



# Questions

## Unit (1)

### (1) Give reasons for each of the following:

- 1- Equal masses of different substances have different volumes.  
or Equal volumes of different substances have different masses.
- 2- The iron nail and the metallic coin sink in water while the piece of wood floats on the water surface.
- 3- Water is not used to extinguish petrol fires.
- 4- Balloons filled with hydrogen or helium rise up in air carrying flags.
- 5- Melting point is used to separate between different substances.
- 6- Electric wires are made of copper or aluminium.
- 7- Screw driver are made of steel, while their handles are made of wood or plastic.
- 8- Cooking pans are made of aluminium.
- 9- Handles of cooking pans are made of wood or plastic.
- 10- Sodium and potassium are kept under kerosene surface.
- 11- Steel bridges and the holders of light bulb are painted from time to time.
  - Metallic spare parts of cars are covered with grease.
- 12- Washing of cooking pans made of aluminium with a rough material.
- 13- Silver and gold are used in making jewels.
- 14- Nickel, gold and silver are used to cover other substances which rapidly gain rust.



- 15- When you leave the perfume bottle opened, you smell it all over the room.
- 16- A drop of ink spreads through water.
- 17- The volume of a mixture of water and alcohol is less than the sum of their volumes before mixing.
- 18- It is difficult to break an iron piece with your hand.
- 19- The atom is electrically neutral in its ordinary state.
- 20- The mass of the atom is concentrated in the nucleus.
- 21- The nucleus is positively charged.
- 22- Nobel gases don't enter a chemical reaction through ordinary conditions.

### **(2) What' meant by:**

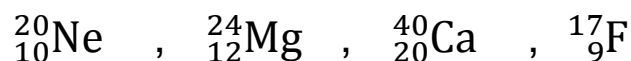
- |                         |                           |
|-------------------------|---------------------------|
| 1- Density              | 2- Melting point          |
| 3- Molecule             | 4- Intermolecular spaces  |
| 5- Intermolecular force | 6- Latent heat of melting |
| 7- Element              | 8- Compound               |
| 9- Atom                 | 10- Atomic number         |
| 11- Mass number         | 12- Energy levels         |
| 13- Quantum of energy   | 14- The excited atom      |



### **(3) Problem**

- 1- What is the density of 35 gm of a substance that occupy 25 cm<sup>3</sup>
- 2- In an experiment to determine the density of water, the following results were recorded.
  - Mass of an empty beaker = 65 gm.
  - Mass of the beaker and water = 165 gm
  - The volume of water = 100 cm<sup>3</sup>.Calculate the density of water.

### **(4) Show the electronic configuration of the following elements:**





## Unit (2)

### (1) Give reason for each of the following:

- 1- The fuel inside the car is similar to the food inside the body of the living organisms.
- 2- The developed countries aim to use solar energy, wind energy and the movement of water more than before.
- 3- The weight of an object is different from its mass.
- 4- The kinetic energy will increase four times as the velocity of the moving object is doubled.
- 5- In the simple pendulum, the kinetic energy of the vibrating body is maximum when it passes its original position during its movement.
- 6- When the ball of pendulum reaches the maximum height the potential energy equals the mechanical energy.
- 7- Car engine is important to the car.
- 8- The freezer of the fridge is found at the top of the fridge.
  - The air conditioner is fixed at the upper part of room.
- 9- The electric heater is placed at the bottom of the room.
- 10- The heat of the sun doesn't reach to the Earth by conduction or convection.
- 11- The production of electricity from solar energy is preferred to that which produced from burning of fuel.
- 12- You feel hot when you touch a hot metallic spoon.



### (2) What's meant by:

- 1) Energy
- 2) The mechanical energy
- 3) Potential energy
- 4) Kinetic energy
- 5) The conservation law of mechanical energy
- 6) The conservation law of energy
- 7) Heat energy
- 8) The temperature
- 9) conduction
- 10) convection
- 11) radiation

### Important Laws:

- 1) Work (w) = Force (f) × Displacement (d)
- 2) Weight = mass × Acceleration of gravity
- 3) potential energy (P.E) = weight (w) × height (h)
- 4) Kinetic energy (k.E) =  $\frac{1}{2}$  mass (m) × (velocity)<sup>2</sup> (v)<sup>2</sup>

### Important units:

- |                                     |                    |
|-------------------------------------|--------------------|
| 1) Work → Joule                     | 2) force → Newton  |
| 3) Displacement → metre             | 4) weight → Newton |
| 5) mass → k.g                       |                    |
| 6) Acceleration of gravity → Newton |                    |
| ≈ 9.8 = 10                          | k.g                |
| 7) P.E → Joule                      |                    |
| 8) Height → meter                   |                    |



9) K.E  $\rightarrow$  Joule

10) velocity  $\rightarrow$  m/sec

### Energy transformation:

Technological application	Energy transformations
1- simple cell	Chemical energy $\rightarrow$ electric energy
2- Electric Lamp	Electric energy $\rightarrow$ light & heat energy
3- Car engine	a) chemical energy (stored in fuel changes by burning) $\rightarrow$ thermal energy b) thermal energy $\rightarrow$ mechanical energy
4- car dynamo	Mechanical energy $\rightarrow$ electric energy
5- car lamps	Electric energy $\rightarrow$ light energy
6- car radio	Electric energy $\rightarrow$ sound energy
7- Electric heater of car (air conditioner)	Electric energy $\rightarrow$ heat energy
8- sewing machine	Electric energy $\rightarrow$ mechanical (kinetic energy)
9- solar cell on solar battery	Solar energy $\rightarrow$ electric energy
10- television	Electric energy $\rightarrow$ light & sound energy
11- Alarm clock	Chemical energy (stored in battery) Kinetic & sound energy
12- cellular phone	Electromagnetic waves $\rightarrow$ sound energy
13- solar heater	Solar energy $\rightarrow$ heat energy
14- solar oven	
15- solar furnace	



## Unit (3)

### (1) Give reasons for:

- 1- We can distinguish between banana plant and Molukhiah plant.
- 2- Cycas is a gymnosperm plant.
- 3- The front teeth of hedgehog are extending out wards.
- 4- The diversity of living organisms.
- 5- Horse's limbs end in a strong solid hoof.
- 6- Bird migration is a behavioural adaptation.
- 7- Beaks and legs of birds are modified in many different ways.
- 8- Insectivorous plants cannot make proteins by themselves.
- 9- The legs of predatory birds have three anterior fingers and posterior one.
- 10- Dinosaurs and mammoth had been perished.
- 11- Some animals hibernate in winter.
- 12- Elodea roots are weak where it's leaves are neckless.
- 13- Elodea stem has air chambers inside it.
- 14- Calamagrostis roots extend vertically for long distance in the soil.
- 15- Opuntia leaves are reduced into spines.
  - Leaves of some desert plants are surrounded by waxy layer.
  - Leaves of calamagrostis plant are spiraled and contain a few numbers of stomata.
- 16- Leaf – insect is hardly to be discovered by its enemies.
- 17- The camel is considered as the desert ship.
- 18- Camel's upper lip is forked and its enamel teeth is strong.





- 19- Camel's fur thickness differs at the different body regions.
- 20- The camel has no need for sweating.
- 21- The camel stores fats in its hump.
- 22- The camel can be alive for 3 – 4 months without eating any food.

### **(2) Define (Scientific term):**

- 1- Micro – organisms
- 2- Gymnosperms
- 3- Angiosperms (flowering plants)
- 4- Arthropods
- 5- Arachnids
- 6- Myriapods
- 7- Rodents
- 8- Lagomorphs
- 9- Taxonomy
- 10- Species
- 11- Adaptation
- 12- Structural adaptation (Anatomical)
- 13- Functional adaptation
- 14- Behavioural adaptation
- 15- Predacious plants (insectivorous)
- 16- camouflage





## *Model Answers*

### Unit (1)

#### (1) Give reasons for each of the following:

1- Equal masses of different substances have different volumes.

or Equal volumes of different substances have different masses.

**Because they have different densities.**

2- The iron nail and the metallic coin sink in water while the piece of wood floats on the water surface.

**Because coin and nail have density higher than water while piece of wood has density lower than water.**

3- Water is not used to extinguish petrol fires.

**Because the density of petrol is less than that of water so, petrol floats on water surface and doesn't put out the fire.**

4- Ballons filled with hydrogen or helium rise up in air carrying flags.

**Because the densities of hydrogen and helium are less than the density of air.**

5- Melting point is used to separate between different substance.

**Because each substance has a definite melting point which differs from the others.**

6- Electric wires are made of copper or aluminium.

**Because they are good conductors of electricity.**



7- Screw driver are made of steel, while their handles are made of wood or plastic.

**Because steel is a good conductor of electricity but wood and plastic are bad conductors of electricity.**

8- Cooking pans are made of aluminium.

**Because it is a good conductor of heat and it has a high melting point and it is easy to transfer heat.**

9- Handles of cooking pans are made of wood or plastic.

**Because wood and plastic are bad conductors of heat.**

10- Sodium and potassium are kept under kerosene surface.

**To prevent their reaction with atmospheric oxygen as they are active metals.**

11- Steel bridges and the holders of light bulb are painted from time to time.

- Metallic spare parts of cars are covered with grease.

**To protect them from rust and corrosion.**

12- washing of cooking pans made of aluminium with a rough material.

**To remove any layer formed on them.**

13- Silver and gold are used in making jewels.

**Because they are chemically poor active.**

14- Nickel, gold and silver are used to cover other substances which rapidly gain rust.

**To protect them from rust and corrosion.**

15- When you leave the perfume bottle opened, you smell it all over the room.

**Because the molecules of the perfume are in continuous motion and they keep the properties of perfume.**



16- A drop of ink spreads through water.

**Because the molecules of ink are in a continuous motion in all directions among water molecules.**

17- The volume of a mixture of water and alcohol is less than the sum of their volumes before mixing.

**Because some molecules of alcohol occupy the intermolecular spaces among water molecules.**

18- It is difficult to break an iron piece with your hand.

**Because there are strong attraction force (intermolecular force) among iron molecules.**

19- The atom is electrically neutral in its ordinary state.

**Because the number of positive protons inside the nucleus is equal the number of negative electrons which revolve around it.**

20- The mass of the atom is concentrated in the nucleus.

**Because the electron has a negligible mass relative to that of proton or neutron.**

21- The nucleus is positively charged.

**Because it contains protons that positively charged particles and neutrons that electrically neutral particles.**

22- Nobel gases don't enter a chemical reaction through ordinary conditions.

**Because the outermost energy levels of their atoms are completely filled with electrons.**



### (2) What' meant by:

#### 1- Density :

It is the mass of unit volume of matter.  $D = \frac{m}{v}$

#### 2- Melting point:

It is the temperature at which matter begins to change from a solid state to a liquid state.

#### 3- Molecule:

It is the smallest part of matter which can exist freely and it has the properties of matter.

#### 4- Intermolecular spaces:

They are the spaces that found among the molecules.

#### 5- Intermolecular force:

It is the force that bounds the molecules together.

#### 6- Latent heat of melting:

It is the amount of heat required to change 1 kg. of substance from solid state to the liquid state without changing in the temperature [although heating is continued]

#### 7- Element:

It is the simplest pure form of matter which can't be analyzed chemically into simple form & it composed of similar atoms.

#### 8- Compound:

It is a substance which is formed from combination of atoms of two or more different elements with constant weight ratios.

#### 9- Atom:

- It is the fundamental building unit of matter
- It is the smallest individual unit of matter which can share in chemical reaction.



### 10- Atomic number:

It is the number of protons in the nucleus of an atom and = number of electrons.

### 11- Mass number:

It is the sum of the numbers of protons and neutrons in the nucleus of an atom.

### 12- Energy levels:

They are imaginary regions around the nucleus in which the electrons move according to their energies.

### 13- Quantum of energy:

It is the amount of energy lost or gained by an electron when it transfers from one energy level to another.

### 14- The excited atom:

It is the atom that gains a quantum of energy.

### (3) Problem

1- What is the density of 35 gm. of a substance that occupy 25 cm<sup>3</sup>

$$D = \frac{m}{v}$$

$$m = 35 \text{ gm}$$

$$V = 25 \text{ cm}^3$$

$$\therefore D = \frac{35}{25} = 1.4 \text{ gm/cm}^3$$

2- Mass of water = 165 – 65 = 100 gm

$$D = \frac{m}{v} = \frac{100}{100}$$

$$D = 1 \text{ gm / cm}^3$$



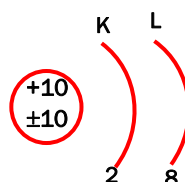
### (4) Show the electronic configuration of the following elements:



no. protons  $\rightarrow 10$

no. neutrons  $\rightarrow 10$

no. electrons  $\rightarrow 10$



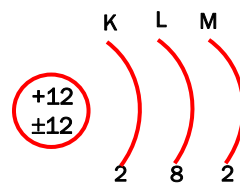
nobel gas



no. protons  $\rightarrow 12$

no. neutrons  $\rightarrow 12$

no. electrons  $\rightarrow 12$



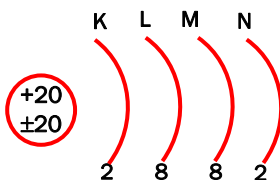
metal



no. protons  $\rightarrow 20$

no. neutrons  $\rightarrow 20$

no. electrons  $\rightarrow 20$



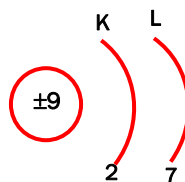
metal



no. protons  $\rightarrow 9$

no. neutrons  $\rightarrow 8$

no. electrons  $\rightarrow 9$



non metal



## Unit (2)

### (1) Give reason for each of the following:

- 1- The fuel inside the car is similar to the food inside the body of the living organisms.

**Because burning each of them produce energy which makes the car move and living organism do work.**

- 2- The developed countries aim to use solar energy, wind energy and the movement of water more than before.

**Because they are cheap resources of energy and do not pollute the environment.**

- 3- The weight of an object is different from its mass.

**Because the weight = mass  $\times$  acceleration of gravity.**

- 4- The kinetic energy will increase four times as the velocity of the moving object is doubled.

**Because kinetic energy is directly proportional to the square of velocity.  $K.E \propto v^2$**

- 5- In the simple pendulum, the kinetic energy of the vibrating body is maximum when it passes its original position during its movement.

**Because when the pendulum passes its original position, its velocity is maximum.**

- 6- When the ball of pendulum reaches the maximum height the potential energy equals the mechanical energy.

**Because when the ball reaches the maximum height its velocity is zero so the kinetic energy is zero.**





7- Car engine is important to the car.

**Because the chemical energy stored in the fuel changes by burning into thermal energy and thermal energy changes into mechanical energy (to move the car).**

8- The freezer of the fridge is found at the top of the fridge.

- The air conditioner is fixed at the upper part of room.

**Because, when the air is cooled, its density increase so it, falls down to cool the room or (to cool the food in the refrigerator), while the hot air (of low density) rises up to be cooled again and so on.**

9- The electric heater is placed at the bottom of the room.

**When the air (around the heater) is heated, its density decreases so, it rises up to warm the room, while the cold air of high density falls down to be heated again and so on.**

10- The heat of the sun doesn't reach to the Earth by conduction or convection.

**It is not transferred by conduction, because air is a bad conductor for heat and it is not transferred by convection because the space between the sun and the atmosphere of the earth does not contain any medium through which heat could be transferred.**

11- The production of electricity from solar energy is preferred to that which produced from burning of fuel.

**Because solar energy is a clean source of energy which doesn't pollute the environment and it is a permanent source of energy.**



12- You feel hot when you touch a hot metallic spoon.

**Due to the transfer of heat of object of high temperature (metallic spoon) to the object of low temperature (you) and the metallic spoon is a good conductor of heat.**

### **(2) What's meant by:**

#### **1) Energy**

It is the ability to do work or to make a change.

#### **2) The mechanical energy:**

It is the summation of potential and kinetic energies of the body.

#### **3) Potential energy:**

It is the stored energy in the object due to a work done on it.

#### **4) Kinetic energy:**

It is the work done during the motion of an object or it is the energy of the moving body.

#### **5) The conservation law of mechanical energy:**

The sum of potential and kinetic energies of an object under the effect of gravity is a constant value.

#### **6) The conservation law of energy:**

Energy is neither created nor destroyed, but it is converted from one form to another.

#### **7) Heat energy:**

It is a form of energy which transfers from the object of higher temperature to that of lower one.



### 8) The temperature:

It is the condition which states the direction of heat energy whether from or to the object when it comes in contact with another and it is directly proportional the particles kinetic energy.

### 9) conduction

It is the transfer of heat through solids from the part of higher temperature to the part of lower temperature.

### 10) Convection

It is the transfer of heat in gases and liquids, where hot molecules have less density and rise up wards, while colder molecules have more density, and fall down.

### 11) Radiation

It is the transfer of heat from hot object to another without any need for a material medium through which heat transfers in different directions.



# Unit (3)

## (1) Give reasons for:

1- We can distinguish between banana plant and Molukhiyah plant.

**Because banana plant carry large sized leaf while the molukhiyah plant carry small sized leaf.**

2- Cycas is a gymnosperm plant.

**Because its seed is formed inside cones and not inside a pericarp (fruit envelope).**

3- The front teeth of hedgehog are extending out wards.

**To capture insects.**

4- The diversity of living organisms.

**To adapt with the environmental changes such as climate change, food diversity and existence of water.**

5- Horse's limbs end in a strong solid hoof.

**To help the horse go through the rocky soil.**

6- Bird migration is a behavioural adaptation.

**Because it is an adaptation in the activity of some animals in different times of the day light.**

7- Beaks and legs of birds are modified in many different ways.

**Because long thin beaks to pick up worms and snails while the legs long thin legs ending in thin fingers to walk in the existence of water.**



- 8- Insectivorous plants cannot make proteins by themselves.  
**Because they can't absorb the nitrogenous substances needed to make proteins from the soil.**
- 9- The legs of predatory birds have three anterior fingers and posterior one.  
**Three anterior and one posterior to firm pouncing the prey.**
- 10- Dinosaurs and mammoth had been perished.  
**Because they couldn't be adapted to the environmental changes.**
- 11- Some animals hibernate in winter.  
**Due to the decrease of temperature.**
- 12- Elodea roots are weak where it's leaves are neckless.  
**Because they are not needed to fix the plant or absorb water and their leaves are neckless, so their connection with the stem will be stronger.**
- 13- Elodea stem has air chambers inside it.  
**To store an amount of oxygen gas produced during photosynthesis process to be used in respiration.**
- 14- Calamagrostis roots extend vertically for long distance in the soil.  
**To reach the humid layers of soil to absorb ground water.**
- 15- Opuntia leaves are reduced into spines.  
- Leaves of some desert plants are surrounded by waxy layer.  
- Leaves of calamagrostis plant are spiraled and contain a few numbers of stomata.  
**To prevent or (reduce) water loss by transpiration.**



16- Leaf – insect is hardly to be discovered by its enemies.

**Because it looks the plant leaf exactly in its colour and shape of wings.**

17- The camel is considered as the desert ship.

**Because it has the ability to store food and water that help it to travel for long distances without drinking or eating.**

18- Camel's upper lip is forked and its enamel teeth is strong.

**To enable it to eat the spiny and dry desert plants without harming it.**

19- Camel's fur thickness differs at the different body regions.

**It is more dense at the vital body regions to provide protection from the extreme cold at night and little dense over other body regions to ease heat loss by radiation during day light.**

20- The camel has no need for sweating.

**Because the blood temperature is not constant and it changes from 34° c in the morning to 41° c during the day light hours.**

21- The camel stores fats in its hump.

**To keep it for 3 – 4 months without eating any food.**

22- The camel can be alive for 3 – 4 months without eating any food.

**Because it store fats in its hump and can lose 25% of its body weight when water and food are not available and its blood composition remains constant.**



## **(2) Define (Scientific term):**

### **1- Micro – organisms**

They are living organisms that cannot be seen by naked eye, but they spread everywhere around us, in air water and soil.

### **2- Gymnosperms**

They are plants, their seeds are formed inside cones and not inside a pericarp (fruit envelope)

### **3- Angiosperms (flowering plants)**

They are plant, their seeds are formed inside a pericarp.

### **4- Arthropods:**

They are invertebrate animals that are characterized by the presence of jointed legs.

### **5- Arachnids:**

Arthropods that have four pairs of legs. Ex (spiders, scorpions)

### **6- Myriapods:**

Arthropods that have numerous legs. Ex: scolopendra, Julius.

### **7- Rodents:**

They are mammals have one pair of incisors in each jaw.

### **8- Lagomorphs:**

They are mammals have two pairs of incisors in the upper jaw and one pair in the lower jaw.

### **9- Taxonomy:**

It is a branch of biology that searches for the similarities and the differences among living organisms and it places the similar ones in groups according to a certain system in order to ease their study.





### 10- Species:

It is a group of more similar living organisms in shape that can reproduce to give birth of new fertile individuals which are able to reproduce and keeping the existence of the species.

### 11- Adaptation:

It is a modification of living organism's behavior, body structure or organs biological functions to become more adapted to the environmental conditions which it lives in.

### 12- Structural adaptation (Anatomical):

It is an adaptation that studies the structure of one body organ.

### 13- Functional adaptation:

It is an adaptation of some organs and tissues to do a specific function.

### 14- Behavioural adaptation:

It is an adaptation in the activity of some animals in different times of the day light.

### 15- Predacious plants (insectivorous)

They are self feeding (auto trophic) green plants because they can perform photosynthesis process so, they can make carbohydrates and can't make proteins.

### 16- camouflage:

It is the ability of some living organisms to be hidden from their enemies or to capture the preys in the predatory species.