Nishant Jindal

metry
the direction
flow.

axis Symmetry
flow and Ckt
age.
are Symmetrically
at same potential

re at same
can overlap.

Perpendicular axis Symmetry

↳ It is perpendicular to the direction of current flow

↳ In perpendicular axis Symmetry Current is not the mirror image.

↳ Points which lie on the perpendicular axis symmetry are at Same potential.

↳ In perpendicular axis symmetry, Symmetrically located resistances have Same Current but in opposite

Path Symm

↳ Resistances are Symmet located battery Same Cu

Equivalent resistance by symmetry

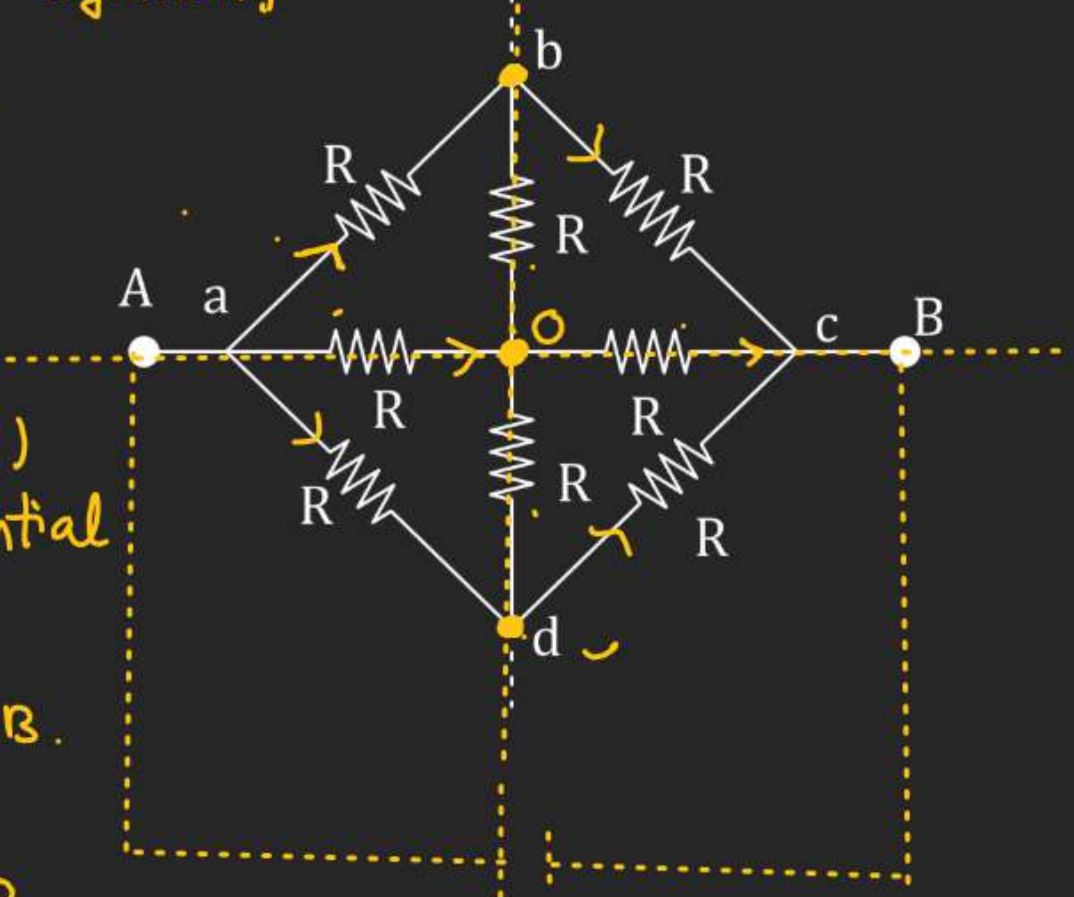
CURRENT ELECTRICITY

\#. $(R_{eq})_{A-B}$

M-1 :- Balance wheat stone bridge.

M-2 :- By Symmetry

Perpendicular axis of Symmetry



Parallel axis of Symmetry.

⇓

Points (b) and (d) are at same potential

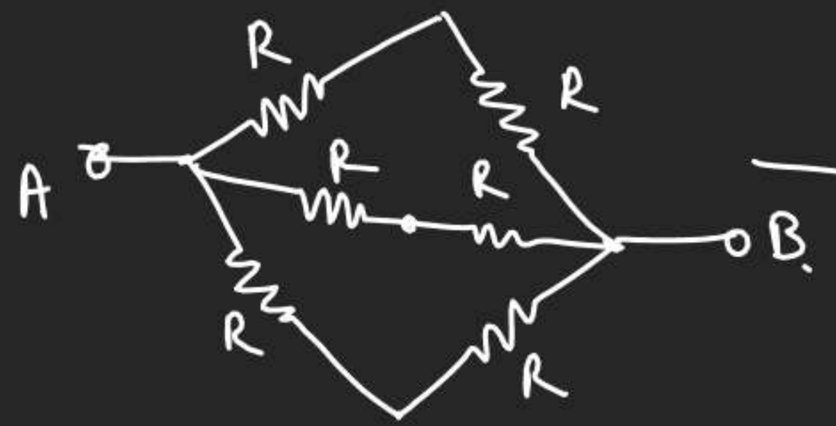
$V_b = V_d$.

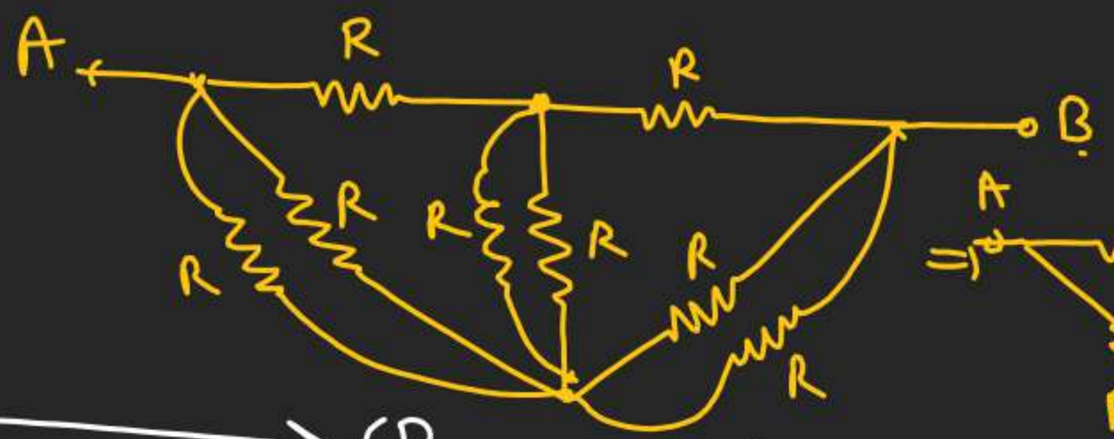
Folding of ckt about AB.

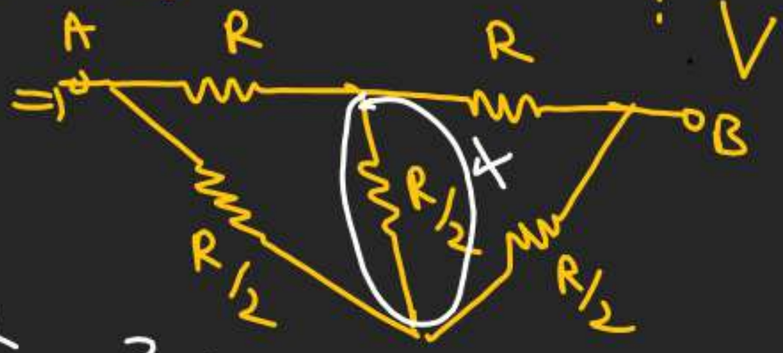
By perpendicular axis. of Symmetry :

Points b, o & d are at same potential

$V_b = V_o = V_d$







$(R_{eq})_{A-B} = \frac{(2R)R}{2R+R} = \frac{2}{3}R$

V

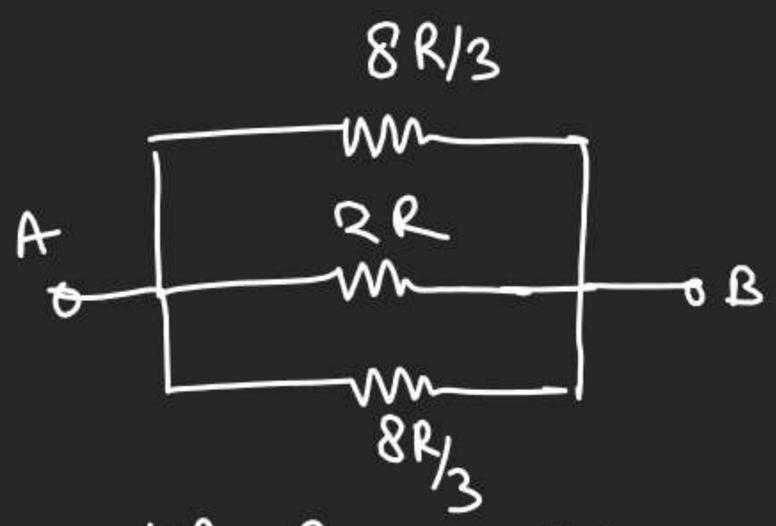
Equivalent resistance by symmetry

CURRENT ELECTRICITY

$(R_{eq})_{A-B} = ??$

By parallel axis of Symmetry

$(V_1 = V_{1'})$, $(V_2 = V_{2'})$



$$R_{eq} = \frac{\frac{4R}{3} \times 2R}{\frac{4R}{3} + 2R} = \frac{8R/3}{10R/3}$$

$$R_{eq} = \frac{8R}{10} = \frac{4R}{5} \text{ Ans}$$

By Perpendicular axis of Symmetry.

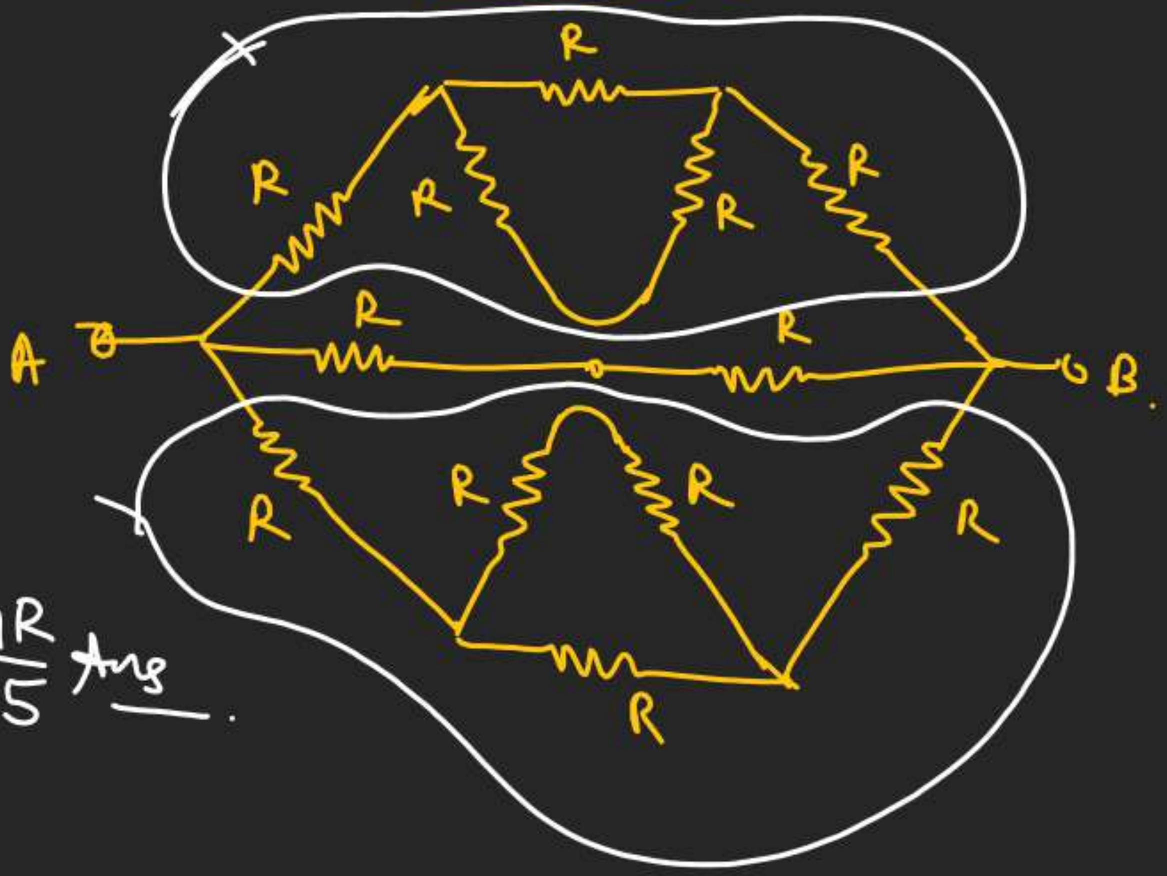
$\Downarrow$

$i_{10} = i_{02}$

$\Downarrow$

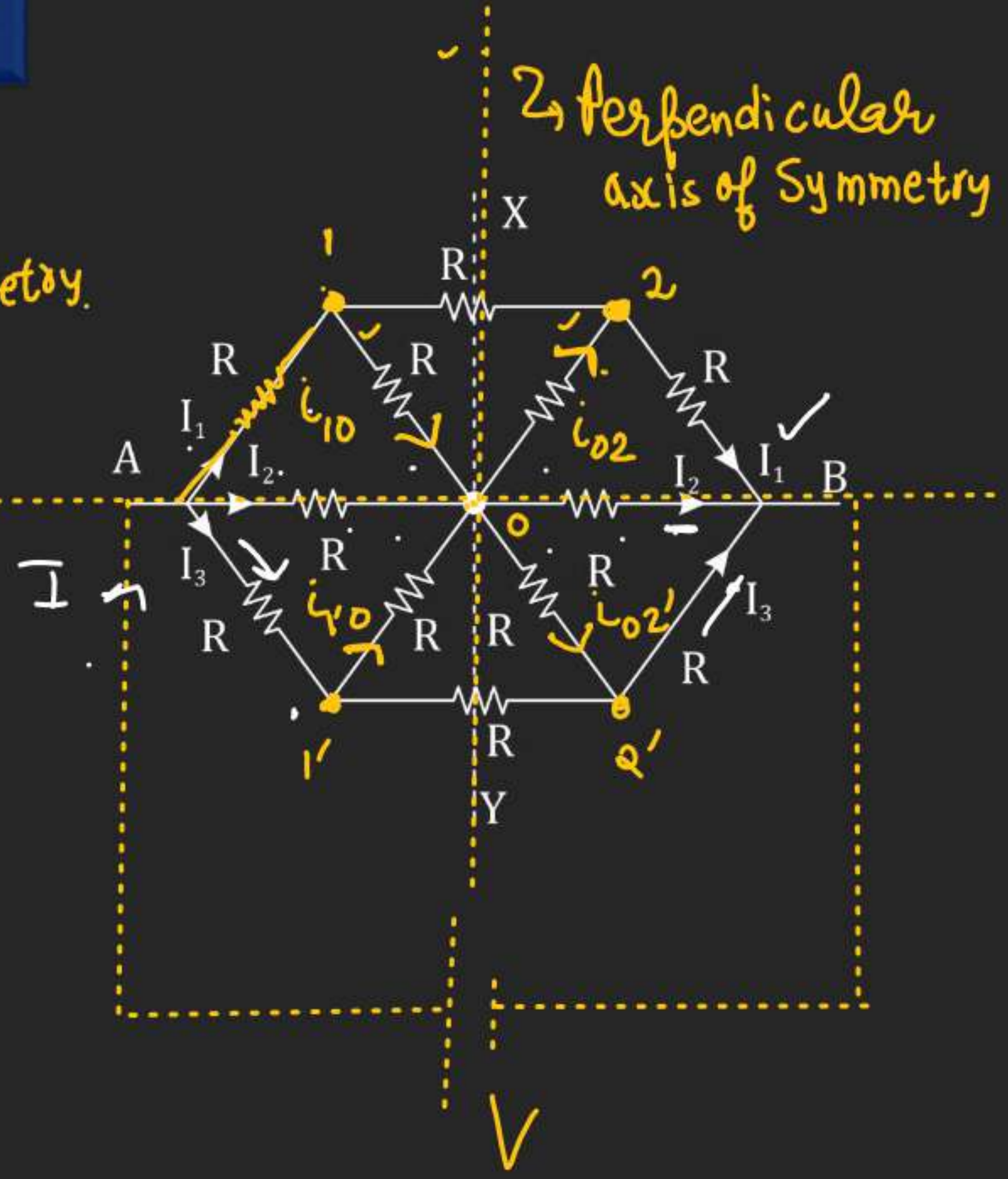
Equal and opposite

$i_{1'0} = i_{02'}$



Parallel axis of Symmetry.

2, Perpendicular axis of Symmetry



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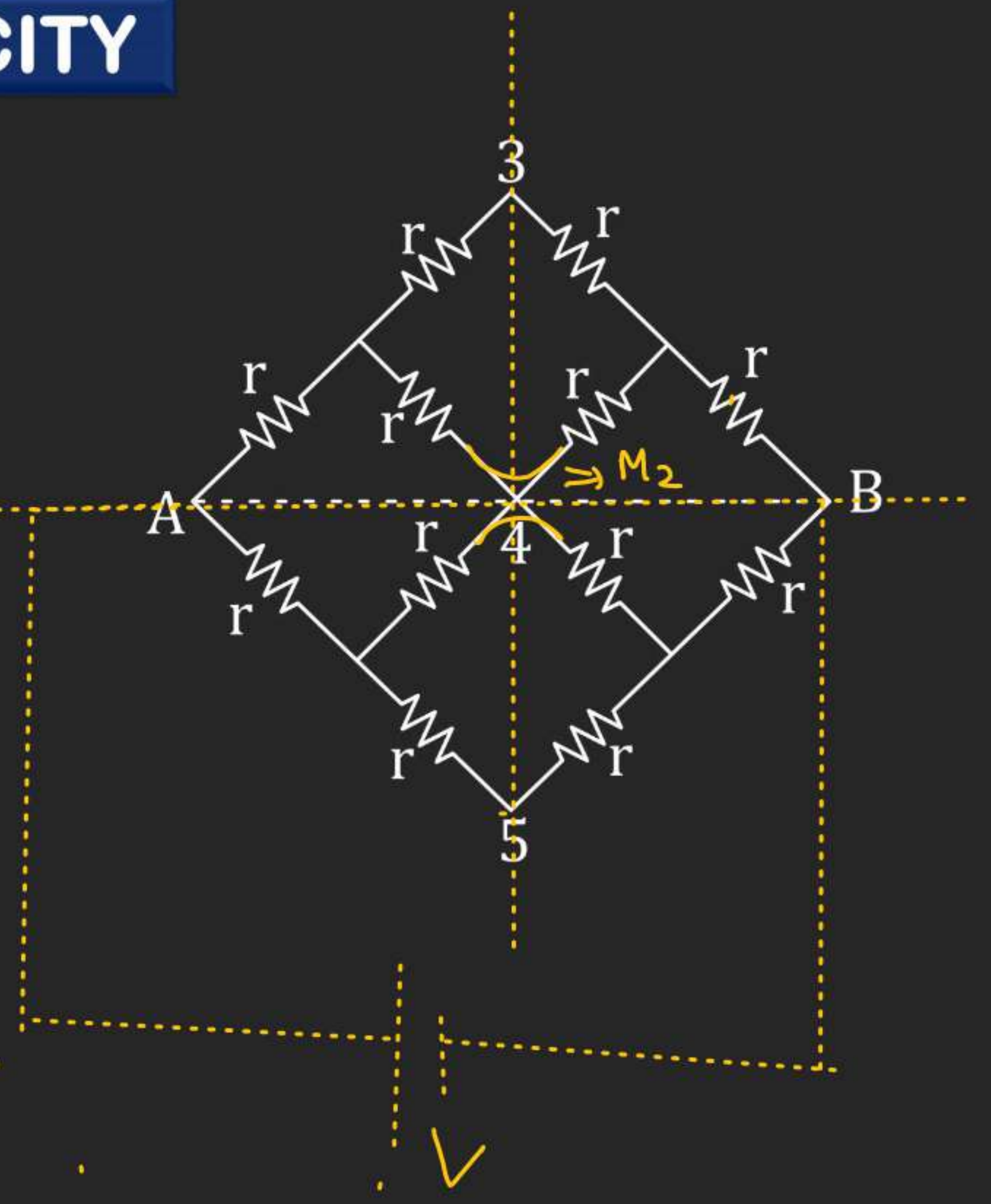
Equivalent resistance by symmetry

CURRENT ELECTRICITY

Q: $(R_{eq})_{A-B} = ??$

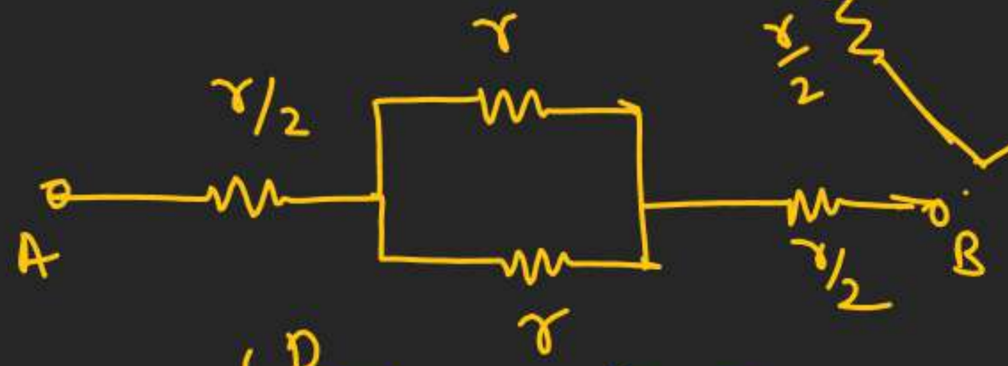
Parallel axis Symmetry

$V_3 = V_5$



M- 2

↳ open at junction



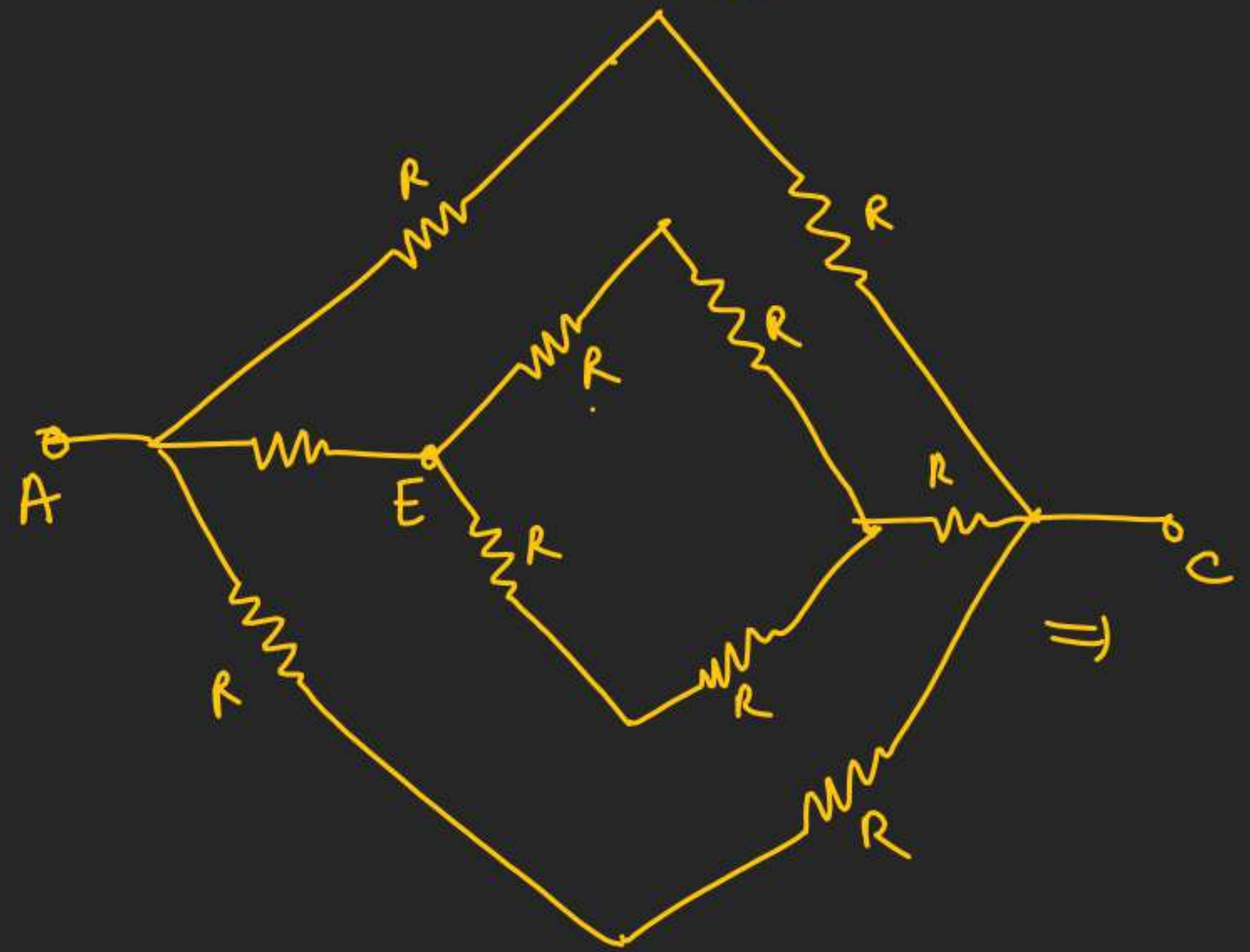
$(R_{eq})_{A-B} = \left[\frac{3r}{2}\right]$ A

Equivalent resistance by symmetry

CURRENT ELECTRICITY

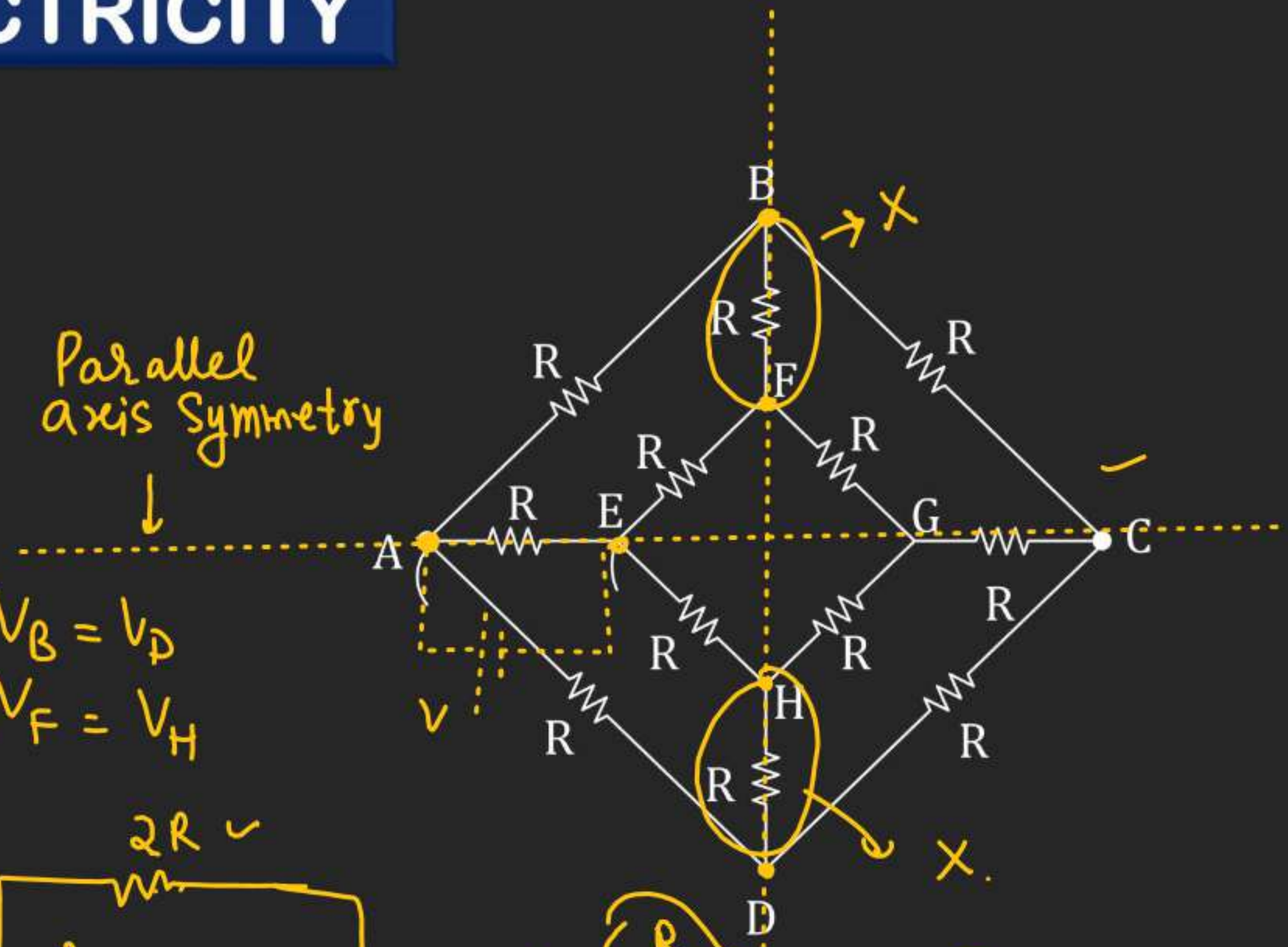
Perpendicular axis of Symmetry.

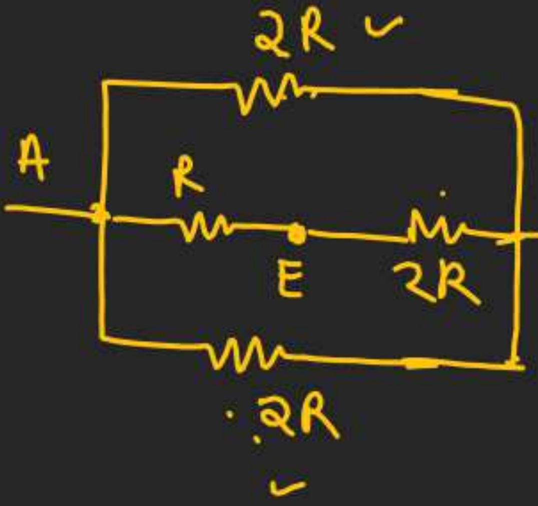
$$V_B = V_F = V_H = V_D$$

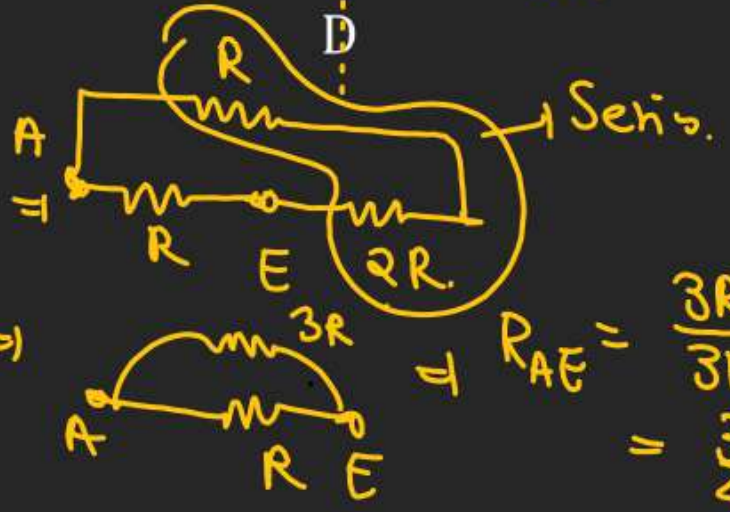


Parallel axis Symmetry

$$V_B = V_D$$
$$V_F = V_H$$







$$R_{AE} = \frac{3R\cdot R}{3R+R} = \frac{3R}{4}$$

Q.1 Each branch in the following circuit has a resistance R. The equivalent resistance of the circuit between the points A and B is:

(A) R

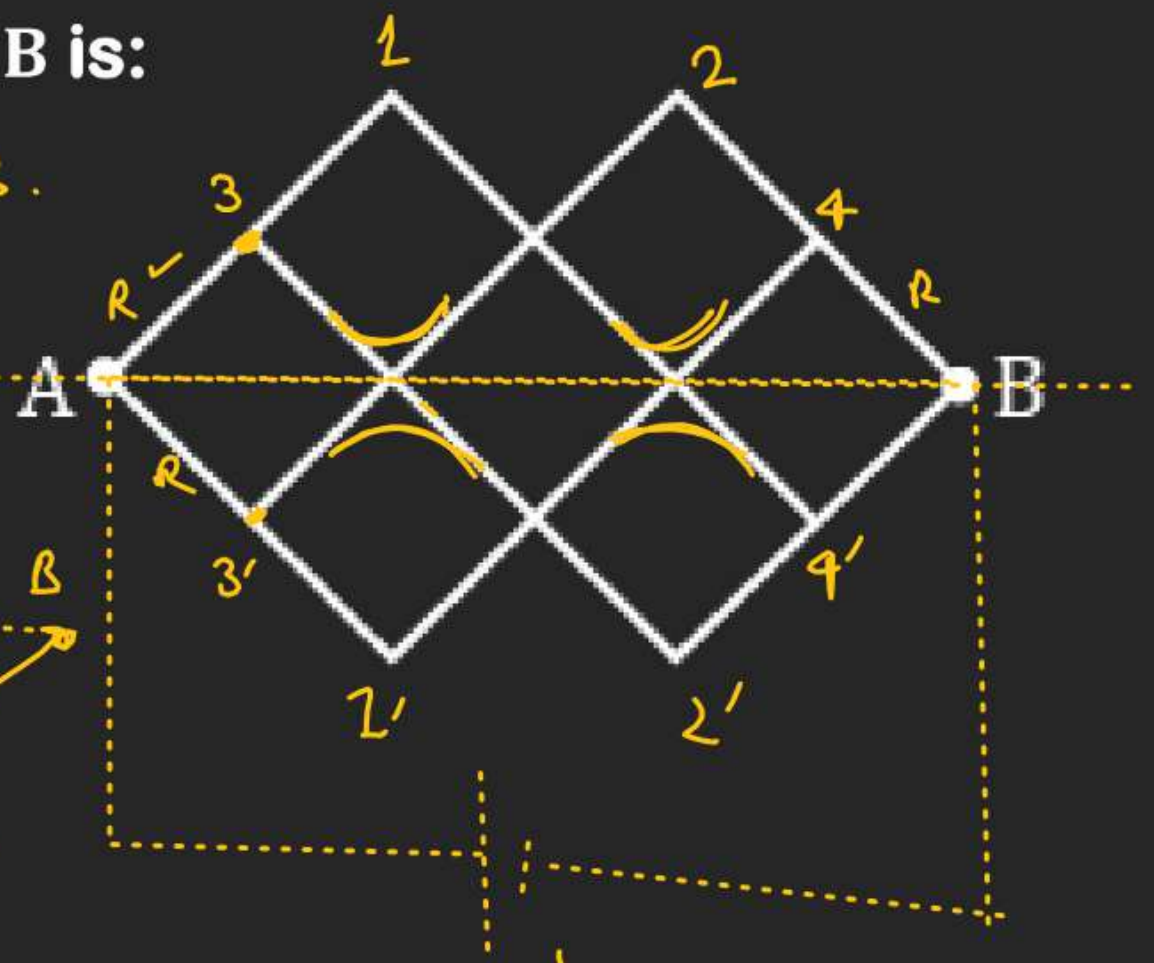
(B) 2R ✓

(C) 4R

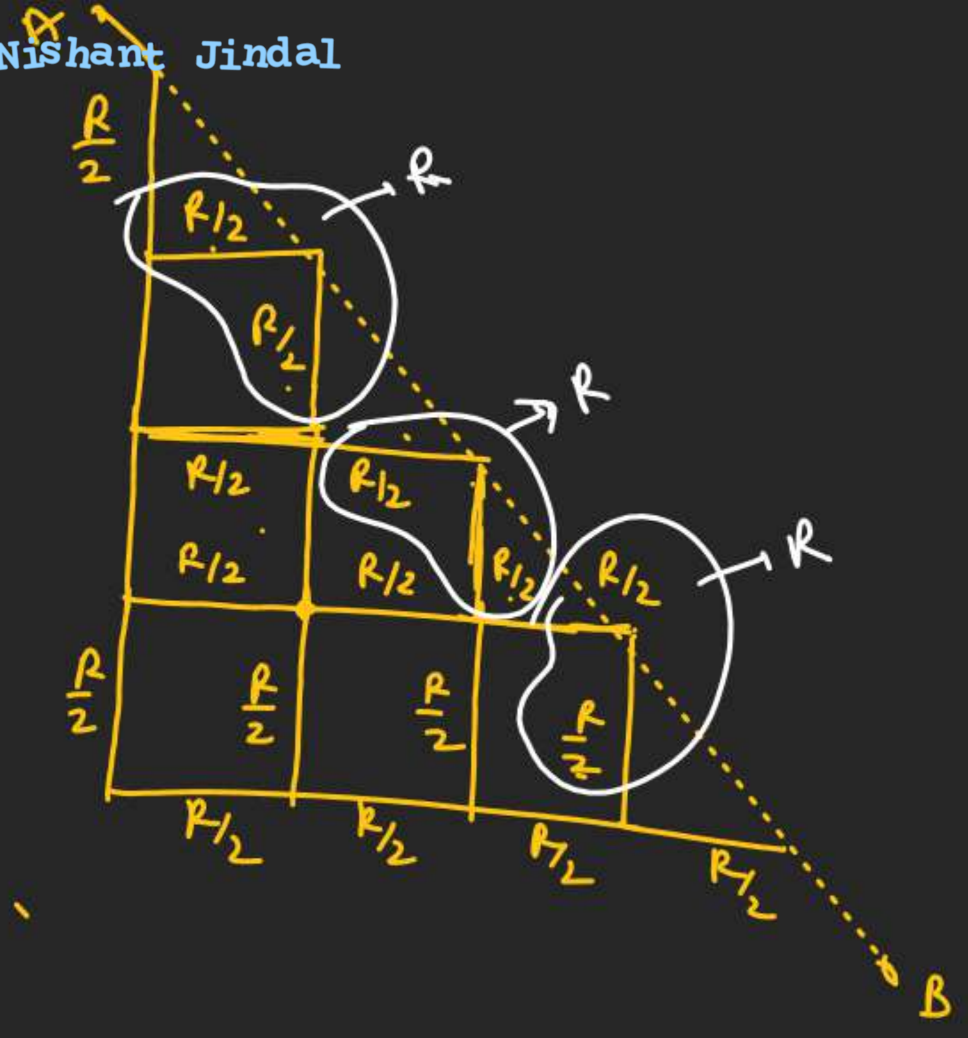
(D) 8R

$$\begin{bmatrix} V_3 = V_3' \\ V_4 = V_4' \end{bmatrix} \quad \begin{bmatrix} V_1 = V_1' \\ V_2 = V_2' \end{bmatrix}$$

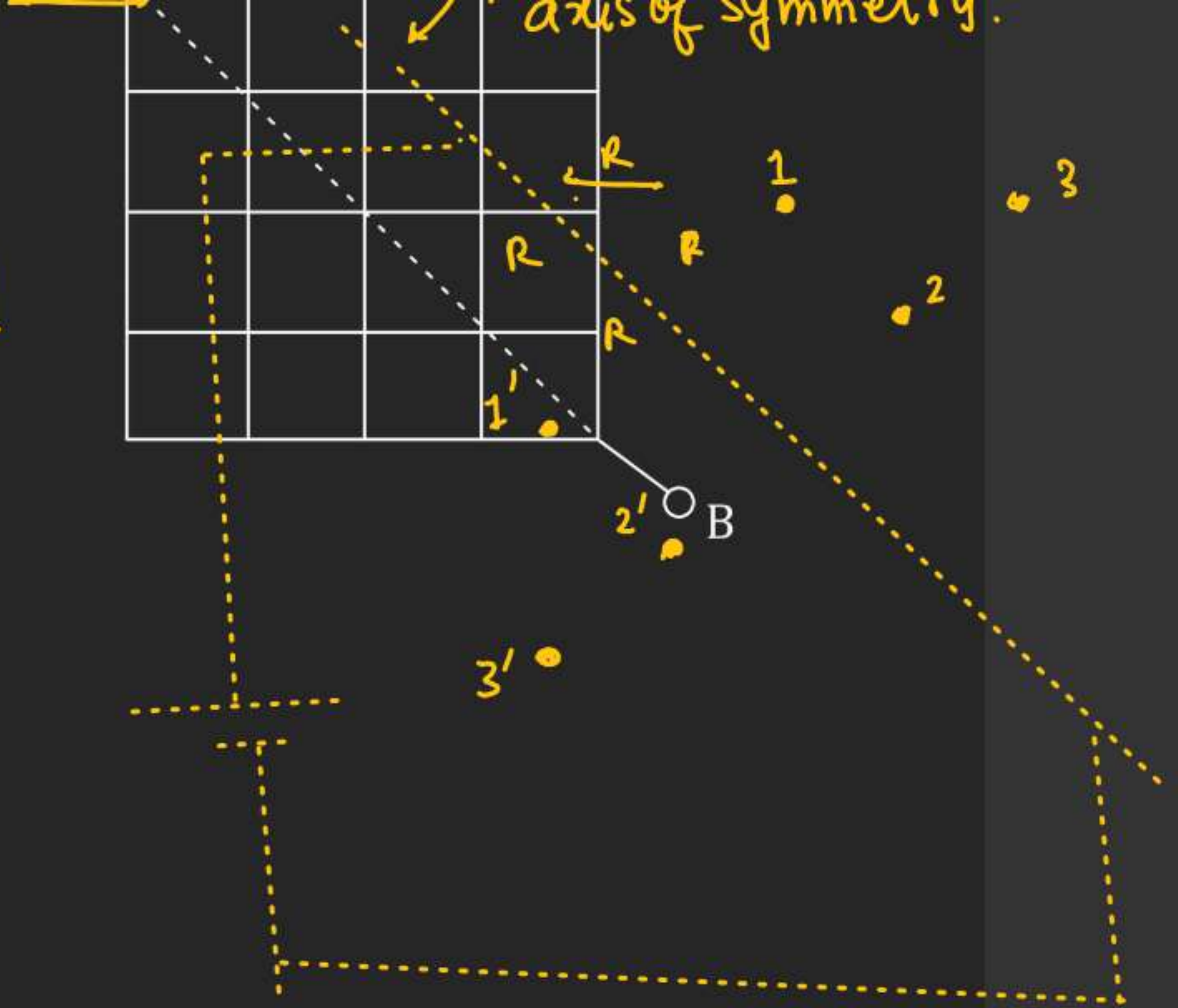
Parall axis of Symmetry



$$(R_{eq})_{AB} = 4\left(\frac{R}{2}\right) = 2R$$

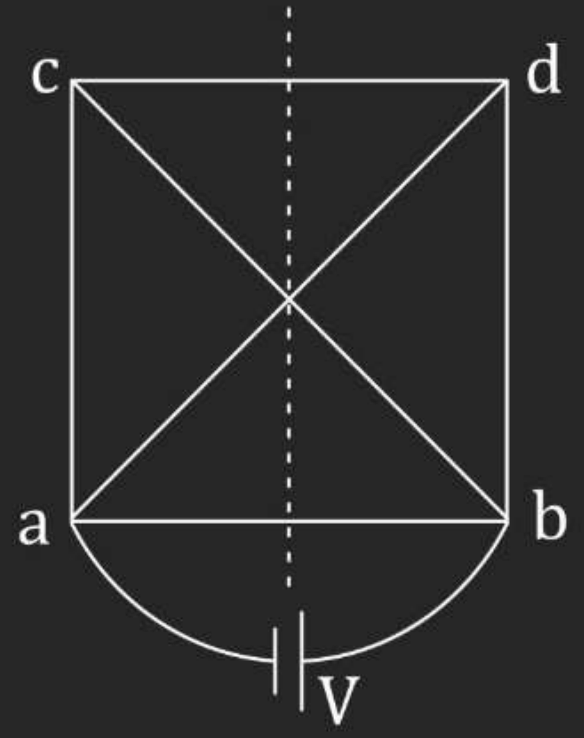


$$\begin{bmatrix} V_1 = V_1' \\ V_2 = V_2' \\ V_3 = V_3' \end{bmatrix}$$



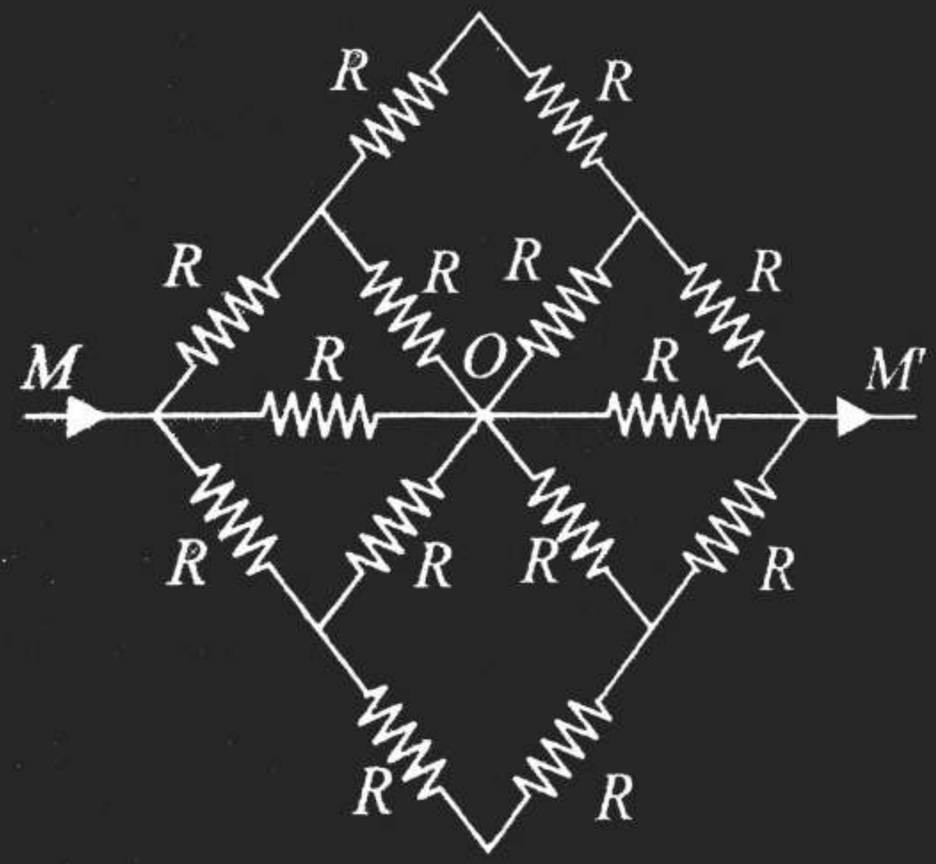
Q.3 In the circuit shown in Fig. abcd is a square. All the wires forming the square and its diagonals are homogeneous and have same cross-section. Find the ratio of power dissipated in resistors ab and cd.

H.W



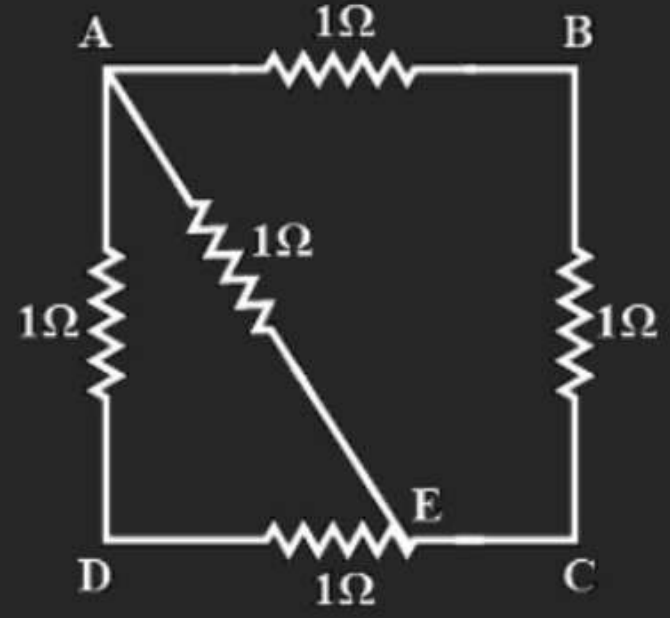
Q.4 In the network shown in figure find the equivalent resistance across the points M and M'.

H.W



Q.6 ABCD is square see Fig where each side is a uniform wire of resistance 1Ω. A point E lies on CD such that if a uniform wire of resistance 1Ω is connected across AE and constant potential difference is applied across A and C then B and E are equipotential.

H.W



(A) $\frac{CE}{ED} = 1$

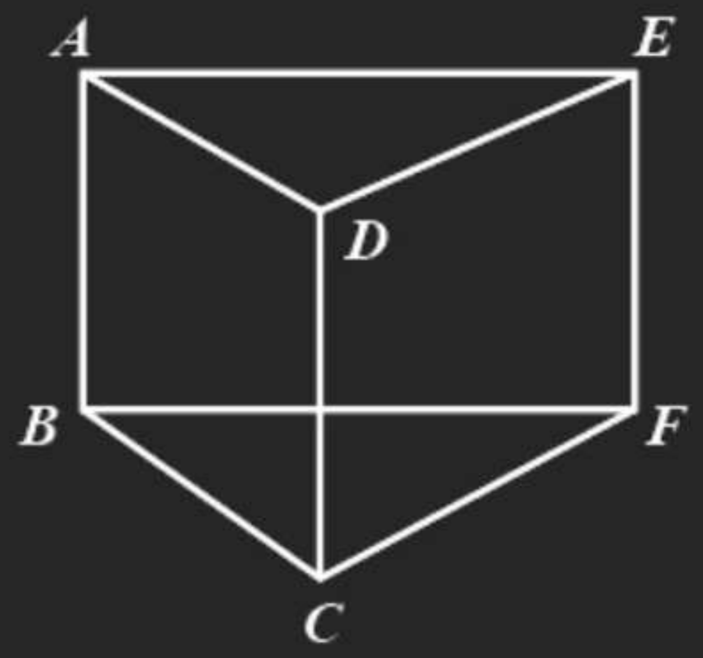
(B) $\frac{CE}{ED} = 2$

(C) $\frac{CE}{ED} = \frac{1}{\sqrt{2}}$

(D) $\frac{CE}{ED} = \sqrt{2}$

Q.3 Nine wires each of resistance r are connected to make a prism as shown in figure. Find the equivalent resistance of the arrangement across terminals (a) A and D (b) A and B

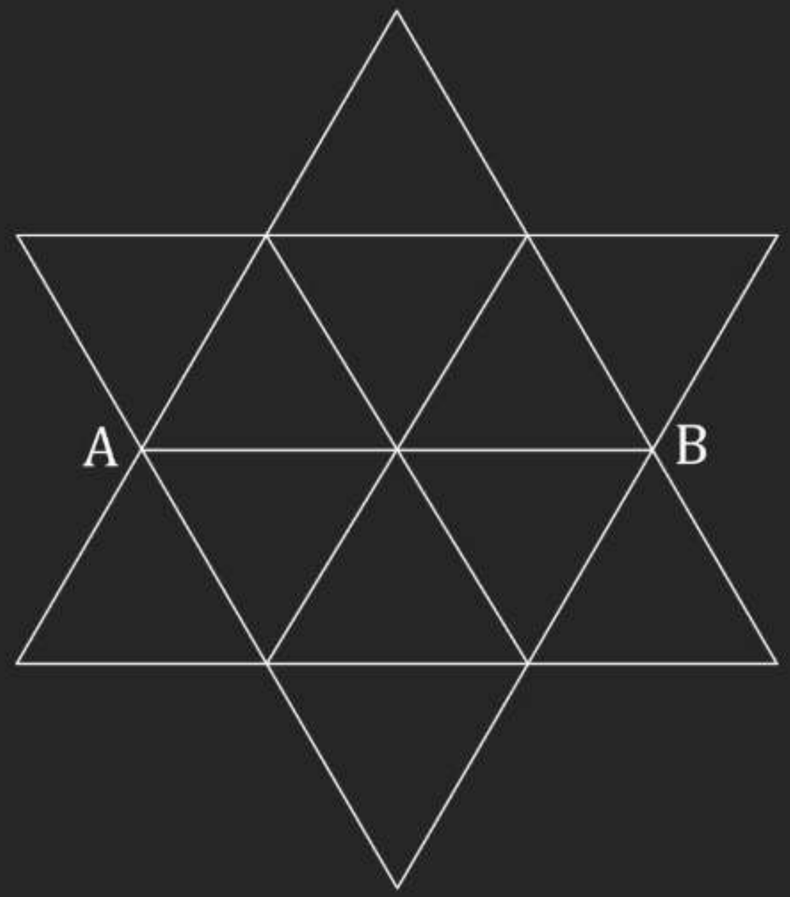
H.W



Q.4 Find the equivalent resistance of the circuit between points A and B shown in

H.W

figure is: (each branch is of resistance $= 1\Omega$)



Nishant Jindal

CURRENT ELECTRICITY

Q.5 Figure shows five identical wires connected in symmetrical zig-zag fashion between points A and F. What will be the change in the resistance of the circuit between A and F if two similar identical wires are added as shown by the dashed line in figure.

H.W