PHYSICS

BOOKS - PEARSON IIT JEE FOUNDATION

ELECTRICITY

Example

1. In one minute a total charge of 108 C flows through a bulb when it is connected to a cell.

Find the electric current flowing through the bulb.

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2. In an electric bulb a current of 5A flows for 1 hour. Find the amount of charge that has passed through the bulb.

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3. An electric current of 2A flows through a circuit consisting of a bulb. Find the number of electrons that would pass through the bulb in 8 minutes.

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4. A bulb uses 3000 J of energy in 50 s. Calculate its power.

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5. A 60 W bulb is switched on for 5 hours daily. If the cost of electricity is Rs. 3 per unit, calculate the bill for the month of April.

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6. In one minute a total charge of 180C flows through a bulb when it is connected to a cell. Find the electric current flowing through the bulb.

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7. In an electric bulb a current of 5A flows for 1 hour. Find the amount of charge that has passed through the bulb.

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8. An electric current of 2A flows through a circuit consisting of a bulb. Find the number of electrons that would pass through the bulb in 8 minutes.

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9. A bulb uses 3000 J of energy in 50 s. Calculate its power.

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10. A 60 W bulb is switched on for 5 hours daily. If the cost of electricity is Rs. 3 per unit, calculate the bill for the month of April.

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Very Short Answer Type Questions

1. What is the charge of an electron ? How many electrons make a coulomb of charge ?

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2. Define conventional and electronic current.

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3. What is the function of powdered carbon present in the electrolyte of a dry cell ?

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4. Why a small quantity of sulphuric acid is added to water for its electrolysis ?

Watch Video Solution

5. What is an electric fuse? How does it function?

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6. What are the circuit symbols for a plug key and a tap key ?

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7. What is the use of magnesium oxide used in an immersion heater ?

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8. The process due to which an uncharged insulated metallic conductor gets electrically charged when held near a charged body is called _____.

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9. What is an electric cell ? What is a primary and a secondary cell ?

Watch Video Solution

10. What is electroplating ?

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11. A body gains 25×10^{18} electrons, by rubbing, it with another body. Find the charge

on the body.

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12. What is electroplating ?

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13. In a dry cell, the cylindrical container made of zinc acts as a _____ terminal of the cell.

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14. What is meant by charging a secondary cell ?

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15. How many types of the charges are there ? State the unit of charge ?

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16. A body contains 3 C of positive charge. Does this refer to the total number of protons or positively charged particles present in the body ?

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17. COMMERCIAL UNIT OF ENERGY

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18. State SI and practical units of electrical energy .

Watch Video Solution

19. What is meant by charging a body ?

Watch Video Solution

20. If two charged bodies attract each other, what could the nature of charges present on

them be?

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21. What is electrical resistance ?

Watch Video Solution

22. What is an electrolyte?

Watch Video Solution

23. What is an electroscope?

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24. Electric potential is a ..... Quantity and its units are ..... .

Watch Video Solution

25. What is electrolysis ?

Watch Video Solution

26. What is an electrical conductor ? Give some examples.

Watch Video Solution

27. HEATING EFFECT OF ELECTRIC CURRENT

Watch Video Solution

28. Define electric power and give its unit.

Watch Video Solution

29. Define electric current. What is the unit of electric current? Define it?

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Short Answer Type Questions

1. Show that $1kWh = 3.6MJ$

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2. Explain the construction of an electric stove.

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3. What is a button cell ?

Watch Video Solution

4. What is meant by charging a body ? Describe charging by conduction and charging by induction.

Watch Video Solution

5. Differentiate between primary and secondary cells.

Watch Video Solution

6. What is an electric fuse? How does it function?

Watch Video Solution

7. When do we say that there is an electric current in a conductor ?

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8. Explain electric circuit and draw a simple electric circuit.

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9. A person takes out a woolen cap from his head and observes the hair on his head rising

up. Explain the reason for this?

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10. What is lightning ? Explain the phenomenon.

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11. Explain the applications of electrolysis.

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12. Why do we use a thin and long tungsten wire as a filament in bulb ?

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13. Explain the working of lightning rod.

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14. ELECTRIC BULB

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Essay Type Questions

1. Explain the construction and working of a gold leaf electroscope.

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2. Explain the construction and working of a dry cell.

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3. Explain atmospheric electricity. How did Benjamin Franklin prove that lighting strikes dues to atmospheric electricity?

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4. Explain the electrolysis of water

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5. Describe the construction and working of a Voltaic cell briefly.

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Concept Application Level 1

1. In a neutral body, the amount of positive charge is equal to the amount of negative charge.

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2. Define conventional and electronic current.

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3. To protect buildings from lightning , a good conductor of electricity like a copper rod, is used.

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4. A body charged positively is considered to be at a _____ potential and a body that is charged negatively is considered to be at a _____ potential.

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5. When a conductor is connected to a source of current, the number of electrons entering at one end of the conductor is equal to the

number of electrons leaving the conductor from the other end, per second

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6. With the help of an electroscope, how can we iden-tify the presence and nature of charge on a body?

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7. When bulbs are connected in series, same current flows through them.

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8. The types of cells in which it is possible to restore the chemicals are called _____ .

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9. Why is nichrome used as a heating element ?

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10. Glass does not allow _____ to flow through it.

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11. Within the cell, conventional current flows from its negative to the positive terminal .

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12. An ebonite rod is rubbed with fur or wool. What type of charges do they acquire ?

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13. A gold leaf electroscope is used for

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14. _____ and _____ are two defects of voltaic cell.

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15. Match the following

Column A			Column B
A.	Transfer of electrons	( ) a.	Addition of H_2SO_4
B.	Dry cell	( ) b.	Method of charging a body
C.	Electrolysis of $CuSO_4$	( ) c.	———( )———
D.	Induction	( ) d.	Watt
E.	Resistance	( ) e.	Valence electrons
F.	Lower potential	( ) f.	———(•)———
G.	Open key	( ) g.	Carbon as a positive electrode
H.	Closed key	( ) h.	Depends on length of the conductor.
I.	Power	( ) i.	Heating effects of electricity.
J.	Electric iron	( ) j.	Negatively charged body

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16. Show that $1kWh = 3.6MJ$

A. 36

B. 0.36

C. 3.6

D. 360

Answer: C

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17. A gold leaf electroscope is used for

A. detect the presence of charge on a body

B. know the nature of charge on a charged body

C. find the amount of charge present on a charged body

D. Both (a) and (b)

Answer: D

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18. Which of the following can be reused after charging?

A. Dry cell

B. Leclanche cell

C. Voltaic cell

D. Lead acid cell

Answer: D

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19. Volt is the unit of_____

A. emf

B. current

C. resistance

D. charge

Answer: A

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20. The process of electrolysis is used in _____

.

A. gold covering

B. metallurgy

C. electric printing

D. All the above

Answer: D

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21. Clouds get electrically charged when

A. the ultraviolet rays of sun falls on them.

B. air molecules rub against water molecules.

C. cold currents of air rub against hot currents of air.

D. Both (b) and (c)

Answer: D

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22. During electrification by friction

A. protons are transferred from one body to another body.

B. neutrons are transferred from one body to another body.

C. None of the above

D.

Answer: C

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23. The electrical energy consumed by a 30 W bulb in 5 minutes is _____ .

A. 9000 kJ

B. 9 Kj

C. 9000 MJ

D. 9 MJ

Answer: B

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24. SI unit of electric charge is :

A. ampere

B. volt

C. joule

D. coulomb

Answer: D

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25. The S.I. unit of surface charge density is _____ .

A. C cm^{-2}

B. A m^{-2}

C. A cm^{-2}

D. C m^{-2}

Answer: D

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26. If 2 A of current flows through a conductor, the charge that flows in one minute is _____ C.

A. 12

B. 120

C. 60

D. 16

Answer: B

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27. When no charge is supplied to or removed from a neutral body, then the amount of _____.

A. positive charge = negative charge present in it

B. positive charge $>$ negative charge present in it

C. positive charge $<$ negative charge present in it

D. no charge is present in the body initially.

Answer: A

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28. Two wires of same material and length have the radii of their cross sections as r and 2r, respectively. The ratio of their resistances

A. $2:1$

B. $4:1$

C. $1:4$

D. $3:2$

Answer: B

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29. Which among the following has carbon as the positive electrode?

A. Lechanche

B. Bichromate cell

C. Dry cell

D. All of the above

Answer: D

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30. The charge supplied to a good conductor always resides

A. at the supplied position itself.

B. on its outer surface.

C. inside the body.

D. All the above.

Answer: B

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31. The process suitable for charging a glass rod is

A. conduction.

B. induction.

C. rubbing against a suitable substance.

D. All of the above

Answer: C

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32. The bluish white streak of light seen during lightning is due to

A. a change of colour of the clouds, as charge passes between the clouds.

B. burning of clouds producing an intense white light.

C. air becoming white hot as charge passes between the clouds.

D. None of the above

Answer: C

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33. During lightning, thunder is produced due to

A. a sudden expansion of air due to intense heat.

B. a collision among clouds.

C. a sudden expansion of clouds due to intense heat.

D. None of the above

Answer: A

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34. In which of the following cells, carbon is not used as positive electrode ?

A. Leclanche cell

B. Lead-acid storage battery.

C. Dry cell

D. None of the above

Answer: B

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35. Which is false about electrolysis ?

A. Most commonly occurring chemical reaction in electrolysis is the 'chemical decomposition reaction'.

B. When an iron rod is to be electroplated with chromium, chromium electrode is used as anode and iron rod is used as cathode.

C. During electrolysis of water, H_2 accumulates at cathode and O_2

accumulates at anode.

D. When electrolysis is used in metallurgical applications, the concentration of electrolyte changes.

Answer: D

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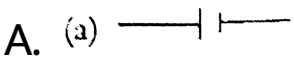
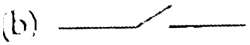
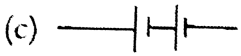
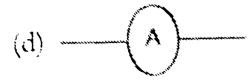
36. In a circuit, a battery can be represented by

A. 

B. 

C. 

D. 

Answer: C

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37. An electric current of 6 A flows through a circuit for 10 minutes. Write the following steps in sequential order to find the electrons that would pass through the circuit in 10

minutes.

Note the given data about current (i) and time (t).

The number of electrons (n) flowing through the circuit can be found using, Q = ne (2)

(c) Find the charge (Q) that flows through the circuit using , Q = it (1)

(d) Equate (1) and (2), to find n.

A. a d b c

B. a b c d

C. b c a d

D. a c b d

Answer: D

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38. Two bulbs each of 60 W and 80 W power are used for (1/4)th a day and (1/2) a day, respectively. Write the following steps in a sequential order to find the total number of units consumed by them when they are used for 30 days.

(a) Now, multiply E with 30, to get the energy consumed by them in 30 days.

(b) Find the electric energy consumed by each bulb in a day using $E_1 = P_1 t_1$ and $E_2 = P_2 t_2$.

(c) Note down the powers of the bulbs and the time for which they are used per day as P_1, P_2 and t_1, t_2 , respectively.

(d) Convert the time into hours.

(e) Find the total energy (E) consumed by them in one day, i.e., $E = E_1 + E_2$.

(f) Write the energy in terms of units, i.e., commercial unit of electric energy.

A. c d b e a f

B. c d e a b f

C. c d a d e f

D. c e a b d f

Answer: A

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39. Assertion (A) : All the bulbs connected in parallel glow brightly.

Reason (R) : All the bulbs are connected

directly to a battery and derive the required electrcial energy.

A. (A) and (R) are correct and (R) is correct explanation for (A) .

B. (A) and (R) are correct but (R) is not the correct explanation for (A).

C. (A) is correct but (R) is not correct.

D. Both (A) and (R) are not correct.

Answer: A

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40. Assertion (A): A 200 W bulb consumes 2 units of electrical energy when it is used for 10 hours.

Reason (R): 1 unit of electrical energy = 1000 k Wh .

A. (A) and (R) are correct and (R) is correct explanation for (A).

B. (A) and (R) are correct but (R) is not the correct explanation for (A).

C. (A) is correct but (R) is not correct.

D. Both (A) and (R) are not correct.

Answer: C

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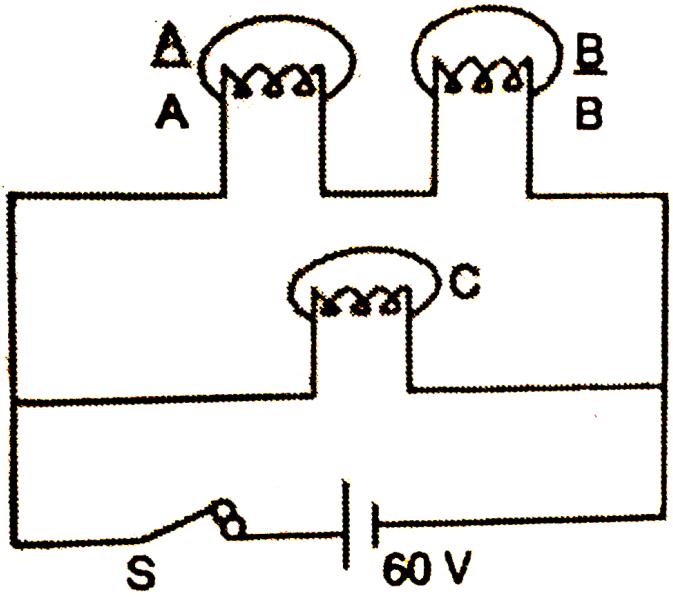
41. Choose the correct statement about the given circuit: Three identical bulbs are

connected as shown in the figure.



A. Bulbs A and B are in parallel with bulb 'C'.

B. The potential (e.m.f) in the circuit is 60 V.

C. When switch 'S' is turned on all bulbs glow with the same brightness.

D. Both (a) and (b).

Answer: D

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42. When a positively charged and another negtively charged bodies with equal magnitude of charge are brought simultaneously in contact with the cap of a positively charged electroscope, then the strips

A. move apart.

B. come closer.

C. remain uneffected.

D. Cannot be determined.

Answer: B

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43. A current carrying metallic comb is placed close to small iron filings, then the

A. iron filings will fly away from the comb, when switch is turned off.

B. iron filings align in the direction of the magnetic field produced around the metallic comb.

C. iron filings will be attracted by the comb.

D. Both (b) and (c).

Answer: B

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44. Choose the correct statement:

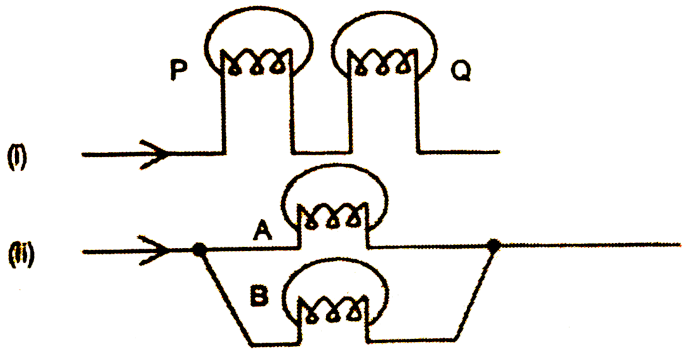
When the same current(i) flows through tow circuits as shown in the figures, then (assume that all bulbs are identical)

(A) bulbs in first combination glow with more brightness.

(B) bulbs in second combination glow with more brightness.

(C) bulbs in both the combination glow with

equal brightness.



A. Only (A) is true

B. Only (B) is true

C. Only (C) is true

D. Cannot be determined.

Answer: A

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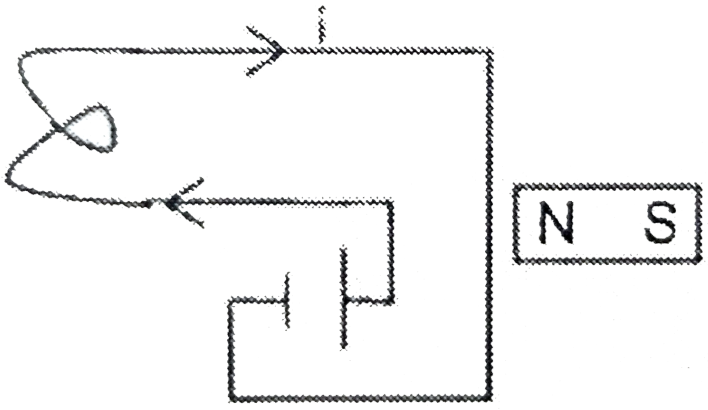
45. A magnet is brought close to a current carrying con-ductor as shown in figure, then



A. it will be repelled by the conductor.

B. it will be attracted by the conductor.

C. it will not show any effect.

D. it will be just deflected.

Answer: D

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Level 2

1. The length (16 cm) and area of cross section $\left(4cm^2\right)$ of a copper wire are increased by 25% each. If the resistance of original wire is 8Ω, find the new resistance.

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2. A charged thermocol ball is suspended by means of a nylon thread. When a neutral body is brought nearer to it the thermocol ball is first attracted by it and then flies away from it. Explain by giving the reason.

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3. A 100 W bulb offers less resistance to electric current than a 25 W bulb' - justify the

statement.

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4. Give two reasons why different electrical appliances in a domestic circuit are connected in parallel.

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5. When we mention the charge of body we indicate only the deficit or excess of electrons

in it but not protons. Why?

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6. Gasoline (explosive) transport trucks generally carry long chains of metal hanging down and touching the ground. Why?

Watch Video Solution

7. In an electric circuit, explain why a fuse is always connected in series.

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8. When a glass rod is rubbed with resin, a mass of $27.3 \times 10^{-14} g$ is transferred from glass rod to resin. Find the amount charge acquired by the glass rod. What is the nature of the charge? (Charge of electron $= 1.6 \times 10^{-19} C$, Mass of electron $= 9.1 \times 10^{-31} kg$)

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9. Two copper wires have equal length but the thickness of one is twice that of the other. If the resistance of the thin wire is 10Ω, find the resistance of the thick wire.

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10. A body 'P' contains 50 electrons and 45 protons and a body 'Q' contains 72 electrons and 77 protons after electrification by friction between the bodies. Find the number of electrons and protons in 'P' and 'Q' before

electrification. Also find the number of electrons transferred between them.

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11. A fluorescent lamp of 20 W and an incandescent bulb of 150 W are used for 5 hours per day in the month of February 2008. If the cost of one unit of electrical energy is Rs. 1.5, which of the two is more economical to use and by how much ?

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12. How much money can be saved per month by using a compact fluorescent lamp of 15 W in place of an incandescent bulb of 100 W if they are used 8 hours per day for 30 days? (Take the cost of one unit of electrical energy as Rs. 2)

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13. What is the difference between the current in the external circuit and inside an electric

cell ?

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14. During the electrolysis process 4 A electric current flows through a copper sulphate solution for 5 minutes. Determine the number of copper atoms deposited at the cathode.

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15. What are the differences between the flow of electric current through metal conductors and electrolytes?

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16. If $36.4 \times 10^{-15} g$ of mass is transferred when fur is rubbed with silk, find the number of electrons lost by fur? (mass of electron $= 9.1 \times 10^{-31}$ kg).

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17. The electrical energy consumed by an electric heater in a duration of 3 h is 0.6 K W h. What is the power consumed by the heater?

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18. Two spheres of equal charge densities have charges in the ratio 1 : 4 on their surfaces Then the ratio of their volumes

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19. Two bulbs P and Q are connected in series to a battery. If the resistance offered by the bulb P is more than that of bulb Q and 6 A of current is passed through the P, then what is the current through Q ?

 Watch Video Solution

20. Number of excess electrons present on a conducting body A is 6.25×10^{18}. When it is brought in contact with another identical

conducting body of charge - 5 coulomb, find the charge present on each body.

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Level 3

1. What is the use of glass bulb in an electric bulb? Can we use an electric bulb without the glass bulb in space?

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2. Can a charged body 'A' having a very small charge on it, be used to charge an uncharged body 'B' , such that the charge acquired by 'B' is many times more than that on 'A'? If so, how? Explain.

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3. A copper wire of mass 20 g carries a current of 6.023 A. What fraction of the total number of free electrons present in copper wire flows through the cross-section of the copper wire

in 2 s ?

(gram atomic weight of copper = 63.5 g)

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4. A, B and C are three indentical metallic spheres having positive, negative and positive charges, respectively. The deficiency or excess of electrons present in A, B and C are 10, 20 and 31, respectively. Initially the spheres A and B are brought in contact and then B and C are brought together. Determine the magnitude

and nature of charge present on the bodies after bringing them in contact. (Take charge of electorn as $1.6 \times 10^{-19} C$).

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5. The tyres of air craft are made of special rubber which make them slightly conducting. Explain the reasons for using special rubber.

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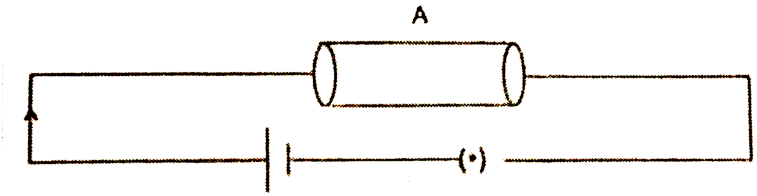
6. A is a conducting rod connected to a cell as shown in the diagram.



If 5 A of current passes through the circuit for 5 s, find the amount charge accumulated on 'A'.

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7. In an atom, electrons revolve around the nucleus in circular orbits. Can this be treated

as electric current?

If an electron revolves around the nucleus 2000 times in one second, what is the equivalent current? Given charge of the electrons as $1.6 \times 10^{-19} C$.

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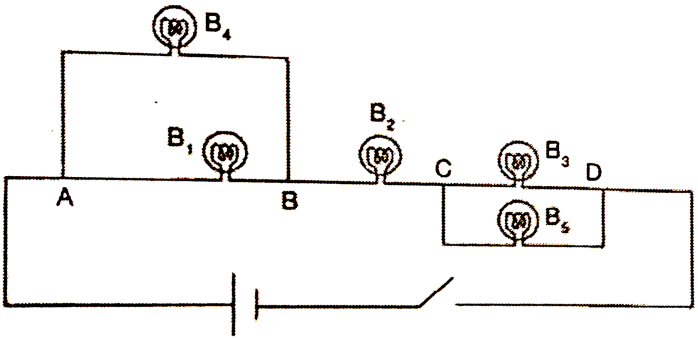
8. Bharat takes five identical bulbs B_1, B_2, B_3, B_4 and B_5 and connects them to a cell as shown in the figure. He compares

(i) The current passing through the different

bulbs and

(ii) the potential difference across different bulbs when the circuit is closed. What does he conclude?



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9. The following table provides the list of different appliances used by two families A

and B in April 2010. If the charge per unit is Rs. 4/-, calculate their monthly bill for April 2010.

	100 W Bulbs	Usage Per Day in hoursZ	Electric Fans of 200 W	Usage Per Day (in hours)	Refrigerator 2500 W	Usage Per Day (in hours)	Washing Machine 2000 W	Usage Per Day (in hours)
Family A	3	5	4	8	1	3	1	2
Family B	4	4	5	6	1	3	1	2

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10. Seeta says that a compact fluorescent lamp uses less electrical energy compared to that of an incandescent bulb. But Geeta, her friend, does not agree with this. Seeta proves it by calculating the money that can be saved per

month by using a compact fluorescent lamp of 15 W in place of an incandescent bulb of 100 W if they are used 8 hours per day for 30 days. How did she prove this? (The cost of one unit of electrical energy is Rs. 2)

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Test Your Concepts Very Short Answer Type Questions

1. What is the charge of an electron ? How many electrons make a coulomb of charge ?

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Watch Video Solution

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State the unit of charge ?

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Watch Video Solution

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Watch Video Solution

22. What is an electroscope?

Watch Video Solution

23. What do you mean by electric potential difference ? How is it measured ? Define its SI unit.

Watch Video Solution

24. What is electrolysis ?

Watch Video Solution

25. What is an electrical conductor ? Give some examples.

Watch Video Solution

26. What is heating effect of electric current? What is its origin?

Watch Video Solution

27. Define electric power and give its unit.

Watch Video Solution

28. Define electric current. What is the unit of electric current? Define it?

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Watch Video Solution

3. What is meant by charging a body ? Describe charging by conduction and charging by induction.

Watch Video Solution

4. Differentiate between primary and secondary cells.

Watch Video Solution

5. Explain the cause of electric current in a conductor.

Watch Video Solution

6. Explain electric circuit and draw a simple electric circuit.

Watch Video Solution

7. A person takes out a woolen cap from his head and observes the hair on his head rising up. Explain the reason for this?

Watch Video Solution

8. What is lightning ? Explain the phenomenon.

Watch Video Solution

9. Explain the applications of electrolysis.

Watch Video Solution

10. Why do we use a thin and long tungsten wire as a filament in bulb ?

Watch Video Solution

11. Explain the working of lightning rod.

Watch Video Solution

Test Your Concepts Essay Type Questions

1. Explain the construction and working of a gold leaf electroscope.

Watch Video Solution

2. Explain the construction and working of a dry cell.

Watch Video Solution

3. Explain atmospheric electricity. How did Benjamin Franklin prove that lighting strikes dues to atmospheric electricity?

Watch Video Solution

4. Explain the electrolysis of water

Watch Video Solution

5. Describe the construction and working of a Voltaic cell briefly.

Watch Video Solution

Concept Application Level 1 State Whether The Following Statements Are True Or False

1. In a neutral body, the amount of positive charge is equal to the amount of negative charge.

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2. The direction of conventional current is the same as the direction of the electronic current.

A. True

B. False

C.

D.

Answer:

Watch Video Solution

3. To protect buildings from lightning, a good conductor of electricity like a copper rod, is used.

Watch Video Solution

4. Conventionally, positively-charged bodies are considered to be at lower potential.

Watch Video Solution

5. When a conductor is connected to a source of current, the number of electrons entering at one end of the conductor is equal to the number of electrons leaving the conductor from the other end, per second

Watch Video Solution

6. An uncharged gold leaf electroscope can detect the nature of charge present on the charged body.

Watch Video Solution

7. When bulbs are connected in series, same current flows through them.

Watch Video Solution

Concept Application Level 1 Fill In The Blanks

1. The types of cells in which it is possible to restore the chemicals are called _____ .

Watch Video Solution

2. Why is nichrome used as a heating element ?

Watch Video Solution

3. Glass does not allow _____ to flow through it.

Watch Video Solution

4. Inside a cell, the conventional current flows from the _____terminal to the _____ terminal.

Watch Video Solution

5. An electroscope is used to find the _____ present on a body.

Watch Video Solution

6. The disadvantages of voltaic cells are _____ and _____

View Text Solution

Concept Application Level 1

1. Match the entries in Column A with the appropriate entries in Column B .

	Column A			Column B
A.	Transfer of electrons	( )	a.	Addition of H_2SO_4
B.	Dry cell	( )	b.	Method of charging a body
C.	Electrolysis of $CuSO_4$	( )	c.	
D.	Induction	( )	d.	Watt
E.	Resistance	( )	e.	Valence electrons
F.	Lower potential	( )	f.	
G.	Open key	( )	g.	Carbon as a positive electrode
H.	Closed key	( )	h.	Depends on length of the conductor.
I.	Power	( )	i.	Heating effects of electricity.
J.	Electric iron	( )	j.	Negatively-charged body

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Concept Application Level 1 Select The Correct Alternative

1. 1 kWh = _____ MJ.

A. 36

B. 0.36

C. 3.6

D. 360

Answer: C

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2. A gold leaf electroscope is used for

A. detect the presence of charge on a body

B. know the nature of charge on a charged body

C. find the amount of charge present on a charged body

D. Both (a) and (b)

Answer: D

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3. Which of the following can be reused after charging?

A. Dry cell

B. Leclanche cell

C. Voltaic cell

D. Lead acid cell

Answer: D

Watch Video Solution

4. Volt is the unit of_____

A. emf

B. current

C. resistance

D. charge

Answer: A

 Watch Video Solution

5. The process of electrolysis is used in _____ .

A. gold covering

B. metallurgy

C. electric printing

D. All the above

Answer: D

Watch Video Solution

6. Clouds get electrically charged when

A. the ultraviolet rays of sun falls on them.

B. air molecules rub against water molecules

C. cold currents of air rub against hot currents of air.

D. Both (b) and (d)

Answer: D

View Text Solution

7. During electrification by friction

A. protons are transferred from one body to another body.

B. neutrons are transferred from one body to another body.

C. electrons are transferred from one body to another body.

D. None of the above

Answer: C

Watch Video Solution

8. The electrical energy consumed by a 30 W bulb in 5 minutes is _____ .

A. 9000 kJ

B. 9 Kj

C. 9000 MJ

D. 9 MJ

Answer: B

Watch Video Solution

9. The S.I. unit of electric charge is_____

A. ampere

B. volt

C. joule

D. coulomb

Answer: D

Watch Video Solution

10. The S.I. unit of surface charge density is _____ .

A. Ccm^{-2}

B. Am^{-2}

C. Acm^{-2}

D. Cm^{-2}

Answer: D

Watch Video Solution

11. If 2 A of current flows through a conductor, the charge that flows in one minute is _____ C.

A. 12

B. 120

C. 60

D. 16

Answer: B

Watch Video Solution

12. When no charge is supplied to or removed from a neutral body, then the amount of _____.

A. positive charge = negative charge present in it

B. positive charge $>$ negative charge present in it

C. positive charge $<$ negative charge present in it

D. no charge is present in the body initially.

Answer: A

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13. Two wires of same material and length have the radii of their cross sections as r and 2r, respectively. The ratio of their resistances

A. $2:1$

B. $4:1$

C. $1:4$

D. $3:2$

Answer: B

Watch Video Solution

14. Which among the following has carbon as the positive electrode?

A. Lechanche

B. Bichromate cell

C. Dry cell

D. All of the above

Answer: D

Watch Video Solution

15. The charge supplied to a good conductor always resides

A. at the supplied position itself.

B. on its outer surface.

C. inside the body.

D. All the above.

Answer: B

Watch Video Solution

16. The process suitable for charging a glass rod is

A. conduction

B. induction

C. rubbing against a suitable substance.

D. All of the above

Answer: C

Watch Video Solution

17. The bluish white streak of light seen during lightning is due to

A. a change of colour of the clouds, as charge passes between the clouds.

B. burning of clouds producing an intense white light.

C. air becoming white hot as charge passes between the clouds.

D. None of the above

Answer: C

Watch Video Solution

18. During lightning, thunder is produced due to

A. a sudden expansion of air due to intense heat.

B. a collision among clouds.

C. a sudden expansion of clouds due to intense heat.

D. None of the above

Answer: A

Watch Video Solution

19. In which of the following cells, carbon is not used as positive electrode ?

A. Leclanche cell

B. Lead-acid storage battery.

C. Dry cell

D. None of the above

Answer: B

Watch Video Solution

20. Which is false about electrolysis ?

A. Most commonly occurring chemical reaction in electrolysis is the chemical decomposition reaction.

B. When an iron rod is to be electroplated with chromium, chromium electrode is used as anode and iron rod is used as cathode.

C. During electrolysis of water, H_2 accumulates at cathode and O_2

accumulates at anode.

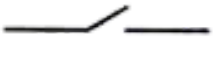
D. When electrolysis is used in metallurgical applications, the concentration of electrolyte changes.

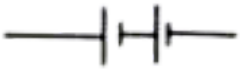
Answer: D

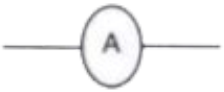
Watch Video Solution

21. In a circuit, a battery can be represented by

A. 

B. 

C. 

D. 

Answer: C

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22. An electric current of 6 A flows through a circuit for 10 minutes. Write the following steps in sequential order to find the electrons

that would pass through the circuit in 10 minutes.

Note the given data about current (i) and time (t).

The number of electrons (n) flowing through the circuit can be found using, Q = ne (2)

(c) Find the charge (Q) that flows through the circuit using , Q = it (1)

(d) Equate (1) and (2), to find n.

A. ADBC

B. ABCD

C. BCAD

D. ACBD

Answer: D

Watch Video Solution

23. Two bulbs each of 60 W and 80 W power are used for (1/4)th a day and (1/2) a day, respectively. Write the following steps in a sequential order to find the total number of units consumed by them when they are used for 30 days.

(a) Now, multiply E with 30, to get the energy consumed by them in 30 days.

(b) Find the electric energy consumed by each bulb in a day using $E_1 = P_1 t_1$ and $E_2 = P_2 t_2$.

(c) Note down the powers of the bulbs and the time for which they are used per day as P_1, P_2 and t_1, t_2 , respectively.

(d) Convert the time into hours.

(e) Find the total energy (E) consumed by them in one day, i.e., $E = E_1 + E_2$.

(f) Write the energy in terms of units, i.e., commercial unit of electric energy.

A. C D B E A F

B. C D E A B F

C. C B A D E F

D. C E A B D F

Answer: A

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24. Assertion (A) : All the bulbs connected in parallel glow brightly.

Reason (R) : All the bulbs are connected

directly to a battery and derive the required electrcial energy.

A. (A) and (R) are correct and (R) is correct explanation for (A).

B. (A) and (R) are correct but (R) is not the correct explanation for (A).

C. (A) is correct but (R) is not correct.

D. Both (A) and (R) are not correct.

Answer: A

 Watch Video Solution

25. Assertion (A): A 200 W bulb consumes 2 units of electrical energy when it is used for 10 hours.

Reason (R): 1 unit of electrical energy = 1000 k Wh .

A. (A) and (R) are correct and (R) is correct explanation for (A).

B. (A) and (R) are correct but (R) is not the correct explanation for (A).

C. (A) is correct but (R) is not correct.

D. Both (A) and (R) are not correct.

Answer: C

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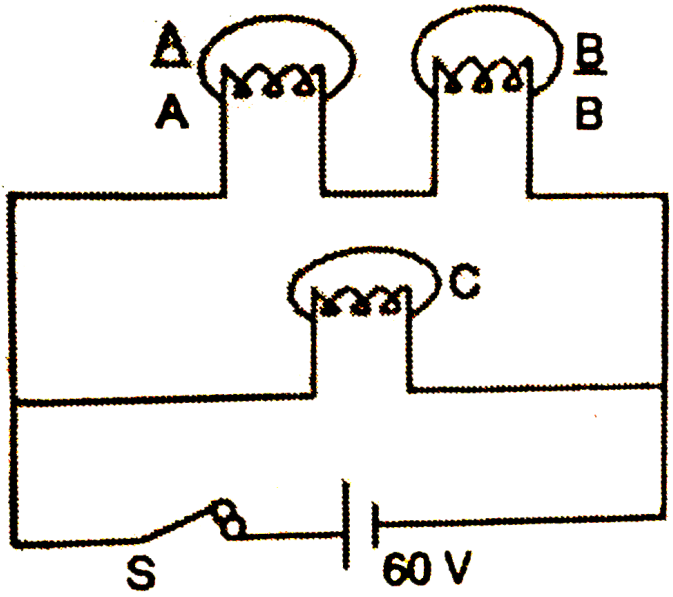
26. Choose the correct statement about the given circuit: Three identical bulbs are

connected as shown in the figure.



A. Bulbs A and B are in parallel with bulb 'C'

B. The potential (e.m.f) in the circuit is 60 V.

C. When switch 'S' is turned on all bulbs glow with the same brightness.

D. Both (a) and (b)

Answer: D

Watch Video Solution

27. When a positively charged and another negtively charged bodies with equal magnitude of charge are brought simultaneously in contact with the cap of a positively charged electroscope, then the strips

A. move apart

B. come closer

C. remain uneffected.

D. Cannot be determined.

Answer: B

Watch Video Solution

28. What happens when a current carrying metallic comb is placed close to small iron filings?

A. iron filings will fly away from the comb, when switch is turned off.

B. iron filings align in the direction of the magnetic field produced around the metallic comb.

C. iron filings will be attracted by the comb.

D. Both (b) and (c).

Answer: B

Watch Video Solution

29. Choose the correct statement:

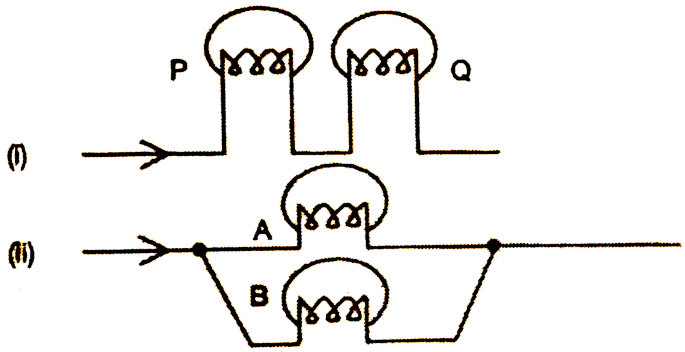
When the same current(i) flows through tow circuits as shown in the figures, then (assume that all bulbs are identical)

(A) bulbs in first combination glow with more brightness.

(B) bulbs in second combination glow with more brightness.

(C) bulbs in both the combination glow with

equal brightness.



A. Only (A) is true

B. Only (B) is true

C. Only (C) is true

D. Cannot be determined

Answer: A

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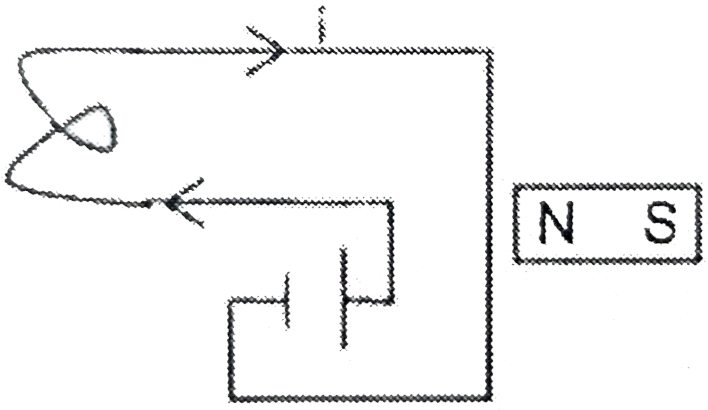
30. A magnet is brought close to a current carrying con-ductor as shown in figure, then



A. it will be repelled by the conductor.

B. it will be attracted by the conductor.

C. it will not show any effect.

D. it will be just deflected.

Answer: D

Watch Video Solution

31. The length (16 cm) and area of cross section $\left(4cm^2\right)$ of a copper wire are increased by 25% each. If the resistance of original wire is 8Ω, find the new resistance.

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Concept Application Level 2

1. A charged thermocol ball is suspended by means of a nylon thread. When a neutral body is brought nearer to it the thermocol ball is first attracted by it and then flies away from it. Explain by giving the reason.

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2. A 100 W bulb offers less resistance to electric current than a 25 W bulb' - justify the

statement.

Watch Video Solution

3. Give two reasons why different electrical appliances in a domestic circuit are connected in parallel.

Watch Video Solution

4. When we mention the charge of body we indicate only the deficit or excess of electrons

in it but not protons. Why?

Watch Video Solution

5. Gasoline (explosive) transport trucks generally carry long chains of metal hanging down and touching the ground. Why?

Watch Video Solution

6. In an electric circuit, explain why a fuse is always connected in series.

Watch Video Solution

7. When a glass rod is rubbed with resin, a mass of $27.3 \times 10^{-14} g$ is transferred from glass rod to resin. Find the amount charge acquired by the glass rod. What is the nature of the charge? (Charge of electron $= 1.6 \times 10^{-19} C$, Mass of electron $= 9.1 \times 10^{-31} kg$)

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8. Two copper wires have equal length but the thickness of one is twice that of the other. If the resistance of the thin wire is 10Ω, find the resistance of the thick wire.

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9. A body 'P' contains 50 electrons and 45 protons and a body 'Q' contains 72 electrons and 77 protons after electrification by friction between the bodies. Find the number of electrons and protons in 'P' and 'Q' before

electrification. Also find the number of electrons transferred between them.

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10. A fluorescent lamp of 20 W and an incandescent bulb of 150 W are used for 5 hours per day in the month of February 2008. If the cost of one unit of electrical energy is Rs. 1.5, which of the two is more economical to use and by how much ?

Watch Video Solution

11. How much money can be saved per month by using a compact fluorescent lamp of 15 W in place of an incandescent bulb of 100 W if they are used 8 hours per day for 30 days? (Take the cost of one unit of electrical energy as Rs. 2)

Watch Video Solution

12. What is the difference between the current in the external circuit and inside an electric

cell ?

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13. During the electrolysis process 4 A electric current flows through a copper sulphate solution for 5 minutes. Determine the number of copper atoms deposited at the cathode.

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14. What are the differences between the flow of electric current through metal conductors and electrolytes?

Watch Video Solution

15. If $36.4 \times 10^{-15} g$ of mass is transferred when fur is rubbed with silk, find the number of electrons lost by fur? (mass of electron $= 9.1 \times 10^{-31}$ kg).

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16. The electrical energy consumed by an electric heater in a duration of 3 h is 0.6 K W h. What is the power consumed by the heater?

Watch Video Solution

17. Two spheres of equal charge densities have charges in the ratio 1 : 4 on their surfaces Then the ratio of their volumes

Watch Video Solution

18. Two bulbs P and Q are connected in series to a battery. If the resistance offered by the bulb P is more than that of bulb Q and 6 A of current is passed through the P, then what is the current through Q ?

Watch Video Solution

19. Number of excess electrons present on a conducting body A is 6.25×10^{18}. When it is brought in contact with another identical

conducting body of charge - 5 coulomb, find the charge present on each body.

Watch Video Solution

Concept Application Level 3

1. What is the use of glass bulb in an electric bulb? Can we use an electric bulb without the glass bulb in space?

Watch Video Solution

2. Can a charged body 'A' having a very small charge on it, be used to charge an uncharged body 'B' , such that the charge acquired by 'B' is many times more than that on 'A'? If so, how? Explain.

Watch Video Solution

3. A copper wire of mass 20 g carries a current of 6.023 A. What fraction of the total number of free electrons present in copper wire flows through the cross-section of the copper wire

in 2 s ?

(gram atomic weight of copper = 63.5 g)

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4. A, B and C are three indentical metallic spheres having positive, negative and positive charges, respectively. The deficiency or excess of electrons present in A, B and C are 10, 20 and 31, respectively. Initially the spheres A and B are brought in contact and then B and C are brought together. Determine the magnitude

and nature of charge present on the bodies after bringing them in contact. (Take charge of electorn as $1.6 \times 10^{-19} C$).

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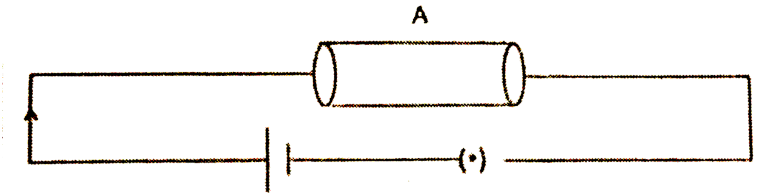
5. The tyres of air craft are made of special rubber which make them slightly conducting. Explain the reasons for using special rubber.

Watch Video Solution

6. A is a conducting rod connected to a cell as shown in the diagram.



If 5 A of current passes through the circuit for 5 s, find the amount charge accumulated on 'A'.

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7. In an atom, electrons revolve around the nucleus in circular orbits. Can this be treated

as electric current?

If an electron revolves around the nucleus 2000 times in one second, what is the equivalent current? Given charge of the electrons as $1.6 \times 10^{-19} C$.

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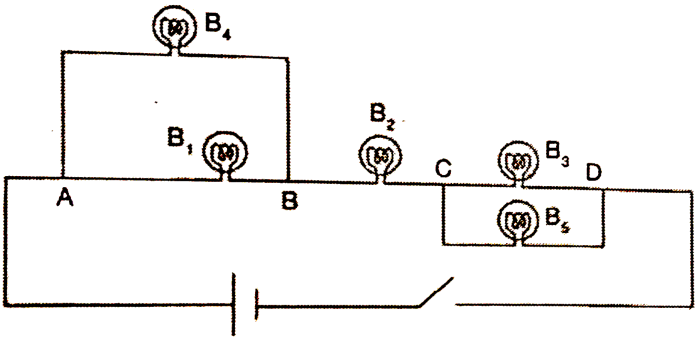
8. Bharat takes five identical bulbs B_1, B_2, B_3, B_4 and B_5 and connects them to a cell as shown in the figure. He compares

(i) The current passing through the different

bulbs and

(ii) the potential difference across different bulbs when the circuit is closed. What does he conclude?



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9. The following table provides the list of different appliances used by two families A

and B in April 2010. If the charge per unit is Rs. 4/-, calculate their monthly bill for April 2010.

	100 W Bulbs	Usage Per Day in hoursZ	Electric Fans of 200 W	Usage Per Day (in hours)	Refrigerator 2500 W	Usage Per Day (in hours)	Washing Machine 2000 W	Usage Per Day (in hours)
Family A	3	5	4	8	1	3	1	2
Family B	4	4	5	6	1	3	1	2

Watch Video Solution

10. Seeta says that a compact fluorescent lamp uses less electrical energy compared to that of an incandescent bulb. But Geeta, her friend, does not agree with this. Seeta proves it by calculating the money that can be saved per

month by using a compact fluorescent lamp of 15 W in place of an incandescent bulb of 100 W if they are used 8 hours per day for 30 days. How did she prove this? (The cost of one unit of electrical energy is Rs. 2)

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