Physicsaholics

DPP – 7 (Current Electricity)

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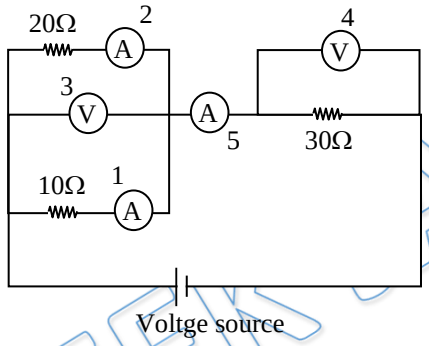
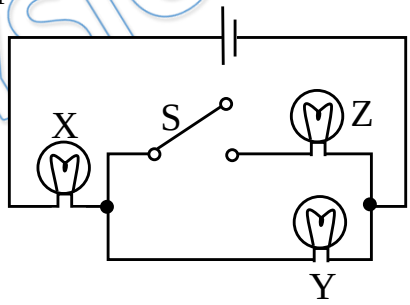
Q 1. If all meters are ideal and reading of voltmeter 3 is 6V. Power supplied by voltage source is -



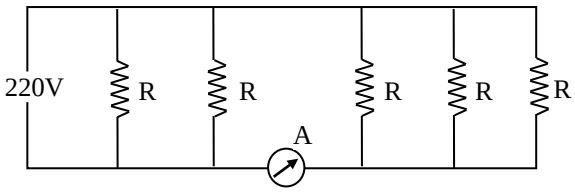
(A) 10 Watt (B) 38 Watt
(C) 20 Watt (D) 30 Watt

Q 2. If X, Y, and Z in figure are identical lamps, which of the following changes to the brightnesses of the lamps occur when switch S is closed?



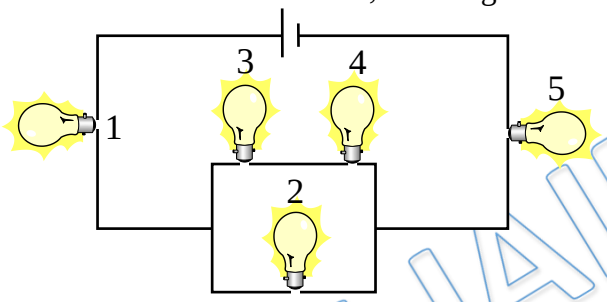
(A) X stays the same, Y decreases (C) X increases, Y stays the same
(B) X increases, Y decreases (D) X decreases, Y increases

Q 3. Five identical lamps each resistance R = 1100ohm are connected to 220V as shown in fig. The reading of ideal ammeter (A) is -



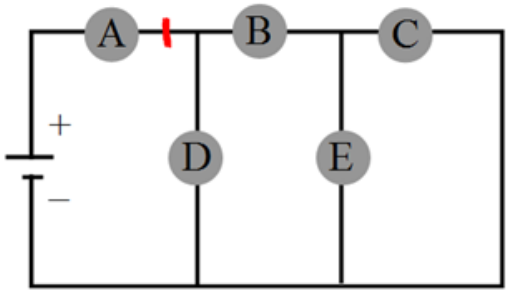
(A) 1/5 Amp. (B) 2/5 Amp.
(C) 3 /5 Amp (D) 1 Amp.

Q 4. All bulbs in figure below are identical which, bulbs light most brightly-



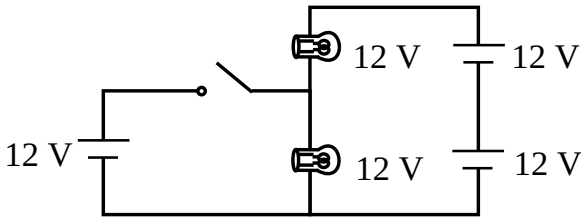
(A) 1 only (B) 2 only
(C) 3 and 4 only (D) 1 and 5

Q 5. In the circuit diagram shown in figure, a fuse bulb can cause all other bulbs to go out. Identify the bulb –



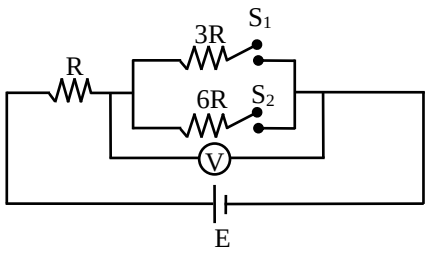
(A) B (B) C
(C) A (D) D or E

Q 6. The light bulbs A & B in the following circuits are identical. When the switch is closed -



(A) Intensity of bulb A increase (C) Intensity of bulb B increase
(B) Intensity of bulb A decrease (D) Nothing changes

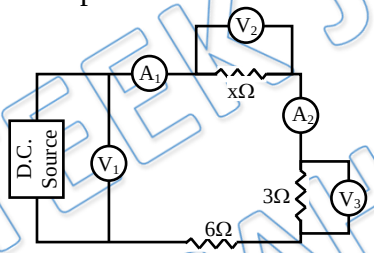
Q 7. In the circuit shown in the figure, reading of voltmeter is V_1 when only S_1 is closed, reading of voltmeter is V_2 when only S_2 is closed and reading of voltmeter is V_3 when both S_1 and S_2 are closed. Then –



(A) $V_3 > V_2 > V_1$ (B) $V_2 > V_1 > V_3$

(C) $V_3 > V_1 > V_2$ (D) $V_1 > V_2 > V_3$

Q 8. In the electric circuit shown in figure, the reading of voltmeter V1 is 26 volt, and the reading of ammeter A1 is 2 ampere. The value of resistance x is –



(A) 2 ohm (B) 4 ohm
(C) 6 ohm (D) 8 ohm

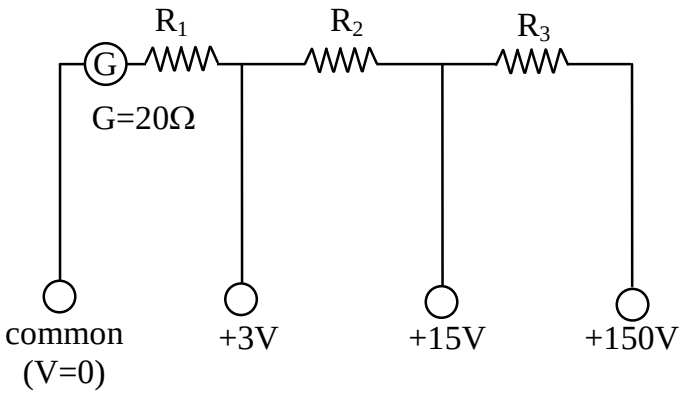
Q 9. A galvanometer of resistance 100 ohm gives a full scale deflection for a current of 10mA. To convert in into an ammeter of one ampere range, required shunt resistance would be:

(A) 10^{-2} ohm (B) 1 ohm
(C) 10^{-1} ohm (D) 10^{-3} ohm

Q 10. The deflection in the galvanometer is reduced from 50 to 20 divisions when it is shunted by a resistance of 12 ohm. The resistance of galvanometer will be -

(A) 18 ohm (B) 24 ohm
(C) 30 ohm (D) 36 ohm

Q 11. Internal electric connections of a multi range voltmeter are shown in the figure. The terminals are marked 3 volt, 5 volt, 150 volt, resistance of the galvanometer is 20 ohm and the value of current is 1 mA for the full scale deflection of the galvanometer. The resistance of R_1 in Kohm



(A) 12 (B) 15
(C) 3 (D) 2.98

Q 12. The resistance of 100 ohm and 200 ohm are connected in series with the 220 V mains. When a voltmeter of 1000 ohm resistance is connected in parallel to 100 ohm, then the reading of voltmeter is –

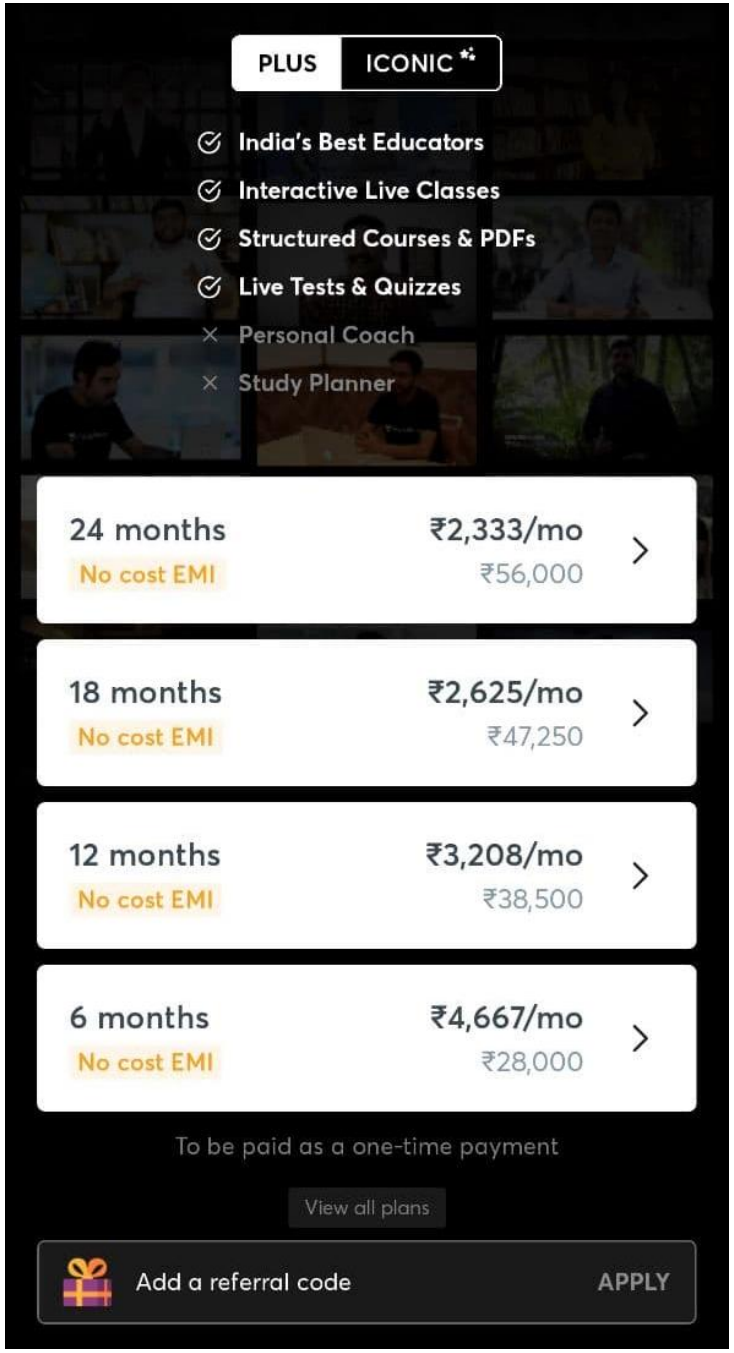
(A) 68.75 volt (B) 6.87 volt
(C) 587.5 volt (D) 58.75 volt

Q 13. The resistance of a moving coil galvanometer is 20 ohm. It requires 0.01 ampere current for full scale deflection. The value of resistance to convert in into a voltmeter of range 20 volt will be -

(A) 198 ohm (B) 1980 ohm
(C) 20 ohm (D) 0 ohm

Answer Key

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



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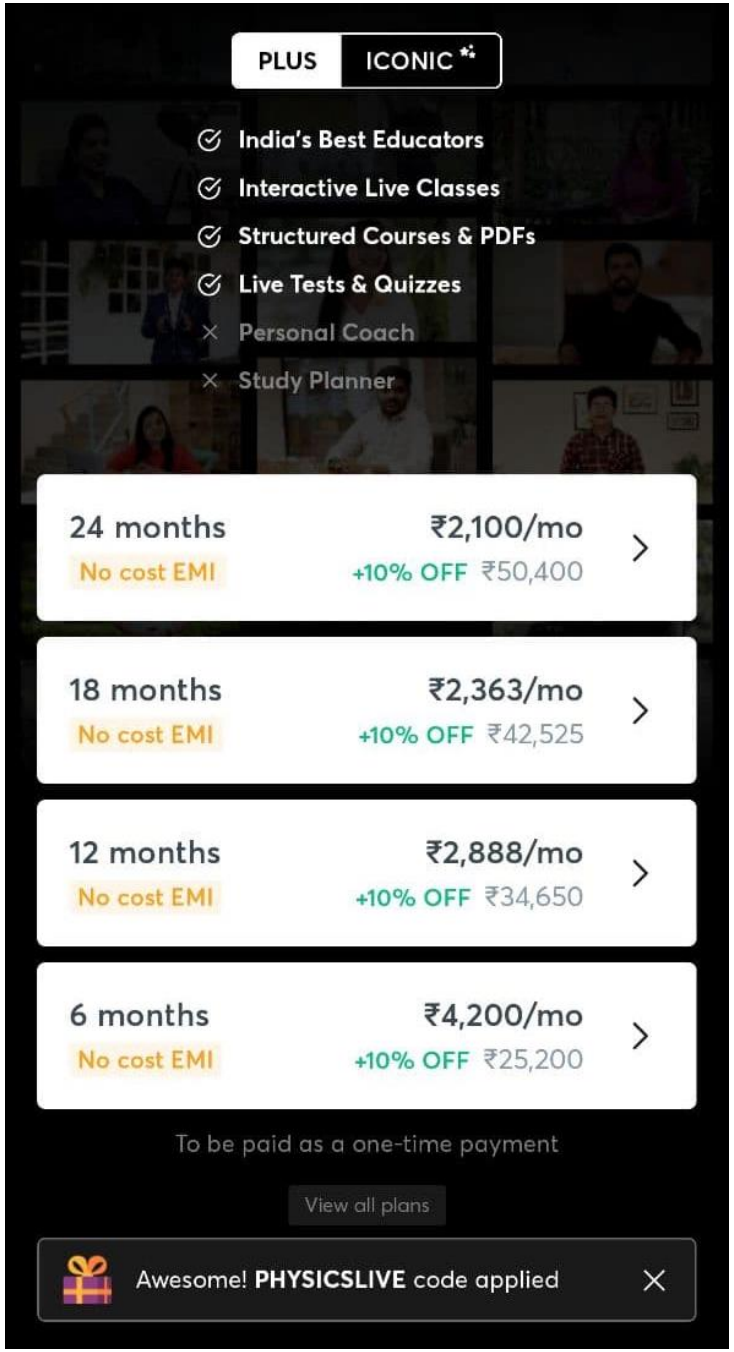


Written Solution

DPP-7 Current Electricity: Bulb Problems, Galvanometer, Voltmeter , Ammeter

By Physicsaholics Team

Solution: 1

$$\text{Current through 20ohm} = \frac{6}{20}$$

$$\text{current through 10ohm} = \frac{6}{10}$$

Total current supplied by voltage source

$$= \frac{6}{10} + \frac{6}{20}$$

$$= 27 \text{ Volt}$$

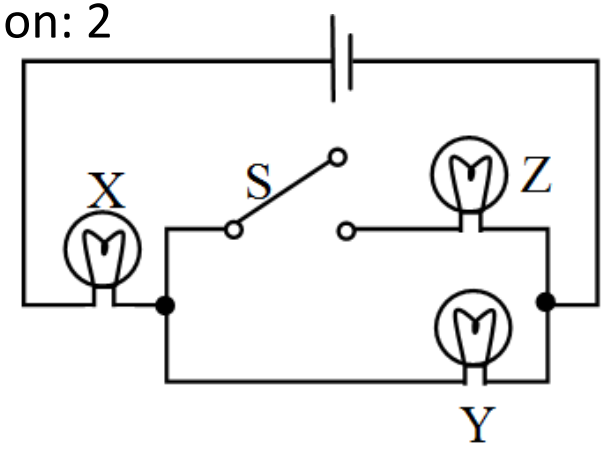
$$\text{Voltage of battery} = 6 + 27 = 33 \text{ volt}$$

$$\text{Power supplied} = \frac{9}{10} \times 33$$

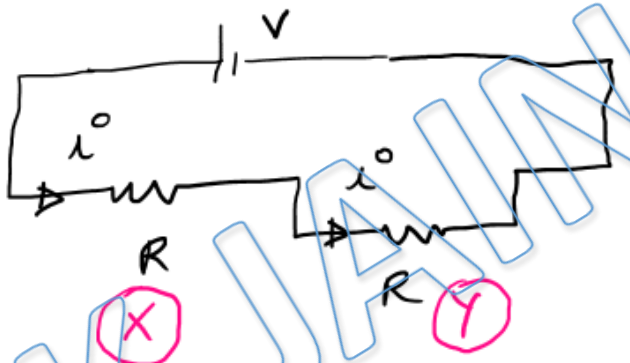
$$= 29.7 \text{ or } 30 \text{ Watt}$$

Ans. d

Solution: 2

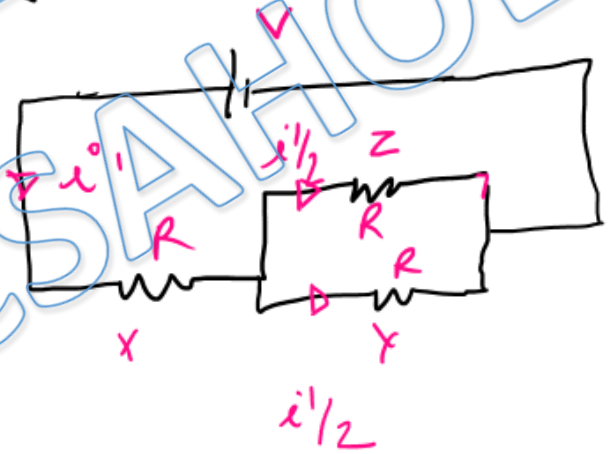


Before closing the switch :-



$i^\circ = \frac{V}{2R}$

After closing the switch



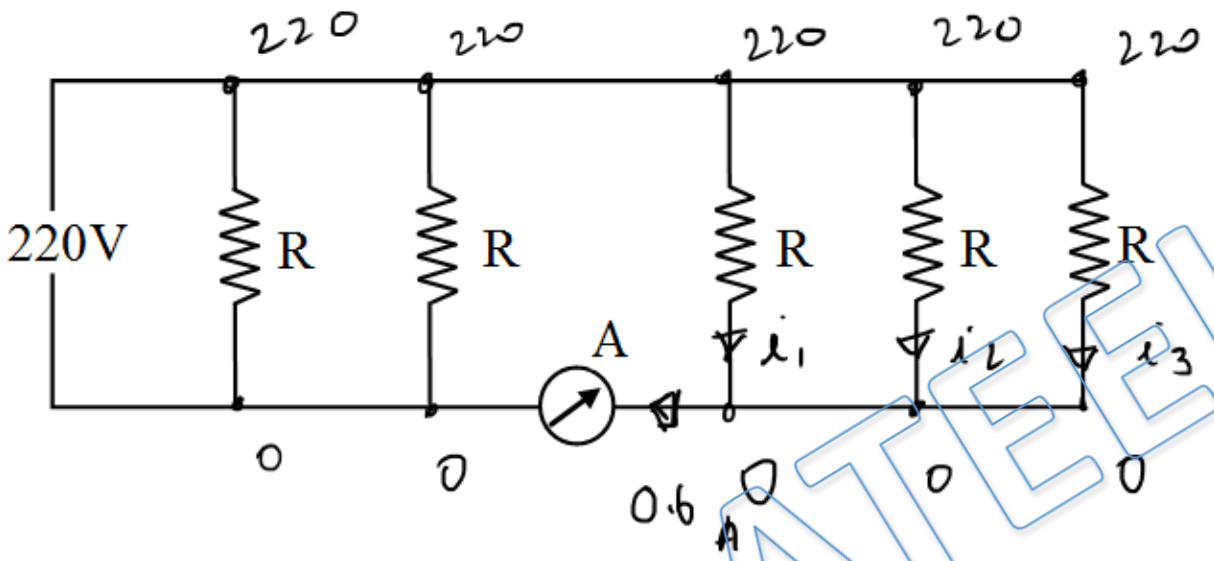
$i^\circ 1 = \frac{V}{3R/2}$

$i^\circ 1 = \frac{2V}{3R}$

as the current on x is inc. and on y dec. so the answer is b

Ans. b

Solution: 3



$R = 1100\ \Omega$

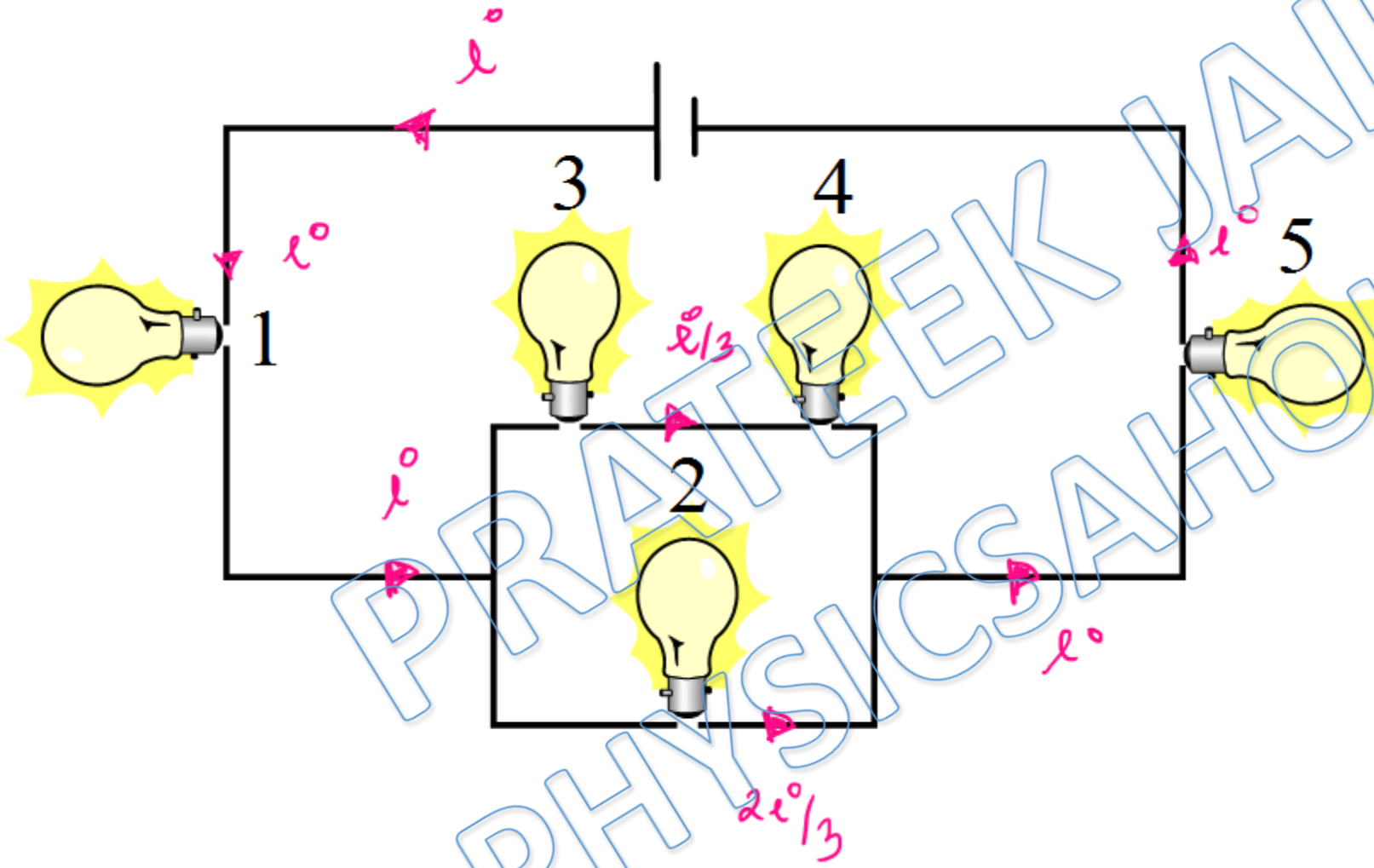
$i_1 + i_2 + i_3 = \frac{220}{1100} + \frac{220}{1100} + \frac{220}{1100}$

$= 0.6\ A$

$= 3/5\ A$

Ans. c

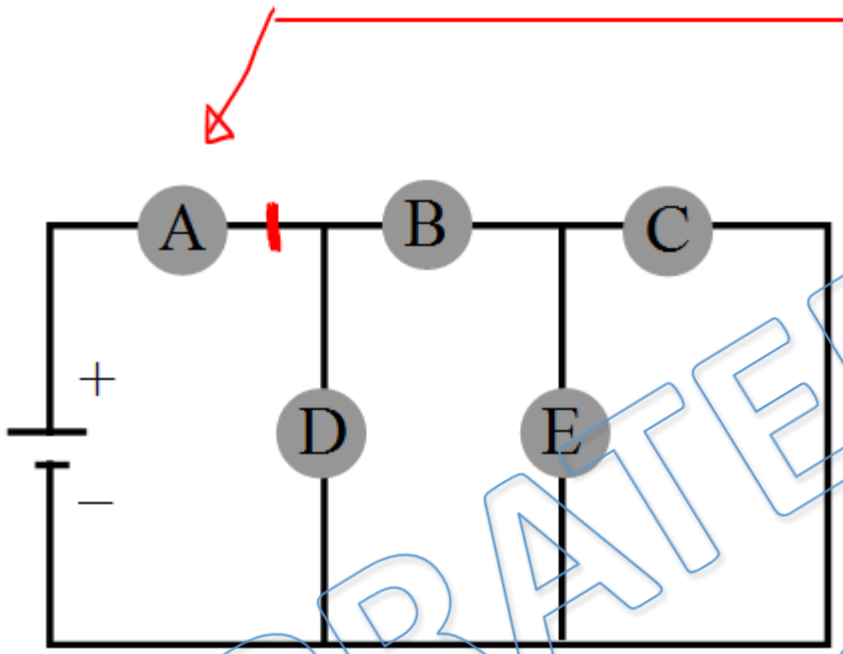
Solution: 4



"So Bulb 1 & 5 will glow more as they are having max current."

Ans. d

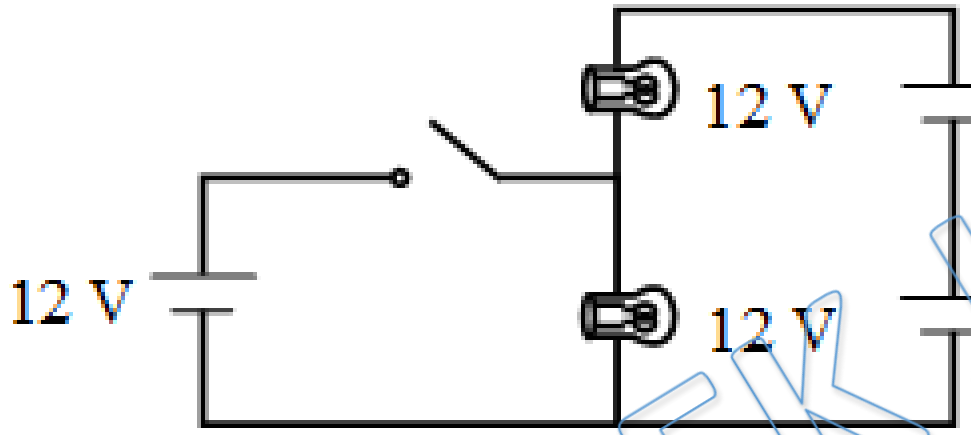
Solution: 5



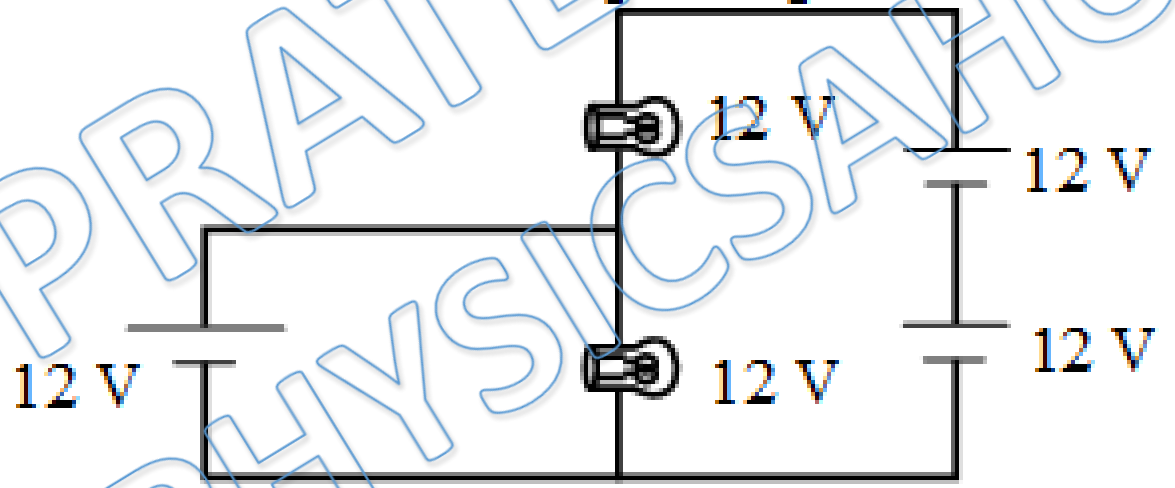
if we fuse a the source will diisconnect from ckt and non of the bulb will lit.

Ans. c

Solution: 6

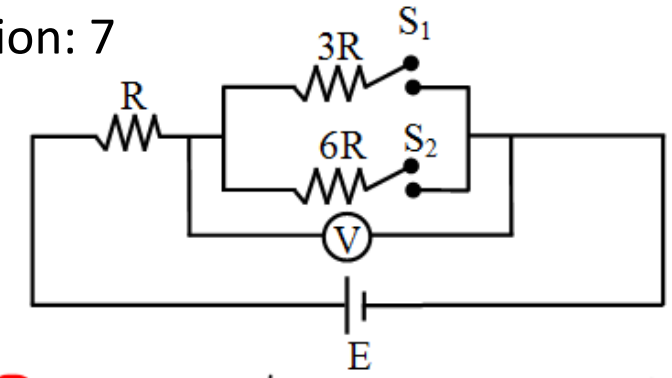


After closing of switch voltage across A & B remain same ∴ Nothing change

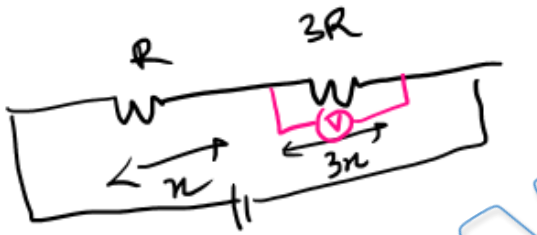


Ans. d

Solution: 7



① When only S1 is closed.



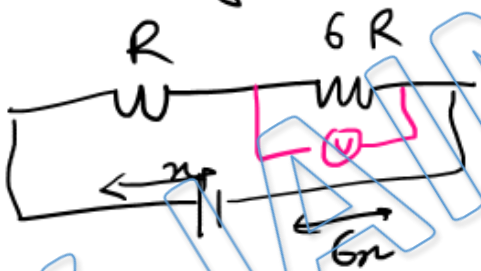
E

$4x = E$

$x = E/4$

$V_1 = 3E/4$

② When only S_2 is closed.



E

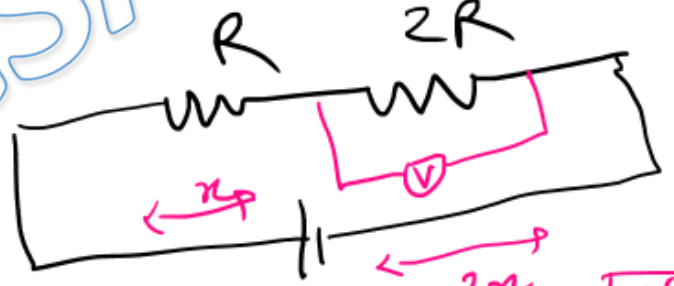
$x + 6x = E$

$7x = E$

$x = E/7$

$V_2 = 6E/7$ *

③ When both are closed.



E

$3x = E$

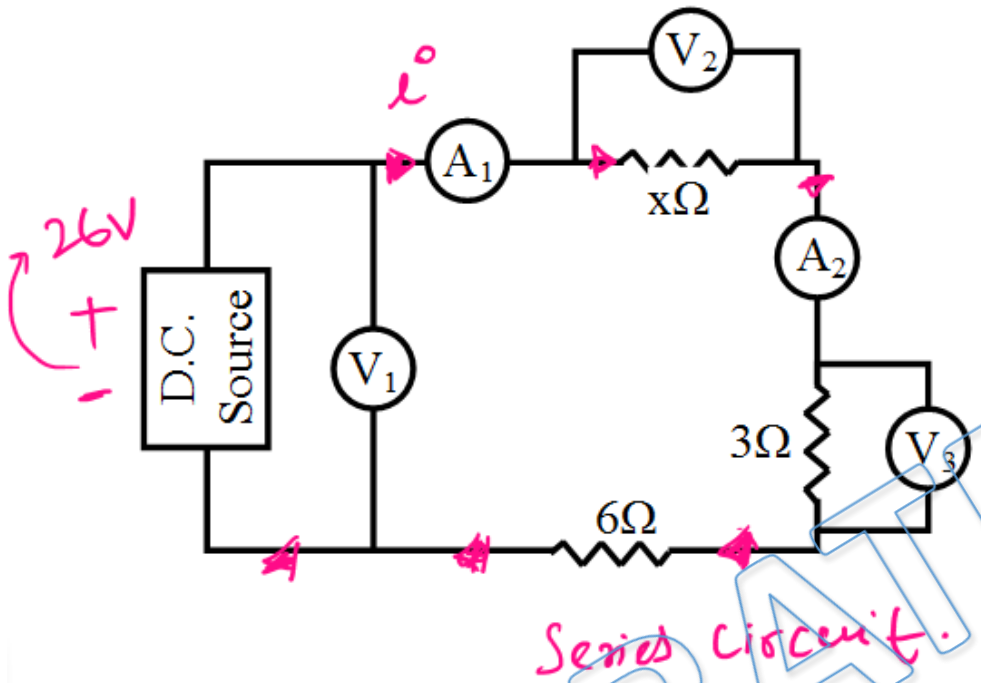
$x = E/3$

$V_3 = 2E/3$

$V_2 > V_1 > V_3$

Ans. b

Solution: 8



As V_1 is Parallel to source it must have an EMF of 26 V & as A_1 is main current on the circuit.

$$i = \frac{V}{R_{eq}}$$

$$2 = \frac{26}{6+3+x}$$

$$9 + x = 13$$

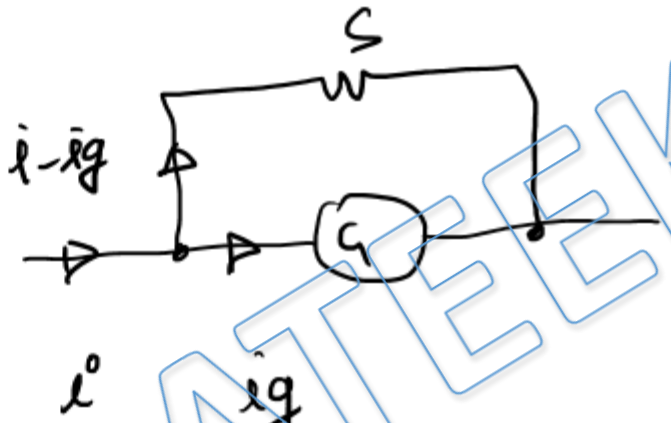
$$\boxed{x = 4\,\Omega}$$

Ans. b

Solution: 9

Soln ⇒

$i_g = 10 \times 10^{-3} A$, $G = 100\,\Omega$



$(i - i_g)S = i_g G$

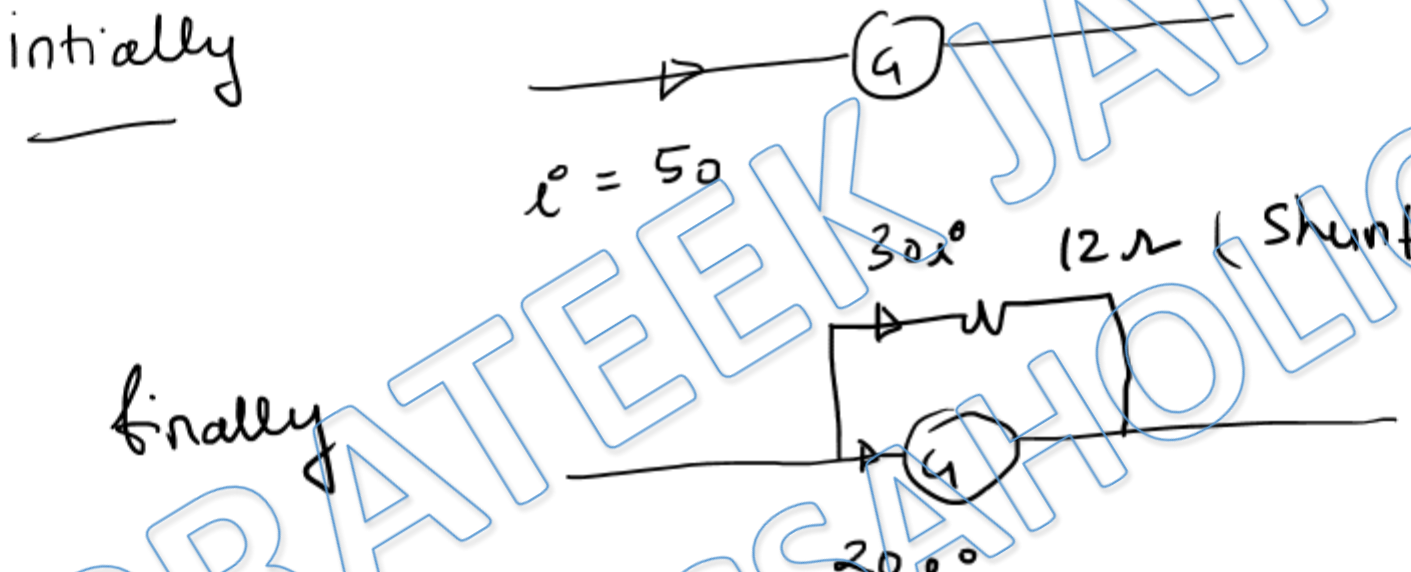
$S = \frac{i_g G}{i - i_g} = \frac{10 \times 10^{-3} \times 100}{1}$

$i - i_g \neq 0$

$\boxed{S = 1\,\Omega}$

Ans. b

Solution: 10

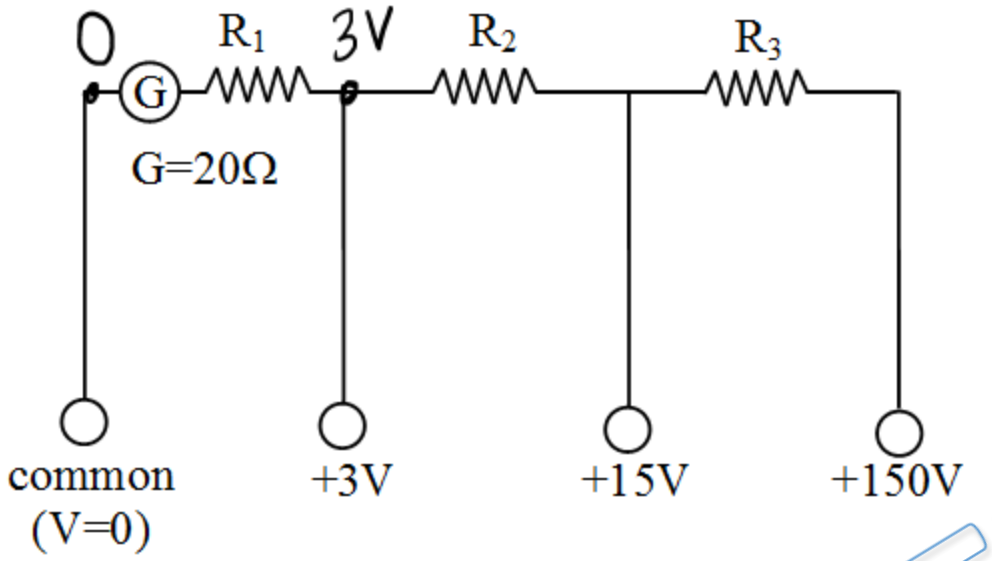


In Parallel Combination $i^0 \propto 1/R$

$$\frac{30i}{20_1^0} = \frac{G}{12} \Rightarrow \boxed{G = 18\,\Omega}$$

Ans. a

Solution: 11



$i = \frac{3}{20 + R_1}$

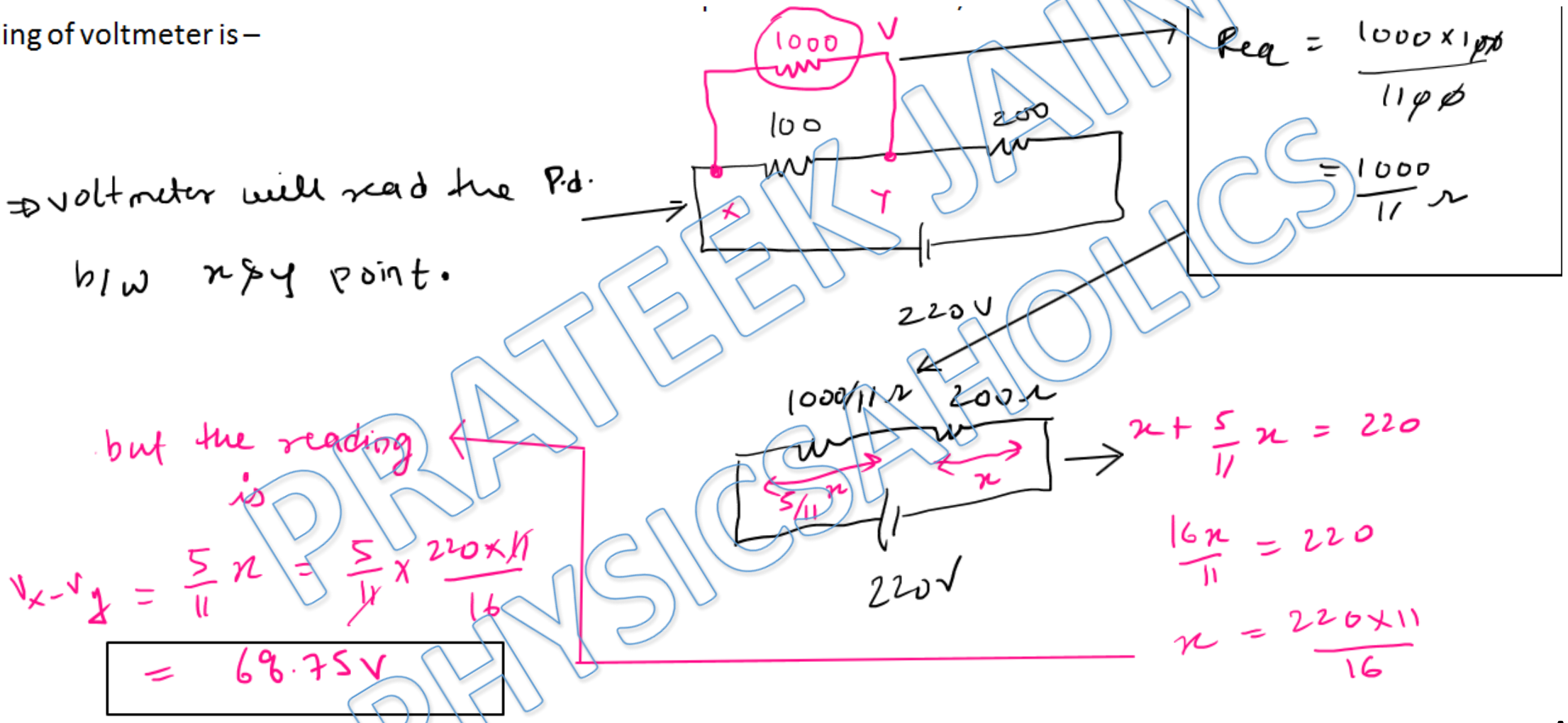
$(1 \times 10^{-3})(20 + R_1) = 3$

$R_1 = 3000 - 20 = 2980\ \Omega$

$2.98\ k\Omega$ Ans. d

Solution: 12

reading of voltmeter is –



⇒ voltmeter will read the P.d. b/w x & y point.

but the reading is

$V_x - V_y = \frac{5}{11}x = \frac{5}{11} \times \frac{220 \times 11}{16}$

$= 68.75\ V$

$x + \frac{5}{11}x = 220$

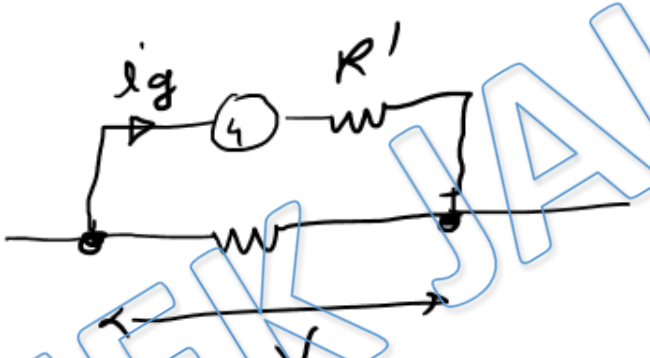
$\frac{16x}{11} = 220$

$x = \frac{220 \times 11}{16}$

Ans. a

Solution: 13

$i_g = 0.01\,A$



$$V = i_g \cdot (G + R')$$

$$20 = 0.01\,(20 + R')$$

$$2000 - 20 = R'$$

$$\boxed{R' = 1980\ \Omega} \quad *$$

Ans. b

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