Mr.Science
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Final revision

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Unit 1
Chemical Combination

Ionic bond	Covalent bond
It is a bond resulting from the electric attraction between a positive ion and a negative ion.	It is a bond occurred among the atoms of non-metals through the participation of each atom with the same number of electrons to complete the outer electron shell of each atom

metals	Non-metals
They are elements which have less than (4) electrons in the outermost energy level.	They are elements which have more than (4) electrons in the outermost energy level.
Solids - except (Mercury "Hg" is liquid).	Solids – gases – except (Bromine "Br" is liquid).
They have metallic luster	They have no luster
They are malleable and ductile	They are not malleable or ductile
They are good conductors of heat and electricity	They are bad conductors of heat and electricity – Except (Graphite "Carbon" is good conductor of electricity

Chemical Bonds

Positive ion	negative ion
It is an atom of metallic element that loses an electron or more during chemical reaction.	It is an atom of nonmetallic element that gains an electron or more during chemical reaction.
It carries positive charges equal to the number of the lost electrons.	It carries negative charges equal to the number of the gained electrons.
The number of its electrons is less than the number of protons inside the nucleus.	The number of its electrons is more than the number of protons inside the nucleus.
The number of energy levels is less than that of its atom.	The number of energy levels is equal to that of its atom.

Types of covalent bond:

1-**Single covalent bond:** It is the bond which arises between two nonmetal atoms, where each atom shares the other atom with one electron.

2-**Double covalent bond:** It is the bond which arises between two nonmetal atoms, where each atom shares the other atom with two electrons.

3-**Triple covalent bond:** It is the bond which arises between two nonmetal atoms, where each atom shares the other atom with three electrons.

Ionic bond	Covalent bond
- Formed due to: Electrical attraction Between two different elements (metal "positive ion"- nonmetal "negative ion") to form compound.	- **Formed due to:** sharing of one pair of electrons or more Between: **two similar nonmetal atoms to form: molecule.** **two different nonmetal atoms to form: compound.**

Chemical Combination

Valency: It is the number of electrons that atom loses, gains or shares during a chemical reaction.

Valency of Metals

Monovalent	Divalent	Trivalent
- Lithium (Li) - Sodium (Na) - Potassium (K) - Silver (Ag)	- Mercury (Hg) - Magnesium (Mg) - Calcium (Ca) - Lead (Pb)	- Aluminum (Al) - Gold (Au)

- Copper (Cu): Monovalent - Divalent
- Iron (Fe): - Divalent (Ferrous) - Trivalent (Ferric)

Valency of Nonmetals

Monovalent	Divalent	Trivalent	Tetravalent
- Hydrogen (H) - Chlorine (Cl) - Bromine (Br) - Iodine (I) - Fluorine (F)	- Oxygen (O)	- Nitrogen (N) - Phosphorus (P)	- Carbon (C)

- Sulpher (S): Divalent – Tetravalent – Hexavalent
- Nitrogen (N) – Phosphorus (P): Trivalent

Atomic group: set of atoms (of different elements) joined together behave like (1) atom during chemical reaction.

Monovalent	Divalent	Trivalent
- Hydroxide (OH) - Nitrate (NO_3) - Nitrite (NO_2) - Ammonium (NH_4) - Bicarbonate (HCO_3)	- Carbonate(CO_3) - Sulphate (SO_4)	- Phosphate (PO_4)

Chemical formula: **It is a formula that represents the number and types of atoms in a molecule.**

Compound	Chemical formula	Compound	Chemical formula	Compound	Chemical formula
Sodium Chloride	NaCl	Aluminium Sulphate	$Al_2(SO_4)_3$	Magnesium Hydroxide	$Mg(OH)_2$
Sodium Nitrate	$NaNO_3$	Aluminium Carbonate	$Al_2(CO_3)_3$	Magnesium Sulphate	$MgSO_4$
Sodium sulphate	Na_2SO_4	Aluminum Oxide	Al_2O_3	Hydrogen Chloride	HCl
Sodium Hydroxide	NaOH	Water	H_2O	Calcium Carbonate	$CaCO_3$
Sodium Carbonate	Na_2CO_3	Copper Carbonate	$CuCO_3$	Calcium Sulphate	$CaSO_4$
Sodium Oxide	Na_2O	Carbon Dioxide	CO_2	Calcium Oxide	CaO

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Acids	Bases
They are substances which dissolve in water producing positive hydrogen ions $(H)^+$.	They are substances which dissolve in water producing negative hydroxide ions $(OH)^-$.
The symbol of acids begins with H.	The symbol of alkalis ends with OH.
They have **sour taste**.	They have **bitter taste**.
They change color of litmus paper into red: Due to presence of hydrogen ions $(H)^+$.	They change color of litmus paper into blue: Due to presence of hydroxide ions $(OH)^-$.
Ex: Hydrochloric acid (HCl) – Sulphoric acid (H_2SO_4)	Ex: Sodium Hydroxide (NaOH) -

Types of Compounds:

Oxides: They are compounds resulted from combination between oxygen and element which is metal or non-metal.

Metal oxides	Non-metal oxide
Formed from combination of oxygen with metal.	Formed from combination of oxygen with nonmetal.
Sodium oxide (Na_2O) - Calcium Oxide (CaO) – (Al_2O_3).	Carbon dioxide (CO_2) – Sulpher trioxide (SO_3).

Salts:

Compounds resulted from combination of positive ion (or atomic group) with negative atomic group (or ion except (O2).

Mineral salts:

Salts dissolved (soluble) in water		Salts undissolved (insoluble) in water
Sodium chloride (NaCl)	Sodium sulphide (Na_2S)	Silver chloride (AgCl)
Potassium sulphate (K_2SO_4)	Calcium nitrate [$Ca(NO_3)_2$]	Lead iodide (PbI_2)
Magnesium carbonate ($MgCO_3$)		Lead sulphate ($PbSO_4$)

Chemical Reaction

Process involves breaking the bonds in the reactant molecules and formingnew bonds in the products.

*** Chemical Equation:**

Set of symbols and chemical formulae representing the reactants and products molecules in the chemical reaction and it represents the conditions of the reaction.

- **G.R *Chemical Equation must be balanced:**

  number of atoms entering reaction = number of atoms resulting from

$$2\,Mg + O_2 \xrightarrow{\Delta} 2MgO$$
$$(2\times24) + (2\times16) \quad 2\,(24+16)$$
$$48 + 32 \quad 2\times40$$
$$(80) \quad (80)$$

(atomic mass of Mg = 24, O = 16)

(Ratio between Mg = $\frac{24}{16}$ & O = $\frac{3}{2}$)

reaction $C + O_2 \xrightarrow{\Delta} CO_2$

* **Law of constant ratios:**

Chemical compound is formed from combination of its elements by constant weight ratios.

* **Types of chemical reactions:**

* **Direct combination reactions:**

Reactions which involve a combination of two substances to form a new compound.

1- Combination of an element with another element.

2- Combination of a compound with a compound.

3- Combination of an element with a compound.

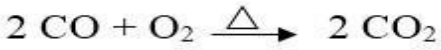
Combination of an element with another element:

Combination of two nonmetal elements	Combination of a metal with a nonmetal
* Carbon joins Oxygen forming Carbon dioxide: $C + O_2 \xrightarrow{\Delta} CO_2$	* Magnesium joins Oxygen forming Magnesium dioxide. $2\,Mg + O_2 \xrightarrow{\Delta} 2\,MgO$
* Hydrogen joins Chlorine forming Hydrogen chloride: $H_2 + Cl_2 \longrightarrow 2\,HCl$	

- **2- Combination of a compound with a compound:**
- Ammonia joins Hydrochloric acid forming ammonium chloride: rod wet with ammonia placed close to tube contains concentrated hydrochloric acid- white fumes (cloud) of ammonia chloride are formed.

$$NH_3 + HCl \xrightarrow{Con} NH_4Cl$$

- **3- Combination of an element with a compound:**
- ***** Carbon dioxide (compound) reacts with Oxygen (element) producing carbon dioxide:



- * Nitrogen monoxide (compound)reacts with Oxygen (element) producing Nitrogen dioxide:
-

- *** Chemical reaction in our life**
- *** <u>importance of Chemical reaction</u>:** used in industries as: Medicines – Fertilizer – Fuel – Plastics.
-
- **<u>* Negative – bad effects of Chemical reaction:</u>**
- **1- Fuel burning:** producing:
- **A- Carbon dioxide (CO_2):** acts as green house: as it allow pass of sunrays to earth and never let them return back.
- **B- Carbon monoxide (CO):**
- **Causes:** Headache – Fainting – Sever stomach aches and may lead to death.
- **2- Sulpher oxides:[Sulpher dioxide (SO2) - Sulpher trioxide (SO3)]**
- They are acidic gases causes: Respiratory system problems – Building corrosion.
- **3- Nitrogen dioxides: [Nitric oxide (NO) – Nitrogen dioxide (NO2)]: resulted at the time of lightning.**
- They are: acidic gases – Poisonous – Affect the nervous system and the eye.
- **4- Burning of Coal and Cellulose fibers:**
- **as paper – Cigarettes cause air pollution and lung cancer.**
-

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Unit 2 lesson 1

Force:

It's an effect attempts to change the object's phase from being static to motion or vice versa or attempts to change the direction of motion.

Measuring unit of force: Newton.

Universal Forces in Nature:

Attraction force: between Earth and objects.

- Earth attracts objects to its center by force called "Object's weight" which increases by increase of the object's mass

Object's weight:

ability of earth to attract that object to its center. Or: It's the force of Earth's gravity on the object.

Object's center of gravity: It's point at the center of object at which the force of gravity affects the object.

Object's weight (W) = Object's mass (m) × Earth's gravity acceleration (g)

Newton Kg 10 m/s^2

1-**Electromagnet**:

It changes the electric energy into magnetic energy.

Uses of Electromagnet:

electric bells – electric winches (used in lifting scrap iron and cars.

2-**Electric generator (Dynamo):** It changes the mechanical energy into electric energy.

3-**Electric motor**: It converts the electric energy into mechanical energy. (motor in fan- blinder- washing machine).

Strong Nuclear forces: used in: Producing electricity - Military purposes (wars)

Weak Nuclear forces: used in: Medicine – Scientific researches – Industry.

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Lesson 2

Inertia:

It's a property of object has to resist the change of its phase unless an external force acted on it.

Passengers are rushed back when the car move suddenly

]Passengers are rushed forward: when the car stop suddenly

Coin falls inside the cup: due to its inertia force

Inertia makes object resist the change of its rest or motion state. □

Technological application on Inertia:

-**G.R** **Using safety belts in cars**:

to stop inertia to keep passengers safe

- **Friction force:** It's resistant force originate between the object in motion and the medium touching it.

Benefit of Friction force : prevent slipping – help in car motion or stopping – help in match burn

Harms of Friction force: make machine erosion – great loss in mechanical energy – decrease performance of machines

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Lesson 3

- **Motion**: It's the change in position in space as time passes.

Relative motion: the change in object's position as time passes relative to another object or fixed point.

Application	Observation
Two cars move in the same direction with the same speed	Two cars stop moving
Two cars in the same direction but one is faster	The other car moves back(in opposite direction)
Two cars moves in an opposite direction and one of them faster	The other car moves with high speed

Types of Motion:

1. **Transitional motion:**

It's motion in which object's position is changed relative to a fixed point from initial to final position as time passes.

Ex: Person – Car - Train

G.R: Transitional motion is a relative motion:

B. it's change of an object's position as time passes relative to another object.

2. **Periodic motion:**

It's the motion which is regularly repeated in equal periods of time.

Ex: **Vibrating motion** (simple pendulum) – **Circular motion** (fan arms) –

Wave motion (stone in water).

Short Haway

1. Wave motion:

Mechanical waves	Electromagnetic waves
Produced by vibration of medium particles	Accompanied by electromagnetic forces
Need a medium to transfer through	Spread in all media and free space
Speed is relatively low (sound speed 340m/s)	Speed is very high (light speed is 300 million m/s)
Ex: Sound waves – water waves	Light waves – X-rays – Radio waves – Ultra violet – Infra red

Lightning and Thunder

- **G.R**: We see Lightning before hearing thunder:
  As Light speed is greater than sound speed

G.R- We receive sunlight but don't hear solar explosions:
B. Light travel through space but the sound need medium.

Technological applications of mechanical waves:

1- **Used in examining and curing sets for human body**

(Ultrasonic waves – Sonar).

2– **Musical instruments:**

a – **Stringed musical instruments**: Violin – Lute – Guitar. b –

b- **Pneumatic musical instruments**: Flute – Reed pipe.

3– **Amplifiers an distributing sets.**

Technological applications of electromagnetic waves:

Electromagnetic waves	Application
Ultra violet rays	Sterilize surgical operation rooms: **Becu. they've property of killing microbes**
X rays	- Photographing bones to detect bones fractures - Examining mineral raws and showing errors, pores and cracks.
Gamma rays	In medical purposes: to treat and discovering some swellings
Visible light	Used in: Photographic cameras – Television cameras – Data show.
Infra red rays	Used in: Night vision - Remote sets – Cooking food: **Becu. they've heat effect**

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Unit 3

Stars: They're big-sized bodies emit enormous amount of heat and light.

G.R: Stars appear small although they're big-sized:

Bec. they are very far away from us. □

Light year: It's the distance covered by light in one year and it = 9.467×10^{12} km.

D in km = d in light year x 9.467×10^{12}

D in light year = d in km ÷ 9.467×10^{12}

Galaxies: Big units form universe.

Our Galaxy is: The milky way galaxy.

Telescopes: Identify the celestial bodies.

The kinds of telescopes: Reflecting – Refracting.

The Solar System: consists of.

The Sun:

1. It's the star of our solar
2. Biggest body in our Solar
3. Lies the center of solar.

The Eight Planets: Spherical opaque bodies revolve around sun in (oval) paths

Inner Planets	Outer Planets
Mercury – Venus – Earth – Mars	Jupiter – Saturn – Uranus – Neptune
Small in size	Big
High density: As they consist of solid bodies.	**Low density**: As they consist of gaseous elements.
Have a few number of moons	Have large number of moons
Their gravitational is small.	Their gravitational is large.

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All planets have Atmosphere: except Mercury.
All planets have moons: except Mercury and Venus.

Outer planets consist of: Helium and Hydrogen as solidified gases

Isaac Newton: discovered Earth's Gravity.

Gravity depend on:
1- The mass of each object. **2- The distance between them.**

Jupiter has largest gravity **Mars** has smallest gravity

Earth has largest gravity in inner planets – largest mass and density

Moons: They're small planets revolve around planets.

Asteroids: They're rocky celestial bodies that revolve the sun in the region of the wanderer asteroids.

The asteroids belt : It's a region separates inner planets from outer planets.

Meteors: luminous arrows that can be seen in the sky due to completely burning in earth's atmosphere.

Meteorites: The remaining part of the rocky masses without burning that falls on the earth's surface.

Comets: They're masses of (rocks, ice and solidified gases) that revolve around the sun in more elongated oval paths. It consist of: head – tail.

Most famous Comet "Halley" takes 76 years around sun.

The sun occupies the centre of the solar system.

The distance between earth& sun is about 150 million Kms
The earth is the third planet regarding the distance from the sun, while it is the fourth order regarding to volume

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Lesson 2

Q. Describe the shape of the earth at the poles& equator:

The Earth is a spherical object and has slight

flat at two poles and **indented** at equator

The tropical radius is about 22 Km larger than the polar radius.

Earth is the biggest mass (planet) in the inner planets

G.R Concerning the volume, the Earth occupies the fourth order.
Bec. **Earth** is bigger than the inner planets

1) Atmosphere: A mixture of gases that surround the Earth

G.R The presence of a white colour surrounds the planet Earth.
B. Earth surrounded by atmosphere

➢ **Importance of atmosphere:**

1. Keep temperature suitable to Earth
2. It has ozone layer which protect us from harmful sunrays
3. It helps in burning of meteors and meteorites
4. All weather phenomena (wind-rains) occurs in it
5. It has important gases as (O_2 – N_2 – CO_2)

G.R The great extension of atmosphere in space is important for Earth's life
Because, it helps in complete burning of meteors and decrease speed of meteorites

2) Earth's hydrosphere

Water represents 71% of the Earth surface
The salty water represents 97% , while the fresh water is about 3%
Ground water exists in the pores and cracks of rocks

Importance of water

1. Plant use it in photosynthesis process
2. Keep body temperature constant
3. It form blood and help in digestion process
4. Keep temperature suitable for man
5. 50% of organisms live in water

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G.R Temperature on Earth's surface suits the life of living organisms.
Becu. Earth is in third order far from the sun makes temperature suitable for life

G.R Steadfastness of the hydrosphere on the Earth surface
OR Keeping the Earth surrounded with the atmosphere
OR Constancy and Steadfastness of objects and organisms on Earth's surface
Because, Earth has a force of gravity

G.R The planet Earth is suitable for life.
Because,. it has water, gravity, atmosphere, suitable temperature and atmospheric pressure
➢ **The suitable atmospheric pressure is about 76 Cm Hg.**

Q. Write the importance of:

Carbon dioxide gas. It is used in photosynthesis process.
Ozone layer. It is used to protect us from the harmful ultraviolet rays.
Oxygen. It is used in respiration process and burning process.
Nitrogen gas. It is used in forming proteins
Hydrosphere. It is used drinking, washing and food digestion.

G.R The inner part of Earth was a molten form
Due to high temperature

Q. How the Earth layers formed ?

Heavy metals have more density (iron and nickel) move towards Earth center while lighter components have low density move upward

* **The layers of the earth** are crust, mantle & core.

The crust The light outer layer of the earth. **Thickness** 8 – 60 km

The mantleThe middle rocky layer of the earth that lies between crust& core
Thickness 2885 km

The core The inner layer of the earth.

Outer core	Inner core
1. It is a layer of molten metals. 2. It's thickness is about 2100 Km.	1. It is a solid layer rich in iron and nickel. 2. It's thickness is about 1350 Km.

Lesson 3

Rocks

A natural solid material exists in the earth's crust& is formed of a group of minerals.

Types of rocks

1- Igneous rocks. 2- Sedimentary rocks. 3- Metamorphic rocks.

First: Igneous rocks:

Rocks Formed from the molten matter (magma or lava).

Examples: Granite. - Basalt.

P.O.C	Plutonic igneous rocks	Volcanic igneous rocks
Size of crystals	Large	Small
Texture	Coarse – rough	smooth
Holes	Absent	Present
Ex.	Granite	basalt
P.O.C	**Granite rock**	**Basalt rock**
Kind	Plutonic igneous rocks	Volcanic igneous rocks
Colour	Pink or grey	Dark
Components	Can be see by eye	Cannot be see by eye
Minerals forming them	Quartz – feldspar – mica	Olivine – feldspar – pyroxene
Found in	Sinai	El Fayoum

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Second: Sedimentary rocks.

They are rocks which are formed from the fragments & decomposed of other rocks.

The formation of sedimentary rocks:

By 3 steps: Erosion. - Transportation. - Sedimentation.

➢ **Examples** **Sandstones.** **-** **Limestone.**

P.O.C	Sandstones	Limestone
Colour	Yellow	White
Texture	Coarse – rough	smooth
Minerals forming them	Quartz – feldspar – mica	Mineral calcite
Reaction with dil. Hydrochloric acid (HCl)	No reaction	It makes effervescence due to CO_2 gas evolved

Third: Metamorphic rocks.

The rocks formed from igneous or sedimentary rocks under **high temperature or pressure** .

Example

Such as: **Marble** (produced from conversion of **limestone**)

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Final Revision

1 Choose the correct answers:

1. The molecules of Nobel gases consist of …….. atom

a. Two similar atoms. b. Two different atoms.

c. One atom. d. Three atoms.

2. The covalent bond usually arises between …….. elements

a. Two metallic. b. Two non-metallic.

c. Metallic and non-metallic. d. Nobel and non-metallic.

3. There are triple covalent bond in …….. molecules

a. Hydrogen. b. Chlorine.

c. Oxygen. d .Nitrogen.

4. All the following metals share in chemical reaction except ……..

a. Sodium ($_{11}$ Na). b. Neon (10 Ne).

c. Hydrogen ($_{1}$ H). d. Nitrogen ($_{7}$N).

5. When Nitrogen atom ($_{7}^{14}$N) gains electrons to complete its outer shell, It becomes ……..

a. N^{+3} b. N^{-2} c. N^{-1} d. N^{-3}

6. All the following elements are monovalent except ……..

a) Hydrogen b) Sodium c) Oxygen d) Chlorine

7. The chemical formula of Calcium carbonate is ……..

a. CaO b. $Ca(NO_3)$ c. $CaCO_3$ d.$Ca(HCO_3)_2$

8. The salt that is formed on combination of positive atomic group with negative atomic group is ……..

a) NH_4Cl b) $(NH_4)_2CO_3$ C) Na2SO4 d) NH4Br

9. When base dissolves in water, It gives ……..ions.

a) H^+ b) H^- C) OH^+ d) OH^-

10. All the following turn the blue litmus paper into red <u>except</u>……..

a) HCl b) HNO_3 c) NaOH d) H_2SO_4

11. The bright magnesium ribbon changes into white powder of …….. when it burns in air.

a) Magnesium nitrite b) Magnesium Oxide

c) Magnesium hydroxide d) Magnesium dioxide

12. Car brakes are one of the application of ……

a. gravitational force b. friction force

c. nuclear force d. inertia force

13. The idea of machine lubrication depends on the decreasing of the ……

a. Object weight b. inertia c. friction force d. gravity

14. The inertia force affects in the ……

a. Moving b. static c. moving and static

15. All of the following are metals <u>except</u> …….

A. iron b. oxygen c. sodium

16. The number of known elements till now is ……

a. 118 b. 113 c. 92 d. 20

17. From solid metal ……

a) Mercury b. nitrogen c. magnesium d. chlorine

18. The neutral atom …… and changes to positive ion.

a) gains electrons b. Charge of nucleus change

c. number of energy levels increases. d. loses electrons

19. In positive ion the number of protons …… number of electrons.

a. less than b. more than c. equal

20. The type of bond in water molecule ……

a. covalent b. single covalent c. double covalent

21. The triple covalent bond is formed in …… molecule

a. Hydrogen b. Nitrogen c. Oxygen d. water

22. Argon is …… valent.

a. zero b. mono c. di d. Tri

23. The chemical formula of carbonate is ……

a. Co_3 b. Co c. HCo_3 d. Tri

24…… salt dissolves in water.

a. $K_2 SO_4$ b. Cu CO3 c) Pb SO_4

25. The combination between ammonia and hydrochloric acid form …… of ammonium chloride.

a. white ppt. b. white powder c. white fumes d. white solution

26. From forces enable living organisms to do biological operation is ……

a. pulse b. Friction c. inertia force

27. From accompanied force due to the motion are ……

a. force of inertia b. friction force c. all the previous

28. When car move forward suddenly the passenger rushed ……

a. forward b. back word c. upright

29. From application on force of inertia is ……

a. safety belts b. car's break c. car tires

30. The water transports from soil to plants leaves by effect of …… force.

a. gravity b. biological c. inertia d. friction

31. The parts of machines must be lubricated to ……

a. increase friction b. increase temperature

c. decrease friction d. reduce inertia

32. The weight of object changes by ……

a. changing its speed b. changing its mass

c. it's distance from earth surface d. b and c

33. The isolated coil in electromagnet is made up from ……

a. iron b. magnet c. copper

34. The objects fall down by the effect of ……

a. electromagnet force b. gravitational force

c. nuclear force d. magnetic force

35. Mass x Earth's gravity acceleration equal ……

a. volume b. weight c. density

36. If you are in a moving train, you imagine that the cars moving in the same direction on the road with same speed ……

a. Stop b. move forward

c. move backward d. move with a high speed

37. when two cars move in same direction with velocity 80 km/h, the driver of the first car imagines that the second car moves with velocity ……km/h

a. zero b. 80 c. 160 d. No correct answer

38. The motion of train is ……

a. periodic motion b. vibrating motion

c. wave motion d. transitional motion

39. The speed of light wave in space …… than speed of radio waves.

a. less b. higher c. equal

40. The distance covered by light in a year = …… km

a. 150 million b. 9.467×10^{12}

c. 6368 d. 5.9×10^{24}

41. …… layer is rich of Iron and nickel.

a. inner core b. crust c. outer core d. mental

42. …… is an example of volcanic rocks.

a. Granit b. marble c. Basalt d. Quartz.

43. ……..is yellow in color and has a coarse texture

a. Granit b. Marble c. Basalt d. Sandstone

44. …….. is produced from conversion of lime stone.

a. Granite b. Marble c. Basalt d. Sandstone

2 Complete the following :-

1- ..... is the only liquid metal element, while ..... is the only liquid non-metals.

2- During dissolving in water acids give …….. ion , while bases give …….. ion

3- The bond in Hydrogen molecules is a ……..bond, while the bond in Nitrogen molecules is a .....and in Oxygen molecule is ……. bond

4- The types of covalent bonds are …… , ... and …….

5- During the formation of sodium chloride (NaCl) molecules ……. atom loses ……. electrons which are gained by ……. atom.

6- Acids turns litmus paper to red due to ……ion ,While bases turn litmus paper to blue due to …… ion.

7- Some metallic elements have more than one valency as…… and ……..

8-Acids have ……. taste and change the colour of litmus paper to ……..

9- Compound are classified into …… ,…….. ,…… and ……

10- The valency of iron in ferrous chloride is …….. while in ferric chloride is ……..

11- …… is an example of soluble salt , While …….. is an example of insoluble salt

12- Earth attracts the object to its …….. by the force known as the object's …… .

13- The measuring unit of object's mass is ……. , while the measuring unit of object's weight is …….
14- Electromagnet is used in making …….. and ……
15-The Earth's inner core consists ……and ……in a solid state
16. The igneous rocks are divided according to the site of the formation in the Earth's surface into……...rocks&……...rocks

17. The igneous rocks are formed of molten material underneath the Earth's crust which is called …….
18. The sequence of sedimentary rocks formation is……..,…….. and ……
19.The metamorphic rock are produced as a result of the effect of heat and pressure on the …….. and …….. rocks
20- Types of motion are ……. and ……..
17- ……is an effect attempts to change object phase from static to motion or vice versa or change motion direction
21- During chemical reaction, sodium atom tends to …… one electron and changes into ……
22- The bond in nitrogen molecule is ….. while that of magnesium oxide is…
23- Granite is an example of ……. rocks, while ……. Is an example of sedimentary rocks
24- The outer level in calcium ion has …… electrons

25- NH_3 + ……. $\xrightarrow{\text{Conc.}}$ NH_4Cl , The type of this reaction is ……

3 Write the scientific term

1- It is an atom that loses (gives) one electron or more during the chemical reaction	(……..)
2-- It is an atom that gains one electron or more during the chemical reaction	(……..)
3- It is an atom that loses or gains one electron or more during the chemical reaction	(……..)
4- It is an atom that doesn't loses or gains one electron or more during the chemical reaction	(……..)
5- A bond between metal (positive ion) and non-	(……..)

metal (negative ion)	
6- Bond between two nonmetals each atom share with the same number of electrons	(……)
7- The numbers of electrons that gained or lost by atom during the chemical reaction	(……)
8-A natural solid material exists in the earth's crust& is formed of a group of minerals.	(……)
9- Formula that represents number and type of atom in the molecules	(……)
10- Substance that dissociate in water forming positive hydrogen ions	(……)
11- Substance that dissociate in water forming negative hydroxide ions	(……)
12- Substance that formed by combination between elements and oxygen.	(……)
13- Breaking down bond between reactants and formation a new bond between products	(……)
14- A set of symbols and chemical formula that represents reactants , products and conditions of reaction	(……)
15- Chemical compound formed by combination between its elements by constant ratios	(……)
16- Mass of reactants equal to mass of products	(……)
17- Chemical reaction between two substances to form a new substance	(……)
18. The measuring unit of the weight.	(……)
19.The measuring unit of the mass.	(……)
20- The change in an object position or direction with the time passes relative to frame of reference	(……)
21. The type of rocks which are formed from the molten matter underneath the earth's crust. (……)	(……)
22. The type of igneous rocks which are formed when magma reaches earth's surface in the form of a flow of lava.	(……)

(……)	
23. The type of rocks which are formed when other rocks are exposed to high pressure& temperature.	(……..)

4 Write the chemical equation

1- Carbon burning in the presence of oxygen.
……..

2- Hydrochloric acid is combined with ammonia gas.
……

3- The reaction between carbon monoxide with oxygen.
……

4- Burning magnesium ribbon in the presence of oxygen.
……..

5- Hydrogen with chlorine.
……

5 Write the chemical formula of the following:

The Compound	Chemical formula
1. Sodium Chloride	
2. Sodium nitrate	
3. Sodium Carbonate	
4. Sodium Hydroxide (Caustic soda)	
5. Calcium Chloride	
6. Calcium Nitrate	
7. Potassium Carbonate.	
8. Calcium Sulphate.	
9. Calcium Hydroxide (Lime water)	
10. Copper Carbonate	
11. Aluminum Carbonate	
12. Aluminum Sulphate.	

6 Give reason for

1- Acids turns litmus paper into red while bases change litmus paper to blue

2- Potassium 19K is monovalent while 8O is divalent.

3- An oxygen atom joins two atoms of sodium when composing one molecule of sodium oxide.

4- White clouds are formed when hydrochloric acid reacts with ammonia gas

5- A chemical equation should be balance.

6- When an atom loses electrons changes into positive ion.

7- The bond in oxygen molecule is a double covalent bond.

8- The car passengers are rushed forward when the car stopped suddenly

9- Fan still working for few seconds after cutting electricity

10-Policemen advice drivers to wear safety belts

11- Weight of an object change from place to another on earth.

12- Effervescence takes place when hydrochloric acid is added to a sample of limestone.

13- When you push a wall, it doesn't move

14-Heart muscle contracts and relaxes regularly.

15-Car tires are covered with a very coarse substance.

16-The Earth’s inner core is rich in iron and nickel.

17- The crystals of minerals that form the plutonic rocks are large-sized

18-Both aluminum ion and nitrogen ion have the same number of electrons

19-The bond in hydrogen molecule is a single covalent bond.

20-Sodium is monovalent, while calcium is divalent.

21-Aluminium oxide molecule is composed of two aluminum atoms and three oxygen atoms.

22-On burning a magnesium ribbon in air, a white powder is formed.

7 What happen when..?

1- Approaching a wet rod with hydrochloric acid to ammonia gas
……..
2- When an electric current passes through an insulated – copper wire coiling around a bar of soft iron
……..
3- Don't use the safety belts in cars
……
4- When driver stop suddenly to cars passengers
……

8 Put (√) or (x) and correct the wrong ones:

1- All non-metals are bad conductor of electricity except graphite ( )
2- Lithium ion has one positive charge ( )
3- All non-metals are solid except mercury ( )
4- The bond in oxygen molecule is triple covalent ( )
5- In ionic bond is formed due to attraction between positive and negative ions ( )
6- Water molecule consists of 2 atoms of two elements ( )
7- The chemical formula of nitric acid is HNO3 ( )
8- Sodium hydroxide is base but magnesium carbonate is oxide ( )
9- The motion of simple pendulum is a transitional motion ( )
10- Potassium sulphate salt is dissolve in water ( )
11- The burning of carbon in presence of oxygen is direct combination
12-The weight of NO2 is higher than weight of NO ( )
13-Oxygen reacts with carbon and carbon monoxide forming CO2 ( )
14-The force effects on the direction of motion ( )
15-Electric current has magnetic effects ( )
16-The wire of electro magnet made up of copper ( )
17-The relative speed of car move beside your car with same speed is very high ( )

10 Compare between the following :

1- Acid and base

2- Positive ion and negative ion

3- Ionic bond and covalent bond

12- Identify which type of the following compound and its name

KCl - NaOH - HCl - NO – K_2SO_4 – PbI_2 – KOH – NH_4Cl – CO_2 – H_2SO_4

13- Calculate the mass of an object weight's 10 Newton
(Earth gravity=9.8 m/s2)

……
……..

14- Calculate the weight of an object its mass 10 k.g
(Earth gravity=9.8 m/s2)

……
……..

15- Calculate the masses of reactants and products in the following reactions:
Knowing that the mass of (S= 32 gm, O = 16 gm, Mg= 24 and C= 12)
(C=12, O=16)

$S + O_2 \longrightarrow SO_2$

$C + O_2 \longrightarrow CO_2$

$2\,Mg + O_2 \longrightarrow 2\,MgO$

16-Give one example for:

1. A circular motion
2. Transitional motion
3. Vibrating motion
4. Wave motion
5. Mechanical wave 6. Electromagnetic wave 7- Periodic motion

Model answers

1 Choose the correct answers:

1. c	2. b	3. d	4. b	5. d	6. c	7. c	8. b	9. d	10. c
11. b	12. b	13. c	14. c	15. b	16. a	17. c	18. d	19. a	20. b
21. b	22. a	23. a	24. a	25. c	26. a	27. c	28. b	29. a	30. b
31. c	32. d	33. b	34. b	35. b	36. a	37. a	38. d	39. c	40. b
41. a	42. c	43. d	44. b						

2 Complete the following:-

1. Mercury –bromine	14- Winch – electric bell
2- H+ , OH-	15-iron – nickel
3. Single covalent – triple covalent , double covalent	16- plutonic – volcanic
4. Single-double-triple	17- plutonic
5-sodium -1 electron – chlorine	18- erosion- transportation- sedimentation
6- H+ - negative hydroxide	19- igneous- sedimentary
7-copper- iron	20- transitional – periodic
8- sour – red	21-lose- positive
9- acid- base – oxides – salts	22-triple covalent – ionic
10-di valent – trivalent	23-igneous- sand stones
11- potassium sulphate- Lead sulphate: PbSO4	24-8
12- center – weight	25-HCl
13-Kg – Newton	

3 Write the scientific term

-

1. positive ion	9. chemical formula	17. direct chemical reaction
2. negative ion	10. acids	18. newton
3. ion	11. bases	19. gm or kg
4. Nobel gases	12. oxides	20. motion
5. ionic bond	13. chemical reaction	21. igneous rocks
6. covalent bond	14. chemical equation	22. volcanic rocks
7. Valency	15. law of constant ratio	23. metamorphic rocks
8. rocks	16. law of conservation of matter	

4 Write the chemical equation.

1- $C + O_2 \xrightarrow{\triangle} CO_2$

2- $NH_3 + HCl \xrightarrow{\triangle} NH_4Cl$

3. $2CO + O_2 \xrightarrow{\triangle} 2CO_2$

4. $2Mg + O_2 \xrightarrow{\triangle} 2MgO$

5. $H_2 + Cl_2 \xrightarrow{\triangle} 2HCl$

5 Write the chemical formula of the following:

1. NaCl 2. $NaNO_3$ 3. Na_2CO_3 4. NaOH 5. $CaCl_2$
6. $Ca(NO3)_2$. 7. K_2CO_3 8. CaSO4 9. $Ca(OH)_2$ 10. CuCO3
11. $Al_2(CO3)_3$ 12-$Al_2(SO4)_3$

Give reason for

1. Because acids has positive hydrogen ions while bases have negative hydroxide ions
2. Because potassium losses one electron while oxygen gains 2 electrons.

3. Because sodium is monovalent while oxygen is divalent
4. Due to formation of ammonium chloride
5. To achieve law of constant mass
6. Because number of positive protons is more than number of negative electrons
7. Because each atom share with two electrons
8. Due to the force of inertia
9. Due to the force of inertia
10. To stop effect of inertia force when stop suddenly
11. Due to change earth's gravity acceleration
12. Due to formation of ammonium chloride
13. Because the force is improper
14. To deliver the blood to all body cells
15. To decrease the friction force
16. Because they are heavy metals.
17. Because the magma cooled slowly, and take large time to be formed.
18. Because when aluminum loses 3 electron the number of electrons become 10, while nitrogen gains 3 electrons.
19. Because each of hydrogen atoms share with 1 electron.
20. As sodium loses one electron to complete the outer most energy level, while calcium gains 2 electrons.
21. Because aluminum is trivalent
22. Due to formation of magnesium oxide substance.

7 What happen when..?

1. White fumes of ammonium chloride are produced.
2. **The iron will be a magnet called electromagnet**
3. The driver get harmed when he stop suddenly
4. The passengers will rushed forward

8 Put (√) or (x) and correct the wrong ones:

1.true	2. true	3. false	4. false	5. true	6.false	7. true	8. false	9. false
10. true	11. true	12. true	13. true	14. true	15.true	16.true	false	

12- Identify which type of the following compound and its name

Salt – base –acid – oxide – salt – salt – base – salt – oxide – ACID

13- Calculate

Mass = weight / gravity

= 10 / 9.8 = 1 kg

14. Weight -= mass x gravity

10 x 9.8 -= 98 N

Knowing that the mass of (S= 32 gm, O = 16 gm, Mg= 24 and C= 12)

(C=12, O=16)

$S + O_2 \longrightarrow SO_2$

Mass of reactants = 32 + 2x16=64gm

Mass of products = 32+2x16 = 64gm

$C + O_2 \longrightarrow CO_2$

Mass of reactants =12 + 2x 16

Mass of products = 12+ 2x16

$2Mg + O_2 \longrightarrow 2MgO$

Mass of reactants = 2(24) + 2x16 = 80 gm

Mass of products = 2(24+16) = 80 gm .

-Give one example for:

1. Moon rotation around earth
2. Train
3. Simple pendulum
4. Water wave
5. sound wave 6. Light wave **7-** circular or wave motion