



# PHYSICS

## BOOKS - NAND LAL PUBLICATION

### ELECTRICITY

#### Intext Questions

1. What is a electric circuit?



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2. SI unit of current is:



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3. Calculate the number of electrons that constitute 1 coulomb of charge.



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4. Name a device that help to maintain a potential difference across a conductor?



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5. What is meant by saying that the potential difference between two points is 1 V?



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6. How much energy is given to each coulomb of charge passing through a 6 V battery?



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7. On what factors does the resistance of a conductor depend?



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8. Will the current flow more easily through a thick wire or a thin wire of the same material when connected to the same source ? why?



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9. Let the resistance of an electrical component remains constant while the potential difference across the two ends of the component decreases to half of its former value. What change will occur in the current through it?



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10. Why are coils of electric toasters and electric irons made of an alloy rather than that

of a pure metal?



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**11.** Which among iron and mercury is a better conductor?



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**12.** Which material is best conductor?



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**13.** Draw schematic diagram of a circuit consisting of a battery of three cells of 2 V each a  $5\Omega$  resistor: an  $8\Omega$  resistor and  $12\Omega$  resistor and a plug key, all connected in series?



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**14.** Judge the equivalent resistance when the following are connected in parallel:  $1\Omega$  and  $10^3\Omega$  and  $10^6\Omega$



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**15.** Judge the equivalent resistance when the following are connected in parallel:  $1\Omega$  and  $10^3\Omega$  and  $10^6\Omega$



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**16.** What are the advantages of connecting electric devices in parallel with the battery instead of connecting them in series?



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17. How can three resistors of resistance  $2\ \Omega$ ,  $3\ \Omega$  and  $6\ \Omega$  be connected to give a total resistance of (a)  $4\ \Omega$  (b)  $1\ \Omega$  ?



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18. How can three resistors of resistance  $2\ \Omega$ ,  $3\ \Omega$  and  $6\ \Omega$  be connected to give a total resistance of (a)  $4\ \Omega$  (b)  $1\ \Omega$  ?



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**19.** Why does the cord of an electric heater not glow while the heating element does?



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**20.** Compute the heat generated while transferring 96,000 C of charge in one hour through a potential difference of 50 V.



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**21.** An electric iron of resistance  $20\ \Omega$  takes a current of 5 A. Calculate the heat developed in 30s.



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**22.** What determines the rate at which the energy is delivered by a current?



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**23.** An electric motor takes 5 A from a 220 V line. Determine the power of the motor and the energy consumed in 2 h.



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## Activity 12 1

**1.** What is nichrome ?



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2. What is a voltmeter? How a galvanometer is converted into a voltmeter? Why is a voltmeter connected in parallel in a circuit?



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3. What is the difference between a voltmeter and an ammeter?



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4. What is cell ?



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5. What does straight line graph between V vs. represent?



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6. What is the name of physical quantity which is equal to  $V/I$  ?



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## Activity 12 2

1. When four cells of 1.5 V are connected to series, how much resultant potential difference will be developed ?



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2. A torch bulb is rated 5 V and 500 mA.

Calculate

its power?



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### Activity 12 3

1. Does the current depend on the length of the conductor?



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2. Does the current depend on the area of cross-section of the wire used.?



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3. What happens to resistance when length of conductor is doubled without affecting the thickness of conductor ?



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4. What happens to resistance if the radius cross-section is halved without changing the length of conductor ?



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5. Why does the resistance of aluminium and iron rods of same size and same thickness not equal.



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## Activity 12 4

1. What is series combination of resistances ?



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2. Which factor of electric circuit remains same at each resistance when connected in series ?



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## Activity 12 5

1. Is potential difference same between ends of each resistance connected in series?



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## Activity 12 6

1. What is parallel combination of resistances?



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2. Which factor of electric circuit remains same for each resistances when connected in parallel ?



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3. What is the relationship between  $I$ ,  $I_1$ ,  $I_2$  and  $I_3$ ?



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1. A piece of wire of resistance  $R$  is cut into five equal parts. These parts are then connected in parallel. If the equivalent resistance of this combination is  $R'$ , then the ratio  $R/R'$  is

A.  $\frac{1}{25}$

B.  $\frac{1}{5}$

C. 5

D. 25

**Answer: D**



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2. Which of the following terms does not represent electrical power in a circuit?

A.  $I^2 R$

B.  $IR^2$

C.  $VI$

D.  $V^2 / R$

**Answer: B**



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3. An electric bulb is rated 220 V and 100 W. when it is operated on 110 V, the power consumed will be

A. 100W

B. 75W

C. 50W

D. 25W

**Answer: D**





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4. How is a voltmeter connected in the circuit to measure potential difference between two points?



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5. When a 12 V battery is connected across an unknown resistor, there is a current of 2.5 mA in the circuit. Find the value of the resistance of resistor?



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6. A battery 9 V is connected in series with resistors of  $0.2\Omega$ ,  $0.3\Omega$ ,  $0.4\Omega$ ,  $0.5\Omega$  and  $12\Omega$  respectively. How much current will flow through a  $12\Omega$  resistor?



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7. How many  $176\Omega$  resistors in parallel are required to carry 5A on a 220 V line?



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8. How will you connect three resistors, each of resistance  $6\ \Omega$ , so that the combination has a resistance of (i)  $9\ \Omega$ , (ii)  $4\ \Omega$



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9. Which uses more energy, a  $250\ \text{W}$  TV set for 1 hour or a  $1,200\ \text{W}$  toaster for 10 minutes?



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**10.** An electric heater of resistance  $8\Omega$  draws 15 A from service mains for 2 hour, Calculate the rate at which heat is developed in the heater.



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**11.** Explain the following : Why is the tungsten used almost exclusively for filament of electric lamps?



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**12.** Explain the following: Why are the conductors of electric heating devices, such as bread toasters and electric irons, made of an alloy rather than pure metal?



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**13.** Explain the following : Why is the series arrangement not used in domestic circuits?



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**14.** Explain the following: How does the resistance of a wire vary with its area of cross-section?



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**15.** Explain the following : Why are copper and aluminium usually employed for electricity transmission?



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## Additional Questions

1. When a glass rod is rubbed with a piece of silk cloth the rod



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2. How many types of charges are there?



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3. Give reasons for the following: if you connect ammeter in parallel it burns



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4. What is the contribution of electricity in our daily life?



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5. Define electric current. What is its S.I. unit?

Is it a scalar or a vector quantity?

What is the direction of electric current?



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