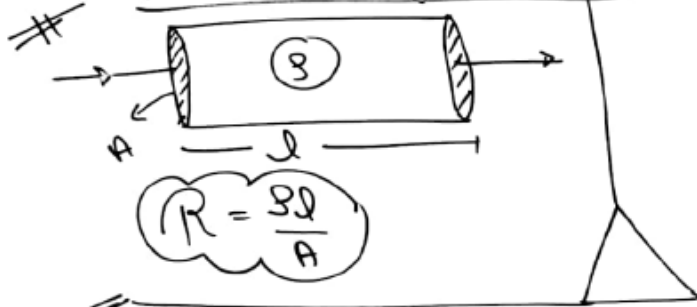


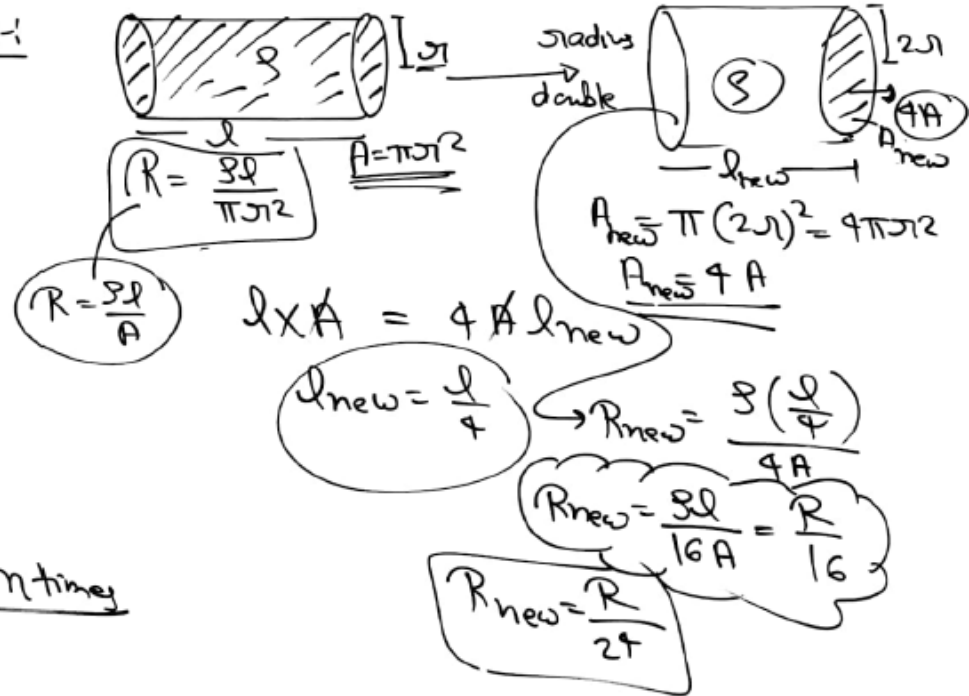
Resistance of Conductor



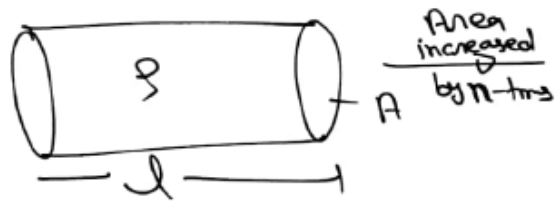
\* If length of wire is increased by  $n$  times & its Resistance increased by  $n^2$  times [V = constant]

\* If radius of conductor is increased by  $n$  times then Resistance of Conductor decreased by  $\frac{1}{n^2}$  times.

Ex-1



⇒ Resistance of Conductor



$$R = \frac{\rho l}{A}$$

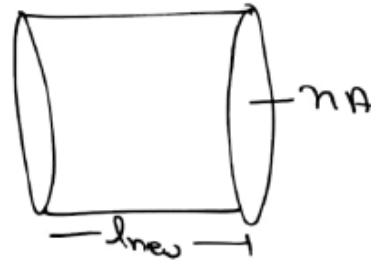
$$A l = (nA) l_{new}$$

$$\frac{l}{n} = l_{new}$$

$$R_{new} = \frac{\rho l/n}{nA}$$

$$R_{new} = \frac{\rho l}{n^2 A}$$

$$R_{new} = \frac{R}{n^2}$$



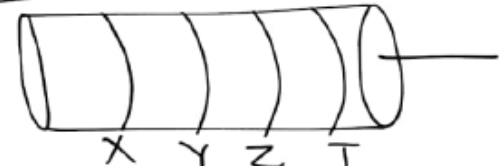
if area of cross-section of conductor is increased by  $n$  times then its Resistance ↓ ses by  $n^2$  times

Color Code Carbon

Color	Number	Multiply
Black	0	$10^0$
brown	1	$10^1$
Red	2	$10^2$
Orange	3	$10^3$
Yellow	4	$10^4$
Green	5	$10^5$
blue	6	$10^6$
Violet	7	$10^7$
Gray	8	$10^8$
White	9	$10^9$

BB  
ROY  
Great  
boy  
Very  
Good  
Wife

	Tolerance
Gold	5%
Silver	10%
No Color	20%



$$R = (XY \times 10^Z \pm T\%) \Omega$$

Q) find R



Red Yellow Silver  
 $X=2, Y=4, Z=8, T=10\%$

$$R = (24 \times 10^8 \pm 10\%) \Omega$$

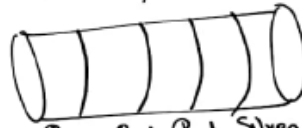
Colour Code Carbon

BB  
ROY  
Great  
boy  
Very  
Good  
Wife

Colour	Number
Black	0
brown	1
Red	2
Orange	3
Yellow	4
Green	5
blue	6
Violet	7
Gray	8
White	9

	T
Gold	5%
Silver	10%
No Carbon	20%

Q) Find R.



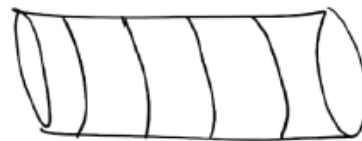
(Red Red Red Silver)

X=2  
Y=2  
Z=2  
T=10%

$$R = (22 \times 10^2 \pm 10\%) \Omega$$

$$\frac{71 \times 10^5 \times 20}{100} = 142 \times 10^4$$

Q2)



blue Gray black Gold

X=6  
Y=8  
Z=0  
T=5%

$$R = (68 \times 10^0 \pm 5\%) \Omega$$

$$= (68 \times 1 \pm 5\%) \Omega$$

$$R = (68 \pm 5\%) \Omega$$



$$R = (XY \times 10^Z \pm T\%)$$



Violet brown Green

X=7  
Y=1  
Z=5  
T=20%

20% error  
R= 20%  
Rai

$$R = (71 \times 10^5 \pm 20\%) \Omega$$

$$R = (71 \times 10^5 \pm 142 \times 10^4) \Omega$$

$$R = (71 \times 10^5 \pm 14.2 \times 10^5) \Omega$$

Color Code Carbon

BB  
ROY  
Great  
boy  
Very  
Good  
Wife

		Color	Number
		Black	0
		brown	1
		Red	2
		Orange	3
		Yellow	4
		Green	5
		blue	6
		Violet	7
		Gray	8
		White	9

	T
Gold	5%
Silver	10%
No Carbon	20%

Q2) NEET-2016

A Carbon resistance  $(47 \pm 4.7) \text{ k}\Omega$  is to be marked with rings of different colours for its identification. The color code sequence will be.

- (a) Violet - Yellow - Orange - silver
- (b) Yellow - Violet - Orange - Silver ✓
- (c) Yellow - Green - Violet - Gold.
- (d) Green - orange - Violet - Gold.

$$\begin{aligned}
 R &= (47 \pm 4.7) \text{ k}\Omega \\
 &= 47 \text{ k}\Omega \pm 4.7 \text{ k}\Omega \\
 &= (47 \times 10^3 \pm 4700) \Omega
 \end{aligned}$$

$$\begin{aligned}
 X &= 4 - \text{Yellow} \\
 Y &= 7 - \text{Violet} \\
 Z &= 3 - \text{Orange} \\
 T &= \text{Silver}
 \end{aligned}$$



Color Code Carbon -

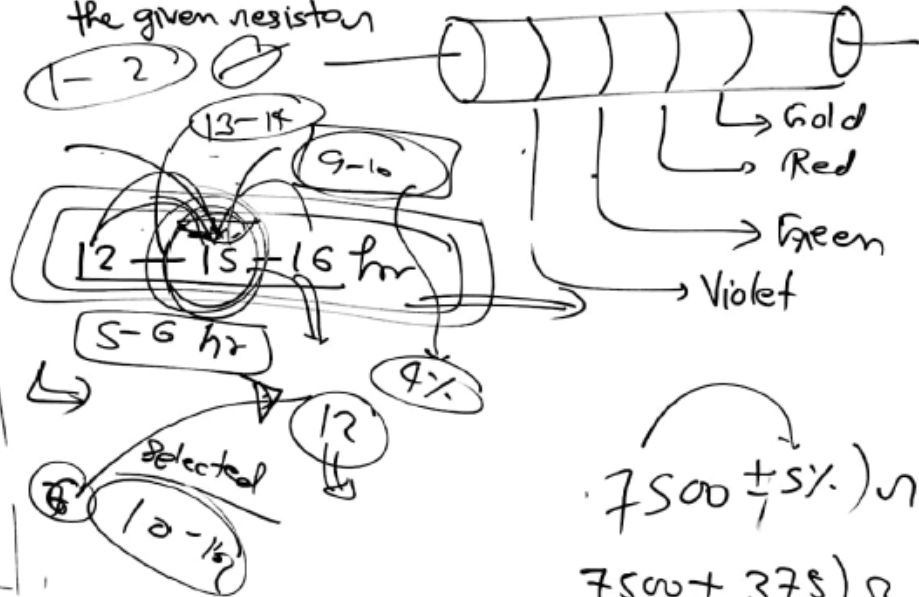
BB  
ROY  
Great  
boy  
Very  
Good  
Wife

Color	Number
Black	0
brown	1
Red	2
Orange	3
Yellow	4
Green	5
blue	6
Violet	7
Gray	8
White	9

	T
Gold	5%
Silver	10%
No color	20%

JEE(M) 2021

Q) The color coding on a carbon resistor is shown in the figure. The resistance value of the given resistor



$$7500 \pm 5\% \Omega$$

$$7500 \pm 375 \Omega$$