CHANGES AROUND US

LEARNING OBJECTIVES:

- Introduction
- Classification of changes
  - >Slow and fast changes
  - >Reversible and Irreversible changes
  - >Desirable and undesirable changes
  - >Periodic and non periodic changes
  - >Physical and chemical changes
  - >Characteristics of physical and chemical changes
- Chemical equations
- Balanced equation

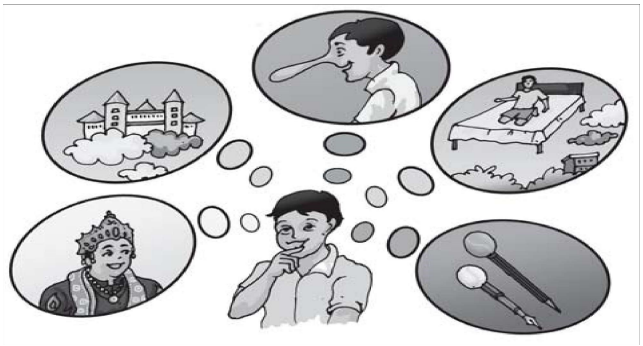
Real LIfe Applications:

Φ No new chemical species forms in a physical change. Changing state of a pure substance between solid, liquid, and gas phases of matter are all physical changes, since the identity of the matter does not change,melting an ice cube,casting silver in a mold,breaking a bottle

Φ A new compound (product) results from a chemical change as the atoms rearrange themselves to form new chemical bonds.burning wood,souring milk,mixing acid and base,digesting food,cooking an egg,heating sugar to form caramel,baking a cake

§§ ***Introduction:***

In our daily life, we observe many changes a round us everything in this universe undergoes a change. These changes may be observed by us at school, home, play ground, garden or any other place.The changes can bring about different kinds of alterations in things around us. Some of the alterations brought about are permanent in Nature and other are temporary in Nature are permanent in Nature and other are temporary in Nature.



Classification of changes: The changes taking place around us can be classified as under

1) Slow and fast changes
2) Reversible and irreversible changes
3) Desirable and undesirable changes
4) Periodic and non periodic changes
5) Physical and chemical changes.

§§ Slow and fast changes:

Some changes are very fast. These changes occur with in seconds (or) minutes.

Examples:burning of a match stick, bursting of a cracker, spinning of a top etc are examples of fast changes. Some changes take place very slowly. These changes may take hours, days, months (or) years to complete.

Eg:Rusting of an iron.

The water changes into ice in a fridge in a few hours.

§§ *Reversible and Irreversible changes:*

A Change which can be reversed is called a **reversible change.** In this change, the products formed can be converted back into their original forms.

Examples: Water can be changed into ice by placing it in the freezing chamber of the fridge. The ice so formed can be converted back into water by placing the ice outside the fridge.

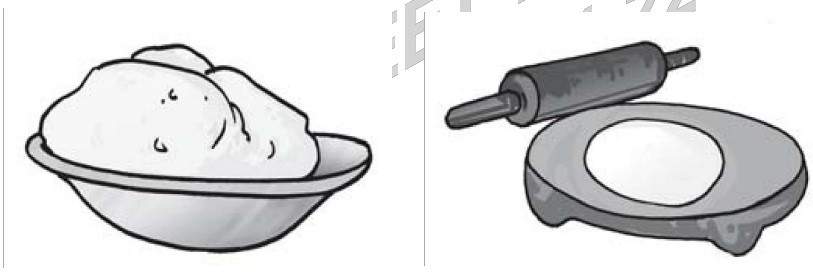
A change which cannot be reversed is called an **irreversible change.** In this change, the products cannot be converted back into their original form.

Examples: When a paper is burnt, it changes to ash and smoke. From ash and smoke, we cannot get back paper. Thus, the change is irreversible.

♠ **Activity**

Take some dough and make a ball. Try to roll out a roti May be you are not happy with its shape and wish to change it back into a ball of

dough again.



A ball of dough and a rolled out roti

Now, think about the three changes you observed .. What do they have in common? Was it possible to get the balloon back to its original shape and size? Was the size of the paper same as before and after making an aeroplane? Was it possible to get back the ball of dough again? What do you conclude? In each of the three activities, is it possible to get back to the material with which we started our activity? If the answer is yes, it means that the changes occurring in these activities can be reversed. Now, let us repeat the same

activities with a difference.

ACTIVITY

S.NO	CHANGE	CAN BE REVERSED
1	Raw egg to boiled egg	Yes/No
2	Batter to idli	
3	Wet clothes to dry clothes	
4	Woollen yarn to knitted sweater	
5	Grain to its flour	
6	Cold milk to hot milk	
7	Straight string to coil String	
8	Bud to flower	
9	Solid ice cream to molten ice cream	
10	Stretched rubber band to its normal size	

§§ ***Desirable and undesirable changes :***

A change brought about by a person (or) the nature, which is useful, is called a desirable change.

Examples:

1) Formation of curd from milk is a desirable change. It is because curd is more easily digestible as compared to milk.

2) Melting of snow on the mountains.

3) Change of weather from winter to summer is a desirable change.

§§ ***Undesirable change:***

A change brought about by a person (or) the nature, such that it has harmful effects is called an undesirable change.

Examples: Food turning bad in summer is an undesirable change.

1) Breaking of glass ware/glass article is an undesirable change.

2) Rusting of articles of iron is an undesirable change.

§§ ***Periodic and non periodic changes:***

Periodic Changes: The changes which occur again and again, after fixed intervals of time, are called periodic changes.

Examples: Swinging of a clock pendulum is a periodic change.

1) Phases of moon is a periodic changes

2) Change of seasons is a periodic change.

3) High and low tides at sea is a periodic change.

4) Beating of heart is a periodic change.

Non Periodic changes:The changes which do not repeat themselves at regular intervals of time, are called non periodic changes.

Examples:

1) Earth quakes are non periodic changes.

2) Land slides during rainy season are non-periodic changes.

3) Falling of leaves from a tree is a non - periodic change.

4) Rusting of iron articles is non periodic changes.

§§ ***Physical and chemical changes:***

All substances around us undergo changes. In some cases, the changes are small and difficult to defect. In other cases, the changes are obvious and easy to defect. These changes generally get accerelated if we heat the substances.

Most of these changes can be classified under two headings.

a) Physical change b) Chemical Change

Physical changes are generally temporary in nature and no new substances are formed.

b) Chemical changes are generally permanant in and new substances are which have entirely new properties.

¶¶ ***Def of Physical Change:*** A physical change is one that changes the shape ,size,physicalstate,and appearance of a substance, but not its chemical composition

¶¶ ***Characteristics of physical change :***

1) No new substances are formed during physical change.

2) Physical change is temporary and can be easily reversible

3) There is no change in weight during physical change.

4) Only a little heat is absorbed (or) given off during a physical change.

5)There is usually no loss or gain of energy during a physical change

¶¶ ***Every day examples of physical changes:***

Some of the very common examples of physical changes

1) Melting of ice (or) wax (or) butter (or) ghee.

2) Freezing of water to ice (or) solidification of liquid wax to solid wax.

3)sublimation of iodine or camphor

4) magnetisation of iron

5) breaking of a glass

6) Crystallisation of salts or sugar from their solutions

7) Changes of colour due to heat as in case of Zinc oxide (Zno) (or) lead monoxide.

§§ ***Chemical Change:*** .

Definition:A change which alters the specific properties of a substance by bringing about a change in its molecular composition, followed by a change in its state is called chemical change.

¶¶ ***Characteristics of a chemical change:***

1) When a chemical change occurs new substances, with entirely new properties are

formed.

2) Chemical change is permanant change,i.e it cannot be easily reversed

3) There is usually a change in weight or mass during chemical reaction

4) Lot of heat is usually given off (or) absorbed during a chemical changes.

¶¶ ***Every day examples of chemical changes.***

1) Cooking of food
2) Food turning bad after a few days.
3) Curdling of milk
4) Germination of seeds
5) Digestion of food with in our bodies
6) Fermentation of sugar solution to alcohol.
7) Rusting of Iron.

¶¶ ***Differences between physical change and chemical change.***

	Physical Change		Chemical Change
1.	The Change takes place only in in state, color, texture, However, composition remains the same.	1.	The Change takes place color, texture etc., along with the change in composition.
2.	Specific properties of the substance do not change	2.	Specific properties of substancechange completely.
3.	No new substances are produced.	3.	New substances, with new chemical properties are produced.
4.	There is no net absorption (or) release	4.	There is always net absorbtion (or) of energy release of energy.
5.	It is a temporary change and can be reversed.	5.	It is a permanent change and cannot be reversed.

TEACHING TASK

I. MCQS with Single answer is correct :

1. Burning of a match stick is a .
a)slow change b)fast change c)reversible change d)none

2. A baby grows into an adult is a .
a)slow change b)fast change c)irreversible change d)none

3. Rusting of an iron is a.
a)slow change b)chemical change c)both a & b d)periodic change

4. The change of seasons from summer to winter is a
a)slow change b)reversible change c)desirable change d)both a & d

5. A change which can be reversed is called.
a)irreversible change b)reversible change c)desirable change d)none

6. When a paper is burnt it changes to ash and smoke it is a.
a)irreversible change b)reversible change c)desirable change d)none

7. A candle on burning forms carbondioxide gas and water vapour.
a)reversible change b)irreversible change c)periodic change d)desirable change

8. Falling of leaves from a tree is a .
a)slow change b)irreversible change c)nonperiodic change d)both b & c

9. A change which cannot be reversed is called.
a)slow change b)irreversible change c)nonperiodic change d)both b & c

10. Curdling of a milk is a.
a)irreversible change ***b)***periodic change ***c)****slow change* *d)both a & c*

11. The orginal substance can not be obtained in a .
a)Physical change b) Chemical change c)slow change d)desirable change

12. ZnO when heated becomes .
a)yellow b)blue c)red d)green

13. At room temperature lead monoxide has .....colour.
a)yellow b)blue c)red d)greenish yellow

14. Zinc oxide is yellow when hot and white when cold This is an example of :
a)Physical change b)chemical change c)fast change d)none

15. The gas evolved on heating $NaNO_3$ is
a) O_2 b)NH_3 c) N_2 d)Cl_2

16. During the white wash lime reacts with .....in the air.
a) O_2 b) N_2 c)NH_3 d)CO_2

17. Which process involved in the formation of the drops
a)Evaporation b)Condensation c)Filtration d)decantation

18. Physical change is a.
a)temperory change b)permanent change c) both a & b d)none

19. Evoparation of water by the heat of sun .
a)Physical change b)chemical change c)fast change d)none

20. Melting of ice is a.
a)reversible change b)Physical change c)chemical change d)both a & b

21. Beating of metals into sheets or drawing metals into wires.
a)temperory change b)reversible change c)Physical change d)all

II. ***MCQS with more than one answer is correct :***

- *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which* ***ONE or MORE*** *is correct. Choose the correct options*

22. These are the products of milk
a)butter b)ghee c)sweets d)none

23. The changes in seasons due to
a) revolution of earth b)rotaion of earth c)position of sun d)none

24. Examples of permanent changes are
a)souring of curd b)cooking food c)ripening of oranges d)none

III. ***Odd one out and give your reason :***

25. Ice, Zinc oxide, wax, Ghee.

26. Seasons, heart beat, clock pendulum, earth quakes

IV. Correct the sentence if it is wrong otherwise rewrite the sentence :

27. Boiled egg is temporary change

28. Drying of clothes in the presence of sun light is a permanent change

29. human growth is a parmanent change.

30. Rusting of iron is a chemical change.

V. Match the following :

- *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with state ments (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*
  *If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

31.

	Group-A		***Group-B***
a)	Natural change	1)	Natural gas
b)	Man made change	2)	Seasons
c)	Chemical change	3)	Milk in curd
d)	Physical change	4)	Rusting of iron
e)	Fossil fuels	5)	ice to water

A) a - 3, b - 2, c - 4, d - 1,e-5 B) a - 4, b - 2, c - 3, d - 5,e-1

C) a - 2, b -3, c -4, d - 5, e-1 D) a - 3, b - 1, c - 4, d - 2,e-5

LEARNER'S TASK

BEGINNERS (Level - I)

I. MCQ with single correct answer:

1. Food turning bad in summer is a .
a)undesirable change b)desirable change c)periodic change d)physical change

2. Rusting of iron is a .
a)slow change b)undesirable change c)chemical change d)all

3. Melting of snow on the mountains in summer is a .
a)desirable change b)physical change c)periodic change d)none

4. The heat produced by the burning of petrol in the engines of cause is a .
a)desirable change b)undesirable change c)both a & b d)physical change

5. Beating of heart is a .
a)periodic change b)physical change c)undesirable change d)desirable change

6. Earth quakes are a .
a)nonperiodic change b)irrverible change c)periodic change d)physical change

7. The changes which occurs again and again after fixed intervels of time are called.
a)chemical change b)physical change c)periodic change d)none

8. Flooding of riverse in rainy seasons is an .
a)undesirable change b)physical change c)chemical change d)none

9. High and low tides at sea is a .
a)periodic change b)physical change c)chemical change d)nonperiodic change

10. change of seasons is a .

a)periodic change b)desirable change c)slow change d)all

11. A chemical change involves .

a)change of state only b)change of colour only

c)change of state as well as composition d)none

12. An example of chemical change is .

a)melting of sulphur b)formation of snow c)earth quakes d)burning of coal

13. Fermentation of sugar solutions to alcohol is a .

a)chemical change b)irreversible change c)permanent change d)all

14. Curdling of milk .

a)chemical change b)irreversible change c)slow change d)all

15. The plants make their food through the process of.

a)phothosynthesis b)respiration c)glycolysis d)none

16. During physical and chemical changes .

a)energy is always absorbed. b)energy is always released

c)no energy is absorbed or released d)energy is either absorbed or released

17. When sugar is on heating into .

a)sugar b)char coal c)steam d)b & c

18. Burning of coal is a .

a)chemical change b)physical change c)fast change d)non periodic change

19. Action of heat on paraffinwax is .

a)chemical change b)permenent change c)physical change d)desirable change

ACHIEVERS (Level - II)

II. ***Descriptive Type Question:***

20. Explane the reversible and irreversible of changes?

21. Define periodic chenge and non periodic chenge examples ?

22. Explan the classification of chenges and give two examples to each?

EXPLORERS (Level - III)

III. ***MCQS with more than one answer is correct :***

- *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which **ONE or MORE** is correct. Choose the correct options*

23. In thermal power stations, heat, smoke, heat energy is produced from burning of coal; this involves

A) Chemical change B) Undesirable change

C) Desirable change D)Non periodic change

24. Which of thw following statements rae correct

A) a chemical eqation consist of formulae of reactants connected by a (+) plus sign

B) a chemical eqation consist of formulae of reactants connected by a (-) minus sign

C) the substances which take part in a chemical reaction are called reactants

D) the substance formed,as aresult of chemical change, are called products

25. water cycle involves

A) Evaporation B) Sublimation C) Condensation D) freezing

26. Changing of iron wire into a magnet involves

A) Chemical change B) Permanent change

C) Temporary change D) Physical change

IV. Odd one out and give your reason :

27. Burning of wood; melting of wax; burning petrol; burning of coal

28. Spinning of a top; curdling of milk; rusting of iron; burning of a match stick.

V. Correct the sentence if it is wrong otherwise rewrite the sentence :

29. A physical change cannot be reversed.

30. Formation of day and night is a fast change.

31. Switching of electric bulb is an irreversible change.

32. Heat is not given off during a chemical change.

33. Burning candle doesnot give heat and light energy.

VI. Match the following:

⬧ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in* ***Column–I*** *have to be matched with statements (p, q, r, s) in* ***Column–II****. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

34.

a)	Growth of a child to an adult	1)	Photosynthesis
b)	Plants making their food in sunshine	2)	Physical change
c)	Falling of leaves from a tree	3)	Slow change
d)	Crushing of an icecube	4)	Nonperiodic change

A) a - 3, b - 2, c - 4, d - 1 B) a - 4, b - 2, c - 3, d - 1

C) a - 1, b - 2, c - 3, d - 4 D) a - 3, b - 1, c - 4, d - 2

35.

a)	Change of seasons	1)	Desirable change
b)	Bursting of balloon	2)	Irreversible change
c)	Formation of manure	3)	Periodic change
d)	Burning of sparkle (or) fire-crackers	4)	Fast change

A) a - 2, b - 1, c - 4, d - 3 B) a - 3, b - 4, c - 1, d - 2

C) a - 2, b - 3, c - 4, d - 1 D) a - 3, b - 1, c - 4, d - 2

VII. Comprehention type:

⬧ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which* ***ONLY ONE i****s correct. Choose the correct option.*

Change is the law of nature. Changes may occur in shape, position, colour, tem perature etc. Every change takes place due to some specific reasons. The changes may be caused due to heating or by mixing or by applying force and pressure. Heating or cooling causes change in physical state of a substance.

36. When water freezes and changes into ice, it

a) expand b)compress c)freez d)none

37. When a candle is burnt, its size reduces. This change is a/an

a)physical change b)chemical change c)reversible d)periodic change

KEY

ΦΦ TEACHING TASK :

1-b 2-c 3-c 4-c 5-b 6-a 7-b 8-d 9-b 10-d 11-b 12-a 13-a
14-c 15-a 16-d 17-c 18-a 19-a 20-d 21-d 22-a,b,c 23-a,b,c 24-a,b 25-ZnO 26-earth quakes 27-F 28-T 29-T 30-T 31-C

ΦΦ LEARNER'STASK :

□ BEGINNERS :

1-a 2-d 3-a 4-a 5-a 6-a 7-c 8-a 9-a 10-d 11-c 12-d 13-d
14-d 15-a 16-d 17-d 18-a 19-c

□ EXPLORERS :

23-a,c 24-b,d 25-a,b,c 26-c,d 27-melting of wax 28-spinning of top, 29-F, 30-F, 31-F, 32-F, 33-F, 34-d, 35-b, 36-b, 37-b,

§§ ***Chemical Equation:***

Definition: The chemical equation is a statement that describes a chemical change in terms of symbols and formulae.

$H_2O + O_2 \rightarrow 2H_2O$

1. a) Reactants: The substances which take part in a chemical reation are called reactants. The reactants are always written on the left hand side of a chemical equation.

(b) Products: The substances formed, as a result of chemical change are called products. The products are always written on the right hand side of a chemical equatio.

2. A chemical equation consists of formulae of reactants connected by a (+) plus sign and an arrow $(\rightarrow)$, followed by the formulae of products connected by (+) plus sign.

¶¶ **Information convayed by eqation:**

1.It shows the reactants which enter into areaction and the products which are formed by the reaction.

2.The amounts of each substance used and substants produced.

¶¶ **Two important principles to remember:**

1.Every chemical compound has a formula which cannot be altered

2.A chemical reaction must account for evary atom that is used .This is an application of the law of conservation of Matter which state that in a chemical reaction atoms are neither created nor destroyed

¶¶ **Some things to remember about writing eqations:**

1. The di atomic molecules are always written $H_2, N_2, O_2, F_2, Cl_2, Br_2, I_2$

2. The sign($\rightarrow$) means "yeilds" and shows the direction of the reaction .

3. A small delta($\triangle$) , above the arrow shows that heat has been added.

4. A double arrow , shows that the reaction is reversible and can go in both directions.

§§ ***Explanation of Chemical equation :***

Like symbols and formulae, chemical equation conveys both qualitative and quantitative meanings.

1. The equation below can be interpreted qualitatively, by saying that hydrogen reacts with oxygen to form water.

$$2H_2O + O_2 \rightarrow 2H_2O$$

Hydrogen oxygen Water.

2. Quantitatively, the equation has number of meanings

(a) Two molecules of hydrogen react with one molecule of oxygen to form two molecules of water.

(b) It states that two volumes of hydrogen will completely react with one volume of oxygen to form two volumes of water.

What is a balanced chemical equation ?

(a) Sodium nitrate decomposes on heating and forms sodium nitrite and oxygen. Writing the symbols and formulae of reactants and products, the equation can be represented as shown below.

$$NaNO_3 \rightarrow NaNO_2 + O_2$$

sodium nitrate sodium nitrite oxygen

However, the given equation is not a correct equation, because the total number of oxygen atoms on the reaction side is 3, where as on the products side is 4. Such type of equation is called unbalanced equation.

However, if we write the above equation as shown below, the number of atoms on each side i.e, reactants and products is same.

$$2NaNO_3 \xrightarrow{\Delta} 2NaNO_2 + O_2$$

In the above equation, there are 2 sodium atoms, 2 nitrogen atoms and 6 oxygen atoms on each side. Such equation is called abalanced equation.

§§ ***Balanced equation :***

An equation in which the number of each atom of an element on reactants side is equal to the number of each atom of an element on product side, is called balanced equation.

Following points necessary before one starts writing a balanced equation.

1.Whether (or) not reaction takes place between two (or) more reactants.

2. One must know all the products formed during the chemical reaction

3. One must know the correct symbols and formulae of the reactants and products.

How to balance a chemical equation

Example: Ferric hydroxide reacts with dilute sulphuric acid to form ferric sulphate And water.This reaction can be written in the form of word equation as

Ferric hydroxide + Sulphuric acid(dil)----------> Ferric sulphate + water

counting the number of various atoms in reactants and products.

	Iron atoms	sulphur atoms	Hydrogen atoms	oxygenatoms
in reactants	1	1	5	7
in products	2	3	2	13

¶¶ ***Balancing iron atoms :*** As the number of atoms of iron on the products side is 2, therefore, in order to make equal number of iron, we will multiply $Fe(OH)_3$ with numeral 2.

$$2Fe(OH)_3 + H_2SO_4(dil) \rightarrow Fe_2(SO_4)_3 + H_2O$$

¶¶ ***Balancing sulphur atoms :*** Sulphur atoms are 3 towards the products side and one towards the reactants side Thus, in order to equalise sulphur atoms, we will multiply H_2SO_4 with numeral 3.

$$2\ Fe(OH)_3 + 3H_2SO_4 \rightarrow Fe_2(SO_4)_3 + H_2O$$

¶¶ ***Balancing hydrogen atoms:*** Hydrogen atoms towards reactants side are 12(6 in $2Fe(OH)_3$ and 6 in $3H_2SO_4$). However, hydrogen atoms towards the products side are 2 in H_2O. Thus, in order to equalise hydrogen atoms, the H_2O on the products side should be multiplied by numeral 6.

$$2\ Fe(OH)_3 + 3H_2SO_4 \rightarrow Fe_2(SO_4) + 6H_2O$$

¶¶ ***Balancing oxygen atoms :***Oxygen atoms towards the side of reactants are 18 (6 in 2 $Fe(OH)_3$ and 12 in H_2SO_4).Oxygen atoms towards the products side are 18 (12 in $Fe_2(SO_4)_3$ and 6 in $6H_2O$). Thus, oxygen atoms are equal on the sides of reactants and products.

The whole balanced equation can be written as

$$2Fe(OH)_3 + 3H_2SO_4 \rightarrow Fe_2(SO_4)_3 + 6H_2O\,.$$

TEACHING TASK

I. MCQS with single answer is correct :

1. In a chemical reaction the atoms are neither created nor .....
A) invented B) destroyed C) both A & B D) None

2. The substance which take part in a chemical reaction are called
A) reactants B) products C) formula D) compound

3. The no. of places at which an element appears in a chemical reaction is called
A) repetition B) periodicity C) frequency D) regularity

4. In a metal and non metal have same frequency then the element i.e. balanced first is
A) non metal B) metal
C) metal if its atomic mass more D)non metal if its atomic number more

5. $CH_4 + O_2 \longrightarrow CO_2 + H_2O$
Balanced Equation
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6. $Cu_2O + Cu_2S \longrightarrow Cu + SO_2$
Balanced Equation
.....

7. $Fe + O_2$ ----------> FeO
Balance the equation
.....

8. $CaOCl_2 + NH_3$ ----------> $CaCl_2 + H_2O + N_2$
Balance this equation.
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9. $Al_2O_3 + C$ ----------> $Al_4C_3 + CO$
Balance this equation.
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10. $HCl + Na$ ----------> $NaCl + H_2$
Balance this equation.

II. MCQS with more than one answer is correct :

- *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D),out of which **ONE or MORE** is correct. Choose the correct options*

11. Chemical equations are takes place in
A) Respiration process B) Photosynthesis
C) Preparation of drugs D) solar system

12. when carbon and oxygen reacts ,the possible products are
A) CO B) CO_2 C) C_2O_3 D) C_2O

13. Reacion between iron and oxygen gives
A) Haematite B) Magnatite C) Dolomite D) Salt

III. TRUE OR FALSE

14. The sign of an arrow −−−−−−−> is read yield

15. Potassium nitrate decomposes on heating to form potassium nitrite and oxygen

16. Respiration process is the reverse of photosynthesis

17. When metals reacts with water produce hydrogen gas.

IV. ODD ONE OUT

18. respiration , photosynthesis , heating of mercuric oxide, decomposition of potassiumnitrate

19. Reactents,Products,Chemical reaction,Heating.

V. Matrix Match Type:

- *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

20.

Column-I	Column-II
a) $2 N_2 + O_2$	1) $2Fe_2O_3 + 4 SO_2$
b) H_2O_2	2) $2N_2O$
c) $4 FeS + 7O_2$	3) $H_2 + O_2$
d) $4 FeS_2 + 11 O_2$	4) $2Fe_2O_3 + 8SO_2$

A)a-2,b-3,c-1,d-4 B)a-1,b-3,c-2,d-4
C)a-4,b-3,c-2,d-1 D)a-1,b-2,c-3,d-4

21.

Column-I	Column-II
a) The substance which take part in chemical reaction	1) Products

b) The substance formed as a result of chemical reaction — 2) Balanced equation

c) A chemical equation in which number of atoms of each element is same on the side of reactants and products — 3) $CaCl_2 + H_2O$

4) Reactants

d) $Ca(OH)_2 + 2HCl$ — 5) $CaCl_2 + H_2O + CO_2$

A)a-2,b-1,c-4,d-3 B)a-1,b-2,c-4,d-3
C)a-4,b-1,c-2,d-3 D)a-1,b-2,c-3,d-4

LEARNER'S TASK

BEGINNERS (Level - I)

MCQS with single answer is correct

1. The substances taking part in a chemical reactions are known as.
a)reactants b)products c)both a & b d)none

2. Thechemical equation is a statement that describes a chemical change in terms of.
a)symbols b)reactants c)formulae d)both a & c

3. $Fe + N_2O \longrightarrow N_2 + Fe_3O_4$
Balanced Equation
. .....

4. $Sn + HCl + NO \longrightarrow SnCl_2 + NH_2OH$
Balanced Equation
. .....

5. $FeSO_4 + H_2SO_4 + HNO_3 \longrightarrow Fe_2(SO_4)_3 + NO + H_2O$
Balanced Equation
. .....

6. $Cu_2O + Cu_2S \longrightarrow Cu + SO_2$
Balanced Equation
.....

7. ..... may be defined as an atom or group of atoms which behaves as a single unit in chemical change.
A) compound B) Molecule C) Ion D) None

8. In a balanced equation
A) The number of molecules of both sides are equal.
B) The number of atoms on both sides are same
C) The diatomic molecules present on both sides are equal
D) Reactants and products are same side

9. A formula has
A) qualitative significance only B) quantitative significance only
C) Both A & B D) None

10. In a chemical reaction the atoms are neither created nor .....
A) invented B) destroyed C) both A & B D) None

11. The new substance is formed in a chemical reaction are called
A) reactants B) products C) formula D) compound

12. The no. of places at which an element appears in a chemical reaction is called
A) repetition B) periodicity C) frequency D) regularity

13. In a metal and non metal have same frequency then the element i.e. balanced first is
A) non metal B) metal
C) metal if its atomic mass more D) non metal if its atomic number more

ACHIEVERS (Level - II)

Descriptive Type Question:

14. Define balancing chemical equation equation?and give two examples.

15. N_2 + H_2 ----------> NH_3
H_2 + O_2 ----------> H_2O Balance the following equations.

16. Define reactants and products?

17. Ferric hydroxide + Sulphuric acid(dil)----------> Ferric sulphate + water
Balance the equation.

EXPLORERS (Level - III)

Multi Correct Choice Type:

- *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which* ***ONE or MORE*** *is correct. Choose the correct options*

18. In a balanced equation
A) The number of molecules of both sides are equal.
B) The number of atoms on both sides are same
C) The diatomic molecules present on both sides are equal
D) Reactants and products are same side.

19. $N_2 + 3H_2 \rightarrow 2NH_3$
The above reaction is a balanced one with corrected limitations. Identify the corrected limitations.
A)Physical states of reactants B)Symbols and formulae of all the substances
C)Number of atoms and molecules D)Physical conditions of a reaction on the arrow.

20. The trivalent ion or radical among the following
A) O B) B C) N D) P

21. The bivalent ion or radical among the following
A) Sulphate B) carbonate C) phosphate D)Sulphide

22. A formula has
A) qualitative significance only B) quantitative significance only
C) Colour property D) None

23. Identify the balanced equation of the following
1) $H_2 + C\ell_2 \rightarrow 2HC\ell$ 2) $2Mg + O_2 \rightarrow 2MgO$
3) $2CO + O_2 \rightarrow 2CO_2$ 4) $Fe + S \rightarrow FeS$

III. Odd one out and give your reason :

24. Balanced equation,Stoichiomatric equation,equal no of reactants&products,catelyst

25. N_2 ,H_2, NH_3, CO_2.

26. H_2O, CO, H_2, O_2.

IV. Correct the sentence if it is wrong otherwise rewrite the sentence :

27. The no of reactants and products are equal in the balencing chemical equation.

28. Balanced chemical equation may sometimes contain more reactant atoms.

29. Balanced chemical equation may sometimes contain more products atoms.

30. The balancing equation containg reactants and products are exite in any state also.

V. Match the following:

◆ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

31.

Column-I	Column-II
a) $Mg + 2HC\ell$	1) $MgO + C$
b) $2Mg + CO_2$	2) $CaC\ell_2 + H_2O$
c) $Ca(OH)_2 + 2HC\ell$	3) $CaC\ell_2 + H_2O + CO_2$
d) $CaCO_3 + 2HC\ell$	4) $MgC\ell_2 + H_2$
	5) $MgO + HCl$

A)a-2,b-3,c-5,d-4 B)a-1,b-3,c-2,d-4

C)a-4,b-1,c-2,d-3 D)a-1,b-2,c-5,d-4

32.

Column-I	Column-II
a) $xH_2 + yO_2 \rightarrow 2H_2O$	1) 1, 1
b) $xC + yO_2 \rightarrow CO_2$	2) 1, 2
c) $xCH_4 + yO_2 \rightarrow CO_2 + 2H_2O$	3) 2, 1
d) $xAl + yO_2 \rightarrow 2Al_2O_3$	4) 4, 3

A) a - 1, b - 4, c - 2, d - 3 B) a - 3, b - 1, c - 2, d- 4

C) a - 1, b - 2, c - 3, d - 4 D) a - 4, b - 3, c - 2, d - 1

VI. Comprehension Type:

◆ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE i**s correct. Choose the correct option.*

A chemical equation in which number of atoms of each element is same on the side of reactants and products is called "balanced equation".

Example: $2KNO_3 \rightarrow 2KNO_2 + O_2$

33. Which of the following is not true for a balanced chemical equation?

1) A balanced chemical equation gives information about physical states of all reacting substances.

2) A balanced equation gives information about the number of atoms of all substances involved in the reaction.

3) Both 1 and 2. 4) None of these.

34. $N_2 + 3H_2 \rightarrow 2NH_3$

Which of the following statements is not true?

1) One molecule of nitrogen and three molecules of hydrogen combine to form two molecules of ammonia at same conditions of temperature and pressure.

2) 28 grams of nitrogen and 6 grams of hydrogen combine to form 34 gramsof ammonia.

3) One gram of nitrogen and three grams of hydrogen combine to form two grams of ammonia.

4) Both 1 and 2.

35. $2Mg + O_2 \longrightarrow 2MgO$ Which of the following statements is not true?

1) One molecule of magnesium and two molecules of oxygen combine to form two molecules of magnesium oxide.

2) 28 grams of magnesium and 6 grams of oxygen combine to form 34 grams of magnesium oxide.

3) 48 grams of magnesium and 32 grams of oxygen combine to form 80 grams of magnesium oxide.

4) Both 1 and 2

KEY

ΦΦ TEACHING TASK :

1-b, 2-a, 3-b, 4-b, (5,6,7,8,9,10 - REFER BELOW), 11-a,b,c,d, 12-a,b , 13-a,b , 14-T, 15-T, 16-T, 17-T, 18-respiration, 19-heating, 20-a, 21-c

5. $CH_4 + 2\ O_2 \longrightarrow CO_2 + 2H_2O$
6. $2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2$
7. $2Fe + O_2 \dashrightarrow 2FeO$
8. $3CaOCl_2 + 2NH_3 \dashrightarrow 3CaCl_2 + 3H_2O + N_2$
9. $2Al_2O_3 + 9\ C \dashrightarrow Al_4C_3 + 6\ CO$
10. $2HCl + 2Na \dashrightarrow 2\ NaCl + H_2$

ΦΦ LEARNER'STASK :

☐ **BEGINNERS :**

1-a, 2-d, (3,4,5,6 - REFER BELOW), 7-b, 8-b, 9-c, 10-b, 11-b, 12-b, 13-b

☐ **EXPLORERS :**

18-a,b,d, 19-a,d , 20-b,c,d, 21-a,b,c, 22-a,b,c, 23-a,b,c,d, 24-catalyst, 25-NH_3 , 26-CO, 27-T, 28-T, 29-T, 30-T, 31-C, 32-B, 33-C, 34-D, 35-D,

3. $3Fe + 4N_2O \longrightarrow 2N_2 + Fe_3O_4$
4. $3Sn + 6HCl + 2NO \longrightarrow 3SnCl_2 + 2NH_2OH$
5. $6FeSO_4 + 3H_2SO_4 + 2HNO_3 \longrightarrow 3Fe_2(SO_4)_3 + 2NO + 4H_2O$
6. $2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2$