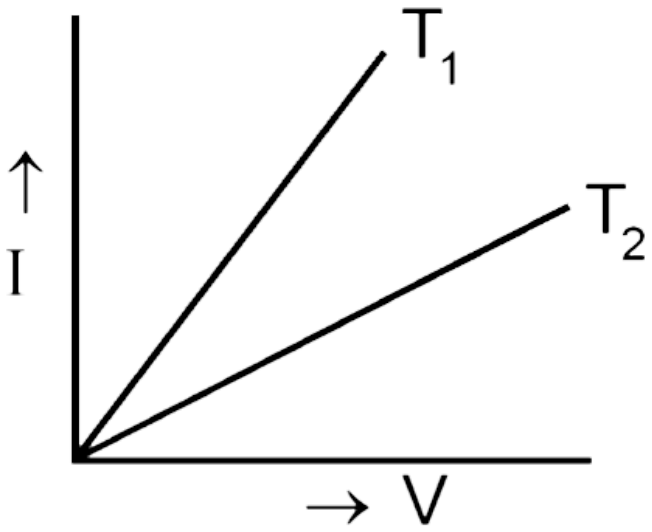
30. The current (I) and voltage (V) graphs for a given metallic wire at two different temperature (T_1) and (T_2) are shown in fig. It is concluded that



A. $T_1 = T_2$

B. $T_1 > T_2$

C. $T_1 < T_2$

D. None of these

Answer: C

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