

Questions

(1) Write the scientific term:

- 1- It is the breaking up of coherences (bonds) in some molecules of the reactants and formation of new coherences in the molecules of new resultants (products) from the reaction. ()
- 2- They are the reactions which involve the breaking up of the compounds by the effect of heat. ()
- 3- They are the reactions which depend on the activity of the metals, where the element which is more active substitutes (replaces) the less active one in another compound. ()
- 4- It is the arrangement of the metals in a descending order according to the degree of their chemical activity. ()
- 5- They are chemical reactions in which one of the elements substitutes another element in a solution of one of its compounds. ()
- 6- They are the reactions in which double substitution (exchange) occurs between the ions (radicals) of two compounds to give two other new compounds. ()
- 7- It is the reaction between an acid and an alkali to form salt and water. ()
- 8- * A chemical process which causes the increase of the oxygen percentage or the decrease of hydrogen percentage.
* A chemical process where the atom loses an electron or more. ()

- 9- * A chemical process which causes the decrease of the oxygen percentage or the increase of hydrogen percentage.
* A chemical process where the atom gains an electron or more.
()
- 10- * It is the substance which gives oxygen or takes hydrogen away during a chemical reaction.
* It is the substance which gains an electron or more during a chemical reaction.
()
- 11- * It is the substance which takes oxygen away or gives hydrogen during a chemical reaction.
* It is the substance which loses an electron or more during a chemical reaction.
()
- 12- It is the change in the concentration of the reactants and the resultants at a unit of time.
()
- 13- They are slow reacting compounds because they don't break up into ions as the reaction takes place between molecules.
()
- 14- They are fast reacting compounds because they break up into ions and the reaction takes place between ions.
()
- 15- It is a substance which speeds up the chemical reaction without changing or being used up.
()
- 16- It is the catalyst which speeds up the chemical reaction.
()
- 17- It is the catalyst which slows down the chemical reaction.
()
- 18- It is the mixture in which the solute molecules are regularly distributed in the solvent parts.
()

- 19- It is the mixture in which the solute molecules are irregularly distributed in the solvent parts. ()
- 20- It is the mixture that is homogenous in composition and properties. ()
- 21- The substance which is found with the greater amount in the solution (the substance in which the solute is dissolved). ()
- 22- The substance which is found with the smaller amount in the solution (the substance which dissolves in solvent). ()
- 23- It is the solution in which an additional amount of the solute can be dissolved at a certain temperature. ()
- 24- It is the solution in which no additional amount of the solute can be dissolved without a change of the temperature. ()
- 25- It is the solution which allows the dissolution of an additional amount of the solute with the increase of the temperature. ()
- 26- It is a substance whose aqueous solution contains positive hydrogen ions (H^+) or positive protons. ()
- 27- It is a substance whose aqueous solution contains negative hydroxide ions (OH^-) ()
- 28- It is a chemical compound which is resulted from the reaction of acid with alkali. ()

(2) Give reasons for:

- 1- The formation of silvery colour on heating of red mercuric oxide.
- 2- The formation of black substance by heating of blue copper hydroxide.
- 3- The formation of black substance by heating of copper carbonate.
- 4- The blue colour of copper sulphate turns into black by heating.
- 5- A yellowish white colour is formed on heating white sodium nitrate.

- 6- * Sodium is kept under kerosene and never kept under the surface of water.
* Sodium fires are not put off with water.
- 7- Both aluminium and zinc react with dilute hydrochloric acid, while copper doesn't react with the same acid.
- 8- The reaction between aluminum and dilute hydrochloric acid takes a short time to start.
- 9- Magnesium substitutes copper in copper sulphate solution, while the opposite cannot happen.
- 10- A brownish red precipitate is formed when magnesium is added to copper sulphate solution.
- 11- The blue colour of copper sulphate disappears on putting a piece of zinc in it.
- 12- The occurrence of effervescence on putting a piece of aluminum in diluted hydrochloric acid.
- 13- A white precipitate is formed on adding silver nitrate solution to sodium chloride solution.
- 14- In the reaction: $\text{H}_2 + \text{CuO} \rightarrow \text{Cu} + \text{H}_2\text{O}$ hydrogen is considered as a reducing agent, while copper oxide is considered as an oxidizing agent.
- 15- In the reaction of hydrogen with hot copper oxide, hydrogen is oxidized, while copper oxide is reduced.
- 16- In the reaction: $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$ sodium is considered as a reducing agent, while chlorine is considered as an oxidizing agent.
- 17- Oxidation and reduction are concurrent processes.
- 18- A blue precipitate is formed on adding sodium hydroxide solution to copper sulphate solution.
- 19- Reactions between ionic compounds are fast whereas, reactions between organic compounds are slow.
- 20- A certain mass of iron filings reacts with acids faster than the reaction of a block of iron have the same mass with acids.

- 21- Using nickel filings in hydrating of oil instead of pieces of nickel.
- 22- Burning of the steel scourers used for cleaning of aluminum in a jar full of oxygen is faster than its burning in atmospheric air.
- 23- The speed of chemical reaction increases when the amount (concentration) of the reactants increases.
- 24- The rate (speed) of chemical reaction increases by heating.
- 25- Food must be heated during its preparation.
- 26- Food goes rotten in summer days if it is not frozen.
- 27- The fridge is used to preserve food.
- 28- Catalyst is used in some chemical reactions.
- 29- Adding a few manganese dioxide to the hydrogen peroxide during the preparation of oxygen gas in laboratory.
- 30- Sweet potato enhances the decomposition of hydrogen peroxide.
- 31- Table salt solution is considered as a homogenous mixture.
- 32- The molten of coinage metals is considered as a type of solution.
- 33- Oil in water mixture is considered as a non-homogenous mixture.
- 34- We must increase the temperature during the preparation of super-saturated solution.
- 35- The aqueous solution of acids changes the blue litmus paper into red.
- 36- The aqueous solution of bases changes the red litmus paper into blue.
- 37- Acids are necessary for digestion process in human body.
- 38- Eating of orange in winter is very important.
- 39- The green leaves of vegetables have a great benefit.
- 40- Magnesium hydroxide is used in the manufacture of antacids medicines.
- 41- Calcium oxide is used in building works.
- 42- Eating food that contains calcium and magnesium minerals is very important specially for children.
- 43- Sodium and potassium minerals have a role in the human body.

(3) Complete the following:

- 1) Nitrogen pentoxide breaks up into and gas.
- 2) At the beginning of the reaction, the concentration of reactants is
- 3) The speed of a chemical reaction can be measured practically by the rate of of reactants or the rate of of resultants.
- 4) The change in the concentration of reactants and resultants in a time unit is
- 5) The rate of chemical reaction depends on,,and
- 6) The reaction of contributing compounds is
- 7) The increase in concentration of reactants makes the chemical reaction
- 8) A substance which increases the chemical reaction without sharing in the reaction is
- 9) $2\text{NaOH} + \text{CuSO}_4 \rightarrow \dots\dots\dots + \dots\dots\dots$
- 10) $\text{Fe} + 2\text{HCl} \rightarrow \dots\dots\dots + \dots\dots\dots$
- 11) $2\text{N}_2\text{O}_5 \rightarrow \dots\dots\dots + \dots\dots\dots$
- 12) is the mixture that is homogenous in and properties.
- 13) It is possible to dissolve more solute in the solution.
- 14) An excess of the solute cannot be dissolved in solution.
- 15) The amount of the solute in saturated solution is than that in super-saturated solution.
- 16) The aqueous solution of an acid contains ions, while that of a base contains ions.
- 17) Acids change the litmus paper into

- 18) Acids react with to give and water.
- 19) Most bases have feel like
- 20) acid is produced in human muscles during physical exercises.
- 21) Calcium carbonates is used in the manufacture of and
.....
- 22) Silve nitrates are used in the manufacture of sensitive

(4) Mention one use for each:

1- Hydrochloric acid

2- Magnesium hydroxide

(5) How can you differentiate between:

Sodium chloride solution and sodium hydroxide solution (by two different methods)

Unit (2)

(1) Complete:

- 1- The current intensity due to the flow of 2700 coulomb in 300 second through a cross-section of a conductor equals
- 2- In the electric circuits, the ammeter is connected in, while the voltmeter is connected in
- 3- Volt = $\frac{\text{joule}}{\text{.....} \times \text{second}}$
- 4- There are two types of electric current which are and
- 5- The electric current can be transported only to short distance.
- 6- There are two methods of connecting electric cells which are and

(2) Write the scientific terms:

- 1- The flow of electric negative charges in a conducting material (metal wire). (.....)
- 2- A device used to measure the electric current intensity. (.....)
- 3- The work done to transfer unit of electric charge between two ends of a conductor. (.....)
- 4- The opposition to the flow of electric current in the conductor. (.....)
- 5- The potential difference across the two poles of the battery when the circuit is opened. (.....)
- 6- The electric current of constant intensity and direction. (.....)
- 7- A type of connection of electric cells used to obtain high e.m.f. (.....)

(3) Choose the correct answer:

- 1- Electrons are charged particles.
a) positively b) neutral
c) negatively d) no correct answer
- 2- is the measuring unit of the electric charges.
a) coulomb b) Ampere
c) volt d) no correct answer
- 3- is used to measure the e.m.f. of a battery.
a) Voltmeter b) Ammeter c) Rheostat d) ohmmeter
- 4- is the measuring unit of electric resistance.
a) ohm b) ampere c) volt d) coulomb
- 5- As the length of rheostat wire increases, the current intensity
a) increases b) decreases
c) constant d) there is no answer
- 6- Direct current can be produced from
a) electrochemical cells b) electric generators
c) electric power stations d) electric motors
- 7- In the simple cell the energy is converted into electric energy.
a) kinetic b) magnetic c) chemical d) mechanical
- 8- In dynamo, energy is converted into electric energy.
a) magnetic b) kinetic c) chemical d) light
- 9- Alternating current is used in
a) electrolysis b) lighting house
c) electroplating d) both a & c

(4) Give reasons for:

- 1- It is better to use alternating current rather than direct current.
- 2- The voltmeter is connected across the two poles of a battery.
- 3- Rheostat is used in some electric circuits.
- 4- Some cells are connected in electric circuit in series.
- 5- Some cells are connected in the electric circuit in parallel.
- 6- e.m.f. of battery whose cells are connected in series is greater than that connected in parallel.

(5) Problems:

- 1- Calculate the electric current intensity that flows through cross section of a wire, if a charge of 10 coulombs passes through in 2 seconds.
- 2- Calculate the current intensity due to the flow of 5400 coulomb in 5 min. through a cross-section of a conductor.
- 3- What is the quantity of electricity which passes through a conductor its resistance 100 ohm for 30 minutes when the potential difference across its ends is 220 volts.
- 4- You have three similar cells, the electromotive force of each is 1.5 volt. Explain by using a diagram how you can connect them to obtain an e.m.f of:
a) 1.5 volts b) 3 volts c) 4.5 volts

Model Answers

(1) Write the scientific term:

- 1- It is the breaking up of coherences (bonds) in some molecules of the reactants and formation of new coherences in the molecules of new resultants (products) from the reaction. (**Chemical reaction**)
- 2- They are the reactions which involve the breaking up of the compounds by the effect of heat. (**Thermal decomposition reactions**)
- 3- They are the reactions which depend on the activity of the metals, where the element which is more active substitutes (replaces) the less active one in another compound. (**substitution reactions**)
- 4- It is the arrangement of the metals in a descending order according to the degree of their chemical activity. (**Chemical activity series**)
- 5- They are chemical reactions in which one of the elements substitutes another element in a solution of one of its compounds. (**simple substitution reactions**)
- 6- They are the reactions in which double substitution (exchange) occurs between the ions (radicals) of two compounds to give two other new compounds. (**Double substitution reactions**)
- 7- It is the reaction between an acid and an alkali to form salt and water. (**Neutralization reaction**)
- 8- * A chemical process which causes the increase of the oxygen percentage or the decrease of hydrogen percentage.
* A chemical process where the atom loses an electron or more. (**Oxidation process**)

- 9- * A chemical process which causes the decrease of the oxygen percentage or the increase of hydrogen percentage.
* A chemical process where the atom gains an electron or more.
(**Reduction process**)
- 10- * It is the substance which gives oxygen or takes hydrogen away during a chemical reaction.
* It is the substance which gains an electron or more during a chemical reaction.
(**Oxidizing agent "factor"**)
- 11- * It is the substance which takes oxygen away or gives hydrogen during a chemical reaction.
* It is the substance which loses an electron or more during a chemical reaction.
(**Reducing agent "factor"**)
- 12- It is the change in the concentration of the reactants and the resultants at a unit of time.
(**The speed of chemical reaction**)
- 13- They are slow reacting compounds because they don't break up into ions as the reaction takes place between molecules.
(**Covalent [coordinate] compounds**)
- 14- They are fast reacting compounds because they break up into ions and the reaction takes place between ions.
(**Ionic compounds**)
- 15- It is a substance which speeds up the chemical reaction without changing or being used up.
(**Catalyst**)
- 16- It is the catalyst which speeds up the chemical reaction.
(**Positive catalyst**)
- 17- It is the catalyst which slows down the chemical reaction.
(**Negative catalyst**)
- 18- It is the mixture in which the solute molecules are regularly distributed in the solvent parts.
(**Homogenous mixture**)
- 19- It is the mixture in which the solute molecules are irregularly distributed in the solvent parts.
(**Non-homogenous mixture**)

20- It is the mixture that is homogenous in composition and properties.

(**Solution**)

21- The substance which is found with the greater amount in the solution (the substance in which the solute is dissolved). (**The solvent**)

22- The substance which is found with the smaller amount in the solution (the substance which dissolves in solvent). (**The solute**)

23- It is the solution in which an additional amount of the solute can be dissolved at a certain temperature. (**Unsaturated solution**)

24- It is the solution in which no additional amount of the solute can be dissolved without a change of the temperature. (**saturated solution**)

25- It is the solution which allows the dissolution of an additional amount of the solute with the increase of the temperature.

(**Supper-saturated solution**)

26- It is a substance whose aqueous solution contains positive hydrogen ions (H^+) or positive protons. (**Acid**)

27- It is a substance whose aqueous solution contains negative hydroxide ions (OH^-) (**Base [alkali]**)

28- It is a chemical compound which is resulted from the reaction of acid with alkali. (**Mineral [salt]**)

(2) Give reasons for:

1-The formation of silvery colour on heating of red mercuric oxide.

Due to decomposition of mercuric oxide by heat into mercury (silver colour) and oxygen gas.

2- The formation of black substance by heating of blue copper hydroxide.

Due to decomposition of copper hydroxide by heat into copper oxide (black) and water.

3- The formation of black substance by heating of copper carbonate.

Due to decomposition of copper carbonate by heat into copper oxide (black) and carbon dioxide gas.

4- The blue colour of copper sulphate turns into black by heating.

Due to decomposition of copper sulphate by heat into copper oxide (black) and sulphur trioxide.

5- A yellowish white colour is formed on heating white sodium nitrate.

Due to decomposition of sodium nitrate by heat into sodium nitrite (yellowish white) and oxygen gas.

6- * Sodium is kept under kerosene and never kept under the surface of water.

*** Sodium fires are not put off with water.**

Because sodium reacts with water strongly and sodium hydroxide is produced and hydrogen gas evolves which burns with a pop sound.

7- Both aluminium and zinc react with dilute hydrochloric acid, while copper doesn't react with the same acid.

Because aluminum and zinc can replace the hydrogen of acid as they come before hydrogen in the chemical activity series, while copper can't replace the hydrogen of acid as it comes after hydrogen in the chemical activity series.

8- The reaction between aluminum and dilute hydrochloric acid takes a short time to start.

Due to the presence of a layer of aluminum oxide on the aluminum sheet which takes a time to separate from the aluminum, then aluminum becomes exposed to the acid.

9- Magnesium substitutes copper in copper sulphate solution, while the opposite cannot happen.

Because magnesium is more active than copper as it comes before copper in chemical activity series, while copper is less active than magnesium as it comes after magnesium in chemical activity series.

10- A reddish brown precipitate is formed when magnesium is added to copper sulphate solution.

Because magnesium replaces the copper as it comes before copper in the chemical activity series and copper precipitates as a reddish brown ppt.

11- The blue colour of copper sulphate disappears on putting a piece of zinc in it.

Because zinc is more active than copper (as it comes before copper in the chemical activity series) so it substitutes copper in copper sulphate solution forming colourless zinc sulphate.

12- The occurrence of effervescence on putting a piece of aluminum in diluted hydrochloric acid.

Because aluminum reacts with dil. Hydrochloric acid forming aluminum chloride and hydrogen gas evolves in the form of effervescence.

13- A white precipitate is formed on adding silver nitrate solution to sodium chloride solution.

Because silver nitrate reacts with sodium chloride to give sodium nitrate and a white precipitate of silver chloride.

14- In the reaction: $\text{H}_2 + \text{CuO} \rightarrow \text{Cu} + \text{H}_2\text{O}$ hydrogen is considered as a reducing agent, while copper oxide is considered as an oxidizing agent.

Because hydrogen takes oxygen and reduces copper oxide to copper and copper oxide loses oxygen and oxidizes hydrogen to water

15- In the reaction of hydrogen with hot copper oxide, hydrogen is oxidized, while copper oxide is reduced.

Because hydrogen takes oxygen and changes into water, while copper oxide loses oxygen and changes into copper.

16- In the reaction: $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$ sodium is considered as a reducing agent, while chlorine is considered as an oxidizing agent.

Because sodium atom loses an electron and changes into positive (+ve) ion, while chlorine atom gains an electron and changes into negative (-ve) ion.

17- Oxidation and reduction are concurrent processes.

Because they occur at the same time.

18- A blue precipitate is formed on adding sodium hydroxide solution to copper sulphate solution.

Due to the formation of colourless sodium sulphate and blue precipitate of copper hydroxide.

19- Reactions between ionic compounds are fast whereas, reactions between organic compounds are slow.

Because the reactions of ionic compounds take place between ions, while the reactions of organic compounds take place between molecules.

20- A certain mass of iron filings reacts with acids faster than the reaction of a block of iron have the same mass with acids.

Because the surface area in case of iron filings is larger than that in case of iron block (i.e. the molecules of acid react with most of iron molecules).

21- Using nickel filings in hydrating of oil instead of pieces of nickel.

To increase the surface area exposed to the reaction to increase the rate of oil hydrating.

22- Burning of the steel scourers used for cleaning of aluminum in a jar full of oxygen is faster than its burning in atmospheric air.

Because the concentration of oxygen inside the jar is more than that in air, so the number of collisions between molecules increases and consequently the speed of the reaction increases.

23- The speed of chemical reaction increases when the amount (concentration) of the reactants increases.

Due to the increase in the number of collisions between molecules therefore, the speed of the reaction increases.

24- The rate (speed) of chemical reaction increases by heating.

Because by increasing the temperature, the movement of molecules increases and the number of collisions between them increases consequently, the speed of the reaction increases.

25- Food must be heated during its preparation.

To increase the speed of chemical reactions which help in cooking of food.

26- Food goes rotten in summer days if it is not frozen.

Due to the increase of the speed of the chemical reactions done by bacteria.

27- The fridge is used to preserve food.

To decrease the temperature by cooling to slow down the reactions done by bacteria.

28- Catalyst is used in some chemical reactions.

To increase the rate of chemical reactions.

29- Adding a few manganese dioxide to the hydrogen peroxide during the preparation of oxygen gas in laboratory.

Because manganese dioxide acts as a catalyst which increase the speed of the reaction.

30- Sweet potato enhances the decomposition of hydrogen peroxide.

Because the oxidase enzyme in sweet potato acts as a catalyst which increases the rate of decomposition of hydrogen peroxide.

31- Table salt solution is considered as a homogenous mixture.

Because the solute molecules are regularly distributed in all parts of the solvent.

32- The molten of coinage metals is considered as a type of solution.

Because the coin is an alloy of copper dissolved in silver in a homogenous form.

33- Oil in water mixture is considered as a non-homogenous mixture.

Because the solute molecules are irregularly distributed in all solvent parts.

34- We must increase the temperature during the preparation of super-saturated solution.

To make the solution accept the dissolution of an additional amount of the solute.

35- The aqueous solution of acids changes the blue litmus paper into red.

Because it contains positive hydrogen ions (H^+)

36- The aqueous solution of bases changes the red litmus paper into blue.

Because it contains negative hydroxide ions (OH^-) .

37- Acids are necessary for digestion process in human body.

Because they help in the digestion of proteins in stomach.

38- Eating of orange in winter is very important.

Because it contains vitamin (C) which improves the immunity against the common cold.

39- The green leaves of vegetables have a great benefit.

Because they contain folic acid which is necessary for the proper growth of cells.

40- Magnesium hydroxide is used in the manufacture of antacids medicines.

Because it is used to neutralize the stomach acidity as it is a base.

41- Calcium oxide is used in building works.

Because calcium oxide is used in the manufacture of cement.

42- Eating food that contains calcium and magnesium minerals is very important specially for children.

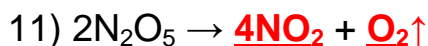
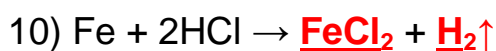
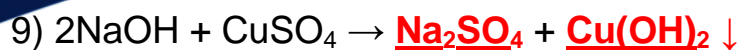
Because they are the main components of bones and teeth.

43- Sodium and potassium minerals have a role in the human body.

Because they are responsible for the transfer of nerve impulses.

(3) Complete the following:

- 1) Nitrogen pentoxide breaks up into nitrogen dioxide and oxygen gas.
- 2) At the beginning of the reaction, the concentration of reactants is 100%.
- 3) The speed of a chemical reaction can be measured practically by the rate of disappearance of reactants or the rate of appearance of resultants.
- 4) The change in the concentration of reactants and resultants in a time unit is the speed of chemical reaction.
- 5) The rate of chemical reaction depends on temperature, catalysts, concentration of reactants and natural of reactants.
- 6) The reaction of contributing compounds is slow.
- 7) The increase in concentration of reactants makes the chemical reaction faster.
- 8) A substance which increases the chemical reaction without sharing in the reaction is catalyst.



12- **Solution** is the mixture that is homogenous in **composition** and properties.

13- It is possible to dissolve more solute in the **unsaturated** solution.

14- An excess of the solute cannot be dissolved in **saturated** solution.

15- The amount of the solute in saturated solution is **less** than that in super-saturated solution.

16- The aqueous solution of an acid contains **H⁺** ions, while that of a base contains **OH⁻** ions.

17- Acids change the **blue** litmus paper into **red**.

18- Acids react with **bases** to give **salt** and water.

19- Most bases have **soapy** feel like **NaOH**.

20- **Lactic** acid is produced in human muscles during physical exercises.

21- Calcium carbonates is used in the manufacture of **glass** and **cement**.

22- Silver nitrates are used in the manufacture of sensitive **photographic film**.

(4) Mention one use for each:

1- **Hydrochloric acid:** in detergents and polishing metals surfaces needed to be coated

2- **Magnesium hydroxide:** in the manufacture of antacids.

(5) How can you differentiate between:

Sodium chloride solution and sodium hydroxide solution (by two different methods)

The first method: by adding silver nitrate solution if white ppt. is formed.

∴ the solution is sodium chloride:



The second method: by adding copper sulphate solution if blue ppt is formed.

∴ The solution is sodium hydroxide:



Unit (2)

(1) Complete:

1- 13.5 Amp.

2- series, parallel

3- volt = $\frac{\text{joule}}{\text{coulomb} \times \text{second}}$

4- direct – alternating

5- direct

6- series – parallel

(2) Write the scientific terms:

1- electric current

2- Ammeter

3- potential difference

4- resistance

5- e.m.f

6- direct electric current

7- series connection

(3)

1 – (c)

2 – (a)

3 – (a)

4 – (a)

5 – (b)

6 – (a)

7 – (c)

8 – (b)

9 – (b)

10 – (b)

11 – (d)

12 – (b)

(4) Give reasons for:

- 1- because it can be transferred to long distances & can be converted to direct current.
- 2- To measure e.m.f. of battery.
- 3- To control the current intensity passing through the circuit & potential difference by changing the resistance.
- 4- To obtain high e.m.f
- 5- To obtain low e.m.f.
- 6- because the total e.m.f. for a group of cells connecting in series is equal to the sum of the e.m.f for these cells, while the total e.m.f for a group of cells connecting in parallel is equal to the e.m.f of one cell.

(5)

1) $q = 10 \text{ coulombs}$ $t = 2 \text{ sec.}$

$$I = \frac{q}{t} = \frac{10}{2} = 5 \text{ Ampere .}$$

2) $q = 5400 \text{ coulomb}$ $t = 5 \times 60 = 300 \text{ sec .}$

$$I = \frac{q}{t} = \frac{5400}{300} = 18 \text{ Ampere .}$$

3) $R = 100 \text{ ohm}$, $t = 30 \times 60 = 180 \text{ sec.}$

$$, V = 220 \text{ v} , R = \frac{V}{I} , I = \frac{V}{R}$$

$$\therefore I = \frac{220}{100} = 2.2 \text{ Ampere .}$$

$$\therefore q = I \times t$$

$$= 2.2 \times 1800$$

$$= 3960 \text{ coulomb .}$$

