Complete :

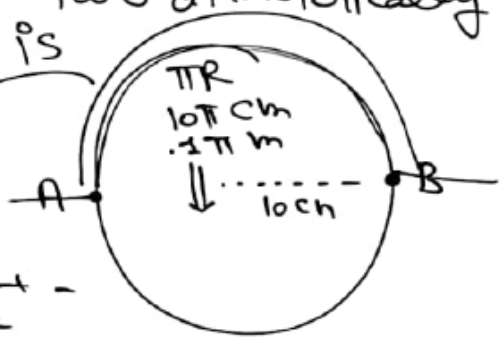
Q1) A wire of resistance 12 Ω per meter is bent to form a complete circle of radius 10cm. The resistance b/w its two diametrically opposite points, A & B are as shown in figure is [AIPMT 2009]

(a) 3 Ω

(b) 6π Ω.

(c) 6 Ω.

(d) 0.6π Ω.



πR

10π cm

$= 10\pi \times 10^{-2}$ m

$= 0.1\pi$ m

1m → 12Ω

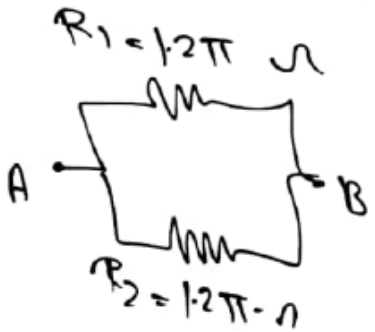
$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$

Resistance $= 0.1\pi \times 12$

$= 1.2\pi$ Ω

NCERT

(1).

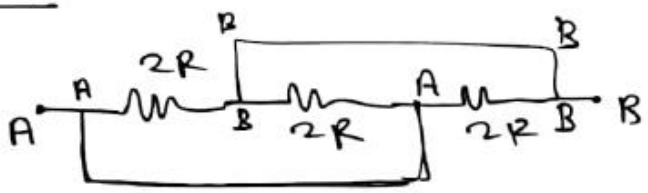


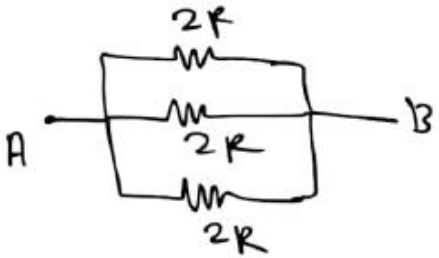
$R_{eq} = \frac{R_1 R_2}{R_1 + R_2} = \frac{1.2\pi \times 1.2\pi}{2.4\pi}$

$= 0.6\pi$ Ω

I.I.T

R_{AB}



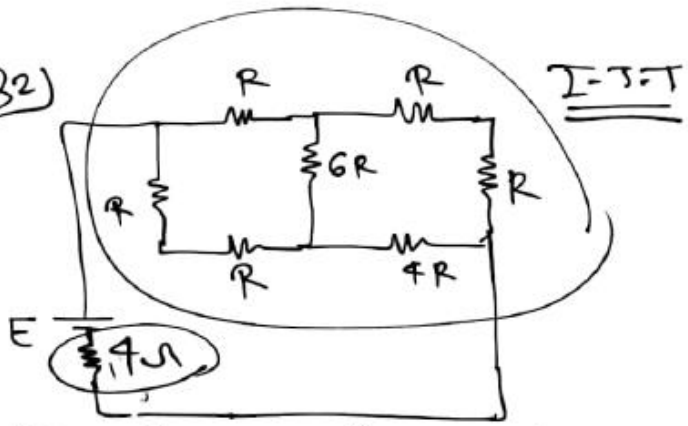


$$\frac{1}{R_{eq}} = \frac{1}{2R} + \frac{1}{2R} + \frac{1}{2R} = \frac{1+1+1}{2R}$$

$$\frac{1}{R_{eq}} = \frac{3}{2R} \qquad R_{eq} = \frac{2R}{3}$$

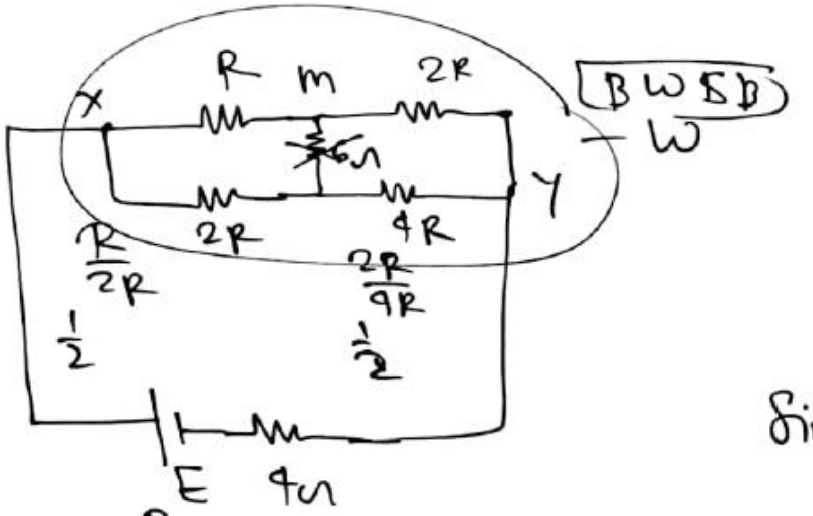
Q2)

I.I.T

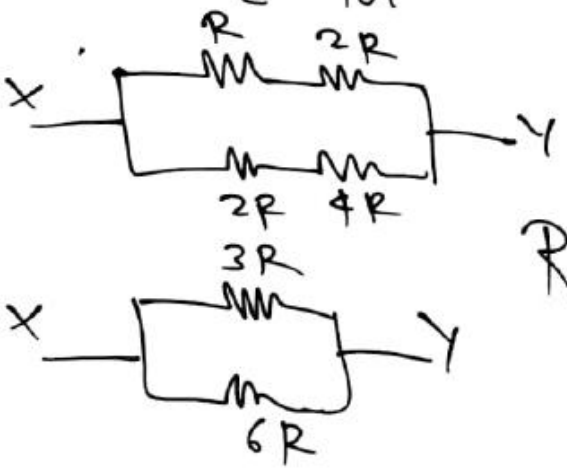


Find the value of R for maximum power delivered.

When Internal resistance equal to external resistance



BWBD



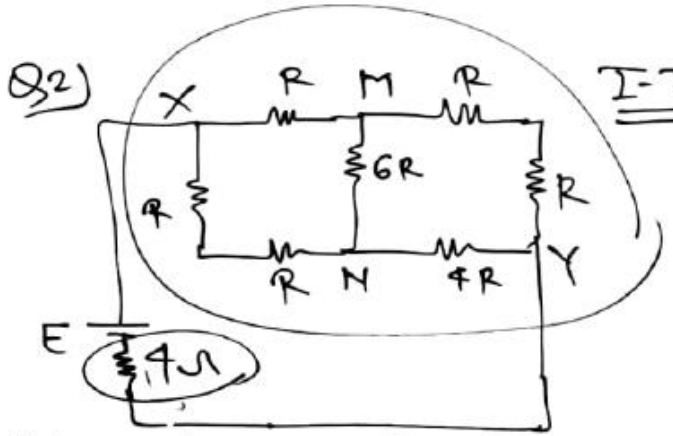
$$R_{XY} = \frac{3R \times 6R}{3R+6R} = \frac{18R^2}{9R} = 2R$$

$2R = 9\Omega$

$2R = 4\Omega$

$R = 2\Omega$

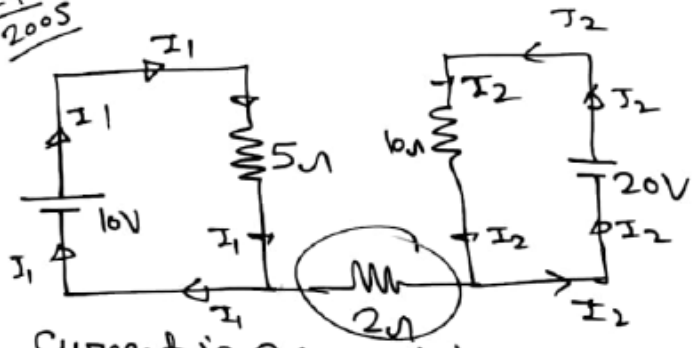
Q2) IIT



Find the value of R for maximum power delivered.

When Internal resistance equal to external resistance

I-I-T 2005



Current in 2Ω resistance.

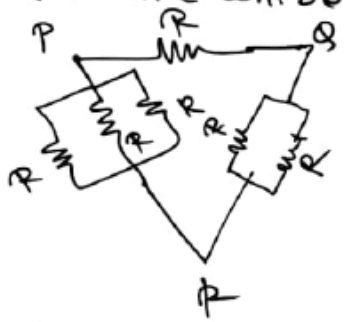
(a) 2A (b) zero (c) 5A (d) 9A

↳ Current never Re-trace its path,

↳ battery से जितना charge निकलेगा, same amount of charge वापस आयेगा battery में।

I-I-T 2001

Six identical resistance connected as shown in figure. The equivalent resistance will be.



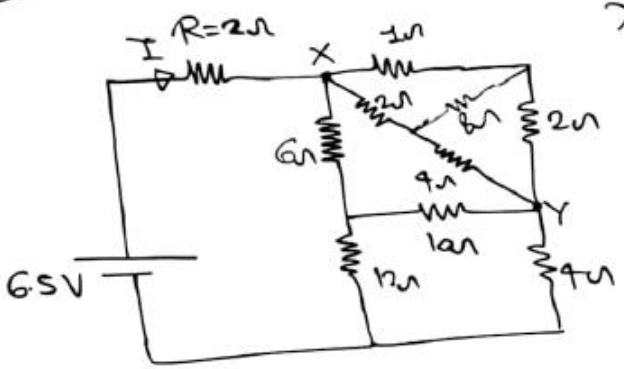
(a) Maximum b/w P & Q

(b) Maximum b/w Q & R

(c) Maximum b/w P & Q.

(d) All are equal.

JEE (Adv) 2015



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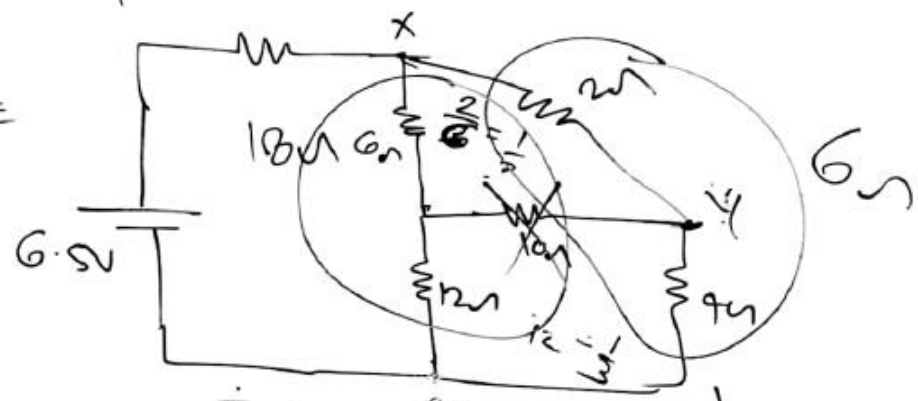

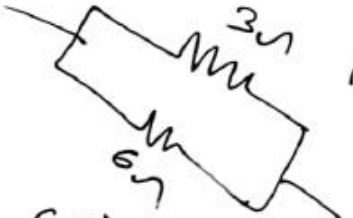

$I = \frac{6.5V}{6.5\Omega}$

$= 1\ Amp$

$Req = \frac{3 \times 6}{3+6}$

$= 2\Omega$

$Req = 6.5\Omega$

$Req = \frac{6 \times 18}{6+18}$

$= \frac{6 \times 18}{24}$

$= \frac{9}{2} = 4.5\Omega$