

# PHYSICS MDCAT

## Current Electricity

### TEST#04 (UNIT # 9)

**Q.86** An electric current of 2 A is passing through a cross section of the coil in 1 second. How many electrons are involved in providing a current of 2 A? The charge on one electron is  $1.602 \times 10^{-19}$  C.

- A)  $3.21 \times 10^{18}$   
B)  $1.25 \times 10^{19}$

- C)  $2.2 \times 10^{16}$   
D)  $6.25 \times 10^{18}$

**Q.87** A student measures a current as 0.25 A. Which of the following correctly expresses this result?

- A) 25 mA  
B) 250 mA

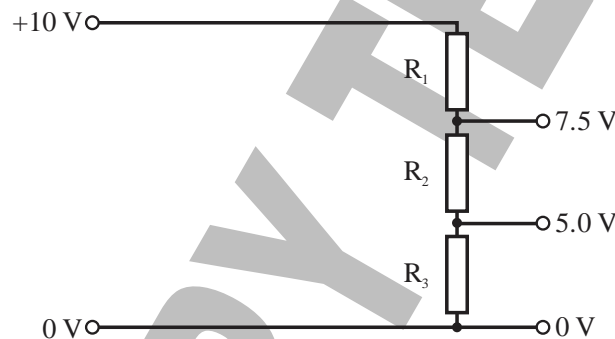
- C) 25 MA  
D) **250 mA**

**Q.88** A wire of resistance  $48 \Omega$  is bent in the form of an equilateral triangle. The resistance between two vertices is:

- A)  $9.7 \Omega$   
B)  $11.9 \Omega$

- C)  **$10.6 \Omega$**   
D)  $12.4 \Omega$

**Q.89** A potential divider is used to give outputs of 5.0 V and 7.5 V from a 10 V source, as shown in figure:



Which combination of resistances,  $R_1$ ,  $R_2$ ,  $R_3$  gives the correct voltages?

	$R_1$ (k $\Omega$ )	$R_2$ (k $\Omega$ )	$R_3$ (k $\Omega$ )
A)	1	1	2
B)	2	1	2
C)	3	2	2
D)	3	2	3

**Q.90** A copper wire of resistance  $2R$  is cut into ten parts of equal length. Two pieces each are joined in series and then five such combinations are joined in parallel. The new combination will have a resistance:

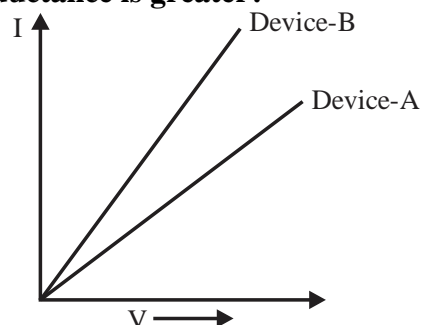
- A)  $2R$

- C)  $\frac{2R}{5}$

- B)  $\frac{2R}{25}$

- D)  $\frac{R}{25}$

**Q.91** For which device the conductance is greater?

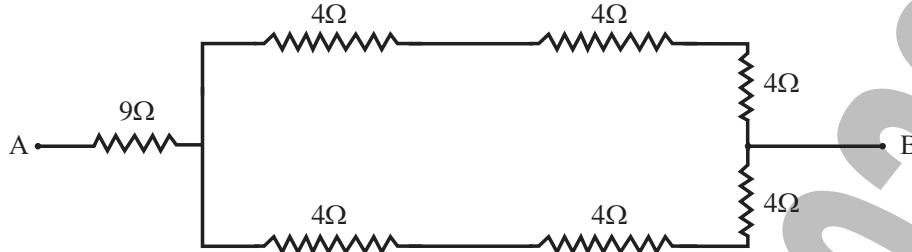


- A) Device – A  
B) **Device – B**

- C) Both have same conductance  
D) Device – B has zero conductance

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**Q.92** The effective resistance of the network shown is:



- A) 15 Ω  
B) 21 Ω  
C) 7 Ω  
D) 24 Ω

**Q.93** Three resistances, each of 6 Ω are connected to form a triangle. The resistance between any two terminals is:

- A) 4 Ω  
B) 8 Ω  
C) 12 Ω  
D) 18 Ω

**Q.94** A wire of resistance 4.0 Ω is stretched to twice its original length. The resistance of new wire will be:

- A) 2 Ω  
B) 8 Ω  
C) 4 Ω  
D) 16 Ω

**Q.95** The resistance of conductor depends on:

- A) Area of cross section of conductor  
B) Physical state of conductor  
C) Nature of conductor  
D) All of these

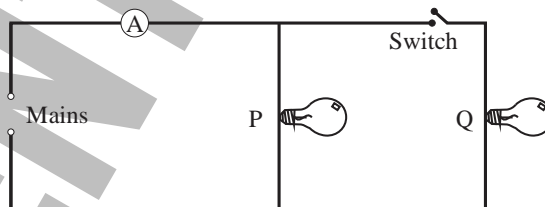
**Q.96** A wire of length 10 m and radius 1 mm has a resistance of 3 Ω. What length of a wire of same material but of radius 2 mm will also have a resistance of 9 Ω?

- A) 25 m  
B) 60 m  
C) 120 m  
D) 100 m

**Q.97** Which statement describes the electrical potential difference between two points in a wire carrying a current?

- A) The force required to move a unit positive charge between the points  
B) The ratio of the energy dissipated between the points to the current  
C) The ratio of the power dissipated between the points to the current  
D) The ratio of the power dissipated between the points to the charge moved

**Q.98** How will the reading in the ammeter A of the figure beneath be affected if bulb Q is disconnected from the circuit shown (consider both bulbs to be identical). The voltage in the mains is maintained at a constant value:



- A) The reading will be reduced to one-half  
B) The reading will not be affected  
C) The reading will be double of previous one  
D) The reading will be increased four fold

**Q.99** Two bulbs one of 35 W, 220 V and other of 70 W, 220 V are connected in parallel across the mains of 220 V. The current:

- A) In 35 W bulb is lesser  
B) In 70 W bulb is lesser  
C) Is same in both bulbs  
D) None of these

**Q.100** The terminal potential difference of a cell when open circuited is (where “E” is emf of cell):

- A) E  
B)  $\frac{E}{2}$   
C) Zero  
D)  $\frac{E}{3}$

**Q.101** The emf of a cell is 6.0 V. When it is short circuited, the current of 3 A flows. The internal resistance of cell is:

- A) 0.25 Ω  
B) 0.50 Ω  
C) 2.0 Ω  
D) 1.0 Ω

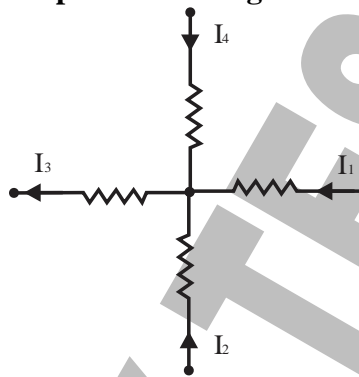
**Q.102** A battery has an emf of 24 V and an internal resistance of 2.5 Ω. When an external 5.5 Ω resistor is connected across the terminals of the battery, the potential difference between the terminals will be:

- A) 22.5 V  
B) 18.5 V  
C) 13.5 V  
D) 16.5 V

**Q.103** The emf “E” of a cell varies with the current drawn from the cell according to the graph:

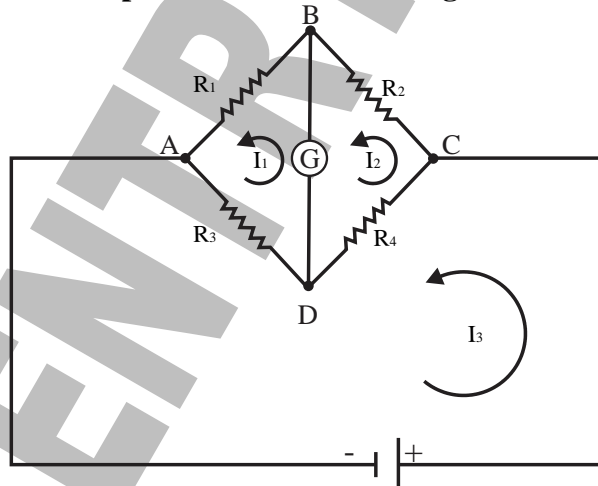


**Q.104** Which of following is correct expression for figure shown below?



- A)  $I_1 + I_2 - I_3 - I_4 = 0$   
B)  $I_1 - I_3 - I_2 + I_4 = 0$   
C)  $I_1 + I_2 = I_4 + I_3$   
D)  $I_1 + I_2 = I_3 - I_4$

**Q.105** The KVL – equation for loop ABDA in the following Wheatstone Bridge is:



- A)  $-I_1R_1 - (I_1 - I_2)R_g - I_1R_3 = 0$   
B)  $-I_1R_1 - (I_2 - I_1)R_g - I_3R_3 = 0$   
C)  $-I_1R_1 - (I_1 - I_2)R_g - (I_1 - I_3)R_3 = 0$   
D) None of these

**Q.106** Conventionally speaking the current flowing towards a point is taken as \_\_\_\_\_ and the voltage of a battery in which current is traversed from high to low potential is taken as \_\_\_\_\_.

- A) Positive, positive  
B) Positive, negative  
C) Negative, Positive  
D) Negative, Negative

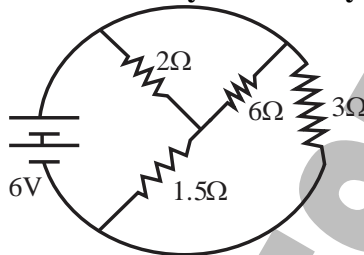
**Q.107** “The sum of all the currents meeting at a point in the circuit is zero”, is a statement of:

- A) KCL  
B) KVL  
C) Ohm’s law  
D) Wheatstone Bridge

**Q.108** The resistance of hot tungsten filament is about 10 times more than the resistance of cold tungsten filament. What will be the resistance of 100 W and 200 V lamp when not in use?

- A) 40 Ω  
B) 20 Ω  
C) 400 Ω  
D) 200 Ω

- Q.109** Ohm's Law is valid when the temperature of the conductor is:  
 A) Constant  
 B) Very low  
 C) Very high  
 D) Changing
- Q.110** A potential difference of 10 V is applied across a conductance of 4 mho. The current in the conductor is:  
 A) 40 A  
 B) 2.4 A  
 C) 2.5 A  
 D) 3.0 A
- Q.111** Of the two bulbs in a house, one glows brighter than the other. Which of the two has larger resistance?  
 A) Bright bulb  
 B) Dim bulb  
 C) Both have same resistance  
 D) Brightness does not depend on resistance
- Q.112** The total current supplied to the circuit by the battery is:



- A) 1 A  
 B) 2 A  
 C) 4 A  
 D) 6 A
- Q.113** A cell of internal resistance  $2 \Omega$  and emf 10 V is connected to a uniform wire of length 500 cm and resistance  $3 \Omega$ . The potential gradient in wire is:  
 A) 24 mV/cm  
 B) 30 mV/cm  
 C) 12 mV/cm  
 D) 4 mV/cm
- Q.114** A certain wire has a resistance  $R$ , the resistance of an other wire of an identical material with the first, except for twice its diameter is:  
 A)  $\frac{1}{4}R$   
 B)  $2R$   
 C)  $4R$   
 D) Same as  $R$
- Q.115** If the temperature of a conductor is increased, the product of resistivity and conductivity:  
 A) Increases  
 B) Remains constant  
 C) Decreases  
 D) May increase or decrease