

9th Standard – Science – Third Term

Notes & Questions

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Prepared By Winmeen Team

9th Standard – SCIENCE - Term III

1. Fluids

If we apply pressure on gasses and liquids they do not get deformed but they began to flow. So they are called **fluids**. The force acting perpendicular to the surface is called thrust. The net force in a particular direction is known a **thrust**.

 $Pressure = \frac{Thrust}{Area of contact}$

It the area is large, the pressure is less, if the area is small the pressure will be great.

 $Pressure = \frac{Total \text{ force exerted by the fluid}}{Area \text{ over wyich the force is exerted}} = \frac{F}{A}$

The pressure exerted by a liquid at a point is determined by (i) depth (h) (ii) density of the liquid (p) and (iii) acceleration due to gravity (g).

Pressure due to a liquid column P= hpg. The earth is surrounded by the atmosphere. The pressure that are exerts is called atmospheric pressure. The atmospheric pressure decreases as we go up in the mountains. It gets more when we go down below sea level like mines. The instrument used to measure atmospheric pressure is called **barometer**.

The first mercury barometer was designed by an Italian physicist Torricelli. Now we are using other types of barometers. Fortin's barometer, Aneroid barometer and Barograph are some of the barometers. A French physicist named Pascal found out that the external pressure applied on an incompressible liquid is transmitted uniformly throughout the liquid. Pascal's law states that an increase in pressure at any point inside a liquid at rest is transmitted equally and without any change, in all directions to every other point in the liquid.

The Density of a substance is the mass per unit volume of a given substance. The SI unit of density is kilogram per cubic metre (kg/m^3) . The symbol of density is rho (p). Relative Density (RD) of a substance is the ratio of density of the substance to the density of water at 4°C.

Relative density (RD) = $\frac{\text{mass of certain volume of a substance}}{\text{mass of equal volume of water}}$

Relative density is measured by using Pycometer also called density bottle. If the referenced substance is water then the term specific gravity is used.

If the density of a substance is less than the density of the liquid it will float. For example a piece of wood which is less dense than water will float on it. a stone which is denser than water will sink into it. We use a **hydrometer** to measure the density or relative density of a liquid. We use a lactometer for measuring the density of milk. A saccharometer is used to measure the density of sugar and an alcoholmeter is used to measure higher levels of alcohol in spirits.

When a body is partially or fully immersed in a liquid it experiences an upward force. This is called buoyant force and the phenomenon is called buoyancy. Sea water is denser than fresh water as it contains salts dissolved in it. So sea water provides more buoyant force than fresh water. When a substance is lighter than the water displaced, it floats. The boat is able to float because its weighs less than the weight of the water displaced by it. Archimedes principle states that 'a body immersed in a liquid experiences a vertical upward buoyant force equal to the weight of the fluid it displaces'.

1. Choose the correct answer:

- 1. The size of an air bubble rising up in water
 - a) decreases b) increases
 - c) remains same d) may increase or decrease
- 2. Clouds float in atmosphere because of their low
 - a) density b) pressure
 - c) velocity d) mass
- 3. In a pressure cooker, the food is cooked faster because
 - a) increased pressure lowers the boiling point
 - b) increased pressure raises the boiling point
 - c) decreased pressure raises the boiling point
 - d) increased pressure lowers the melting point.
- 4. An empty plastic bottle closed with an airtight stopper is pushed down into a bucket filled with water. As the bottle is pushed down, there is an increasing force on the bottom as shown in graph. This is because



- a) more volume of liquid is displaced
- b) more weight of liquid is displaced.
- c) pressure increases with depth
- d) all the above

<u>II. Fill in the blanks:</u>

- 1. In a fluid, buoyant force exists because pressure at the **bottom** of an object is greater than the pressure at the top.
- 2. The weight of the body immersed in a liquid appears to be <u>less</u> than the actual weight.
- 3. The instrument used to measure atmospheric pressure is **barometer.**
- 4. The magnitude of buoyant force acting on an object immersed in a liquid depends on <u>density</u> of the liquid.
- 5. A drinking straw works on the existence of atmospheric pressure.

III. True or False:

1. The Weight of fluid displaced determines the buoyant force on an object. - True

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2. The shape of an object helps to determine whether the object ill float.

3. The foundations of high-rise buildings are kept wide so that they may exert more pressure on the ground. - False

4. Archimedes principle can also be applied to gases.

- True

- False

- True

5. Hydraulic press is used in the extraction of oil form oil seeds.

IV. Match the following:

1. Density	a) hpg
2. 1 gwt	b) Milk
3. Pascal's law	c) $\frac{mass}{volume}$
4. Pressure exerted by a fluid	d) pressure
5. Lactometer	e) 980 dyne
Ans: 1– c; 2- e; 3-d; 4-a; 5-b	

V. Assertion and Reason:

Directions: In each of the following questions, a statement of Assertion (A) is given followed by acorresponding statement of Reason (R) just below it. Of the statements, mark the correct answer as

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false.

- d) If assertion is false but reason is true.
- 1. Assertion: To float, body must displace liquid whose weight is equal to the actual weight. **Reason:** The body will experience no net downward force in that case.

Ans: a) If both assertion and reason are true and reason is the correct explanation of assertion 2. Assertion: Pascal's law is the working principle of a hydraulic lift.

Reason: Pressure is thrust per unit area.

Ans: b) If both assertion and reason are true but reason is not the correct explanation of assertion.

3. Assertion: The force acting on the surface of liquid at rest, under gravity, in a container is always horizontal.

Reason: The forces acting on a fluid at rest have to be normal to the surface.

Ans: d) If assertion is false but reason is true.

4. Assertion: A sleeping mattress is so designed that when you lie on it, a large area of your body comes in the contact.

Reason: This reduces the pressure on the body and sleeping becomes comfortable.

Ans: a) If both assertion and reason are true and reason is the correct explanation of assertion.

5. Assertion: Wide wooden sleepers are kept below railway lines to reduce pressure on the railway tracks and prevent them from sinking in the ground.

Reason: Pressure is directly proportional to the area in which it is acting.

Ans: c) If assertion is true but reason is false.

VI. Short Questions & Answers:

1. On what factors does the pressure exerted by the liquid depend on?

Pressure exerted by a liquid at a point is determined by (i) depth (h) (ii) density of the liquid (p) (iii) acceleration due to gravity (g).

2. Why does a helium balloon float in air?

Hydrogen, helium and hot air are much less dense than ordinary air. This gives them buoyancy to rise and float in air.

3. Why is it easy to swim in river water than in sea water?

Salt water provides more buoyant force than fresh water because buoyant force depends as much on the density of fluids as on the volume displaces. So it is easier to swim in river water than in sea water.

4. What is meant by atmospheric pressure?

The pressure exerted by a layer of air upto certain height (nearly 300 km) around the earth is called the atmospheric pressure.

5. Sate Pascal's law.

The external pressure applied on an incompressible liquid is transmitted uniformly throughout the liquid.

Pascal's law states that an increase in pressure at any point inside a liquid at rest is transmitted equality and without any change, in all directions to every other point in the liquid.

6. How does an object's density determine whether the object will sink or float in water?

Whether an object will sink or float in a liquid is determined by the density of the object compared to the density of the liquid. If the density of a substance is less than the density of the liquid it will float. For example a piece of wood which is less dense than water will float on it. Any substance having more density than water (for example, a stone) will sink into water.

7. State the laws of flotation.

Laws of flotation are:

a) The weight of a floating body is a fluid is equal to the weight of the fluid displaced by the body.

b) The centre of gravity of the floating body and the centre of buoyancy are in the same vertical line.

The point through which the force of buoyancy is supposed to act is known as centre of buoyancy.

8. How does the fish manage to rise up and move down in water?

Fish has an internal swim bladder which is fixed with gas. When it needs to ride or descend, it changes the volume and its density.

9. If you put one ice cube in a glass of water and another in a glass of alcohol, what would you observe? Explain your observation.

If one ice cube is put in a glass of water, it will float on the surface of water because the density of ice cube is less than that of water. But if it is put in a glass of alcohol, it will sink into it because the density of ice cube is greater than that of alcohol.

10. You have a bag of cotton and an iron bar, each indicating a mass of 100 kg when measured on a weighing machine. In reality, one is heavier than other. Can you say which one is heavier and why?

In reality, a bag of cotton is heavier. The volume of 100 kg of iron bar is less than that of 100 kg of cotton bag. So the up thrust for cotton bag when weighing in air medium is higher than that of the iron bar.

11. Why does a boat with a hole in the bottom would eventually sink?

The shape of the boat is constructed in such a way that the weight of the water displaced is equal to the weight of the boat. In a boat with a hole in the bottom, water enters into the boat and as a result the weight increases. When the weight of the boat is greater than the water displaced by the boat, the boat sinks into the water.

VII. Comprehensive type Questions:

- 1. While passing nearby a pond, some students saw a drowning man screaming for help. They altered another passerby, who immediately threw an inflated rubber tube in the pond. The man was saved. Respond to the given questions using the information provided above.
 - a) Why did the passerby use inflated rubber tube to save the drowning man? The inflated rubber tube will not sink into the water even if it is loaded heavily. So the passerby used inflated rubber tube to save the drowning man.
 - **b) Write the principle involved herein.** The density of air is less than the density of water. So the inflated rubber tube floats.
 - c) Which qualities shown by the students and the passerby do you identify that helped in saving the drowning man.

The students had the presence of mind to call out for help. The passerby had the scientific knowledge that a tube filled with air will always float and prevent the man from drowning.

- 2. A balloon displaces air and it results in buoyant force. This buoyant force is more than the weight of the balloon and hence the balloon moves up.
 - a) As the balloon moves up what happens to the density it? As the balloon moves up, the density of air decreases.
 - b) Write the condition for floating of balloon.The weight of the floating balloon in the air is equal to the weight of the air displaced by the floating balloon.
 - c) Buoyant force depends on the density of ______ Buoyant force depends on the density of <u>fluids</u>.

2. Sound

Sound is a form of energy. All sounds are produced by the vibrations of substances. When the vibrations reach our ears we are able to hear the sound. For propagation sound waves require a medium like air, water, steel etc. Sound does not travel through vacuum. When an object vibrates it sets the particles of the medium around to vibrate. The particle in contact with the vibration is displaced from its position of equilibrium. It then exerts a force on the adjacent particle. The first particle comes back to its original position. This process continues in the medium till the sound reached our ears.

Sound is a longitudinal wave. Here the particles of the medium move to and fro along the direction of propagation of the wave. Sound can travel only when there are particles which can be compressed and rarefied. Compressions are regions where particles are crowded together. Rarefactions are the regions of low pressure where particles are spread apart. The maximum displacement of the particles of the medium from their original undisturbed positions is called **amplitude** (A) of the wave. The number of vibrations produced in one second is called the frequency (n) of the wave. The SI unit of frequency is hertz (Hz). Sound with frequency less than 20 Hz is called **infrasonic sound**. Sound with frequency greater than 20,000 Hz is called **ultrasonic sound**. The time required to produce one complete vibration is called the time period of the wave (T). In a sound wave, the distance between centres of two consecutive compressions of two consecutive rarefactions is called wavelength (l). The distance travelled by the sound wave in one second is called velocity of the sound.

Speed (v) =
$$\frac{Distance}{Time}$$

Both lightning and thunder originate simultaneously. But we see the lightning fist and hear the thunder afterwards. This is due to the fact that light waves travel faster than sound waves. Sound travels about 5 times faster in water than in air. When the speed of any object exceeds the speed of sound in air it is said to the travelling at **supersonic speeds.** These supersonic waves produce shock waves which carry a large amount of energy. The shock waves produce very loud sound called 'sonic boom'. The shock waves generated by supersonic jet planes can shatter glasses and cause damage to buildings.

Sound waves are reflected when they hit an obstacle of large size. According to the laws of reflection the angle of incidence and the angle of reflection are same. The direction of the incident sound, the direction of the reflected sound and the normal are in the same place. Megaphones, loud speakers, horns and nathaswaram are designed to send sound in a particular direction. The stethoscope used to listen to the sounds in the body magnifies the sound by multiple reflections in the connecting tube. When we shout or clap neat a tall building or mountain the sound comes back to us a little later. This is called echo. In order to heat the echo the listener should be at least 17 metres away form the obstacle.

A Sound created in a big hall will persist by repeated reflection from the walls. This persistence of sound is called **reverberation**. Sound waves greater than 20,000 Hz are called ultrasonic sound waves. We can't hear them. But the ultra sound is useful in examining the inner part of the body. As echogram is an image obtained by the use of reflected ultrasonic waves. SONAR stands for Sound Navigation and Ranging. It is used to measure the depth of sea. Our ear has pinna, auditory canal, eardrum, middle ear with three bones and the cochlea. We hear sound when the vibrations pass from the outer ear to the inner ear. The cochlea converts the pressure variations into electrical signals. When these signals reach the brain through the auditory nerve we hear the sound.

I. Choose the correct answer:

- 1. Which of the following vibrates when a musical note is produced by the cymbals is an orchestra?
 - a) stretched strings b) stretched membranes
 - c) air columns d) metal plates
- 2. Sound travels in air:
 - a) if there is no moisture in the atmosphere
 - b) if particles of medium travel from one place to another.
 - c) if both particles as well as disturbance move from one place to another.

d) if disturbance moves.

3. A musical instrument is producing continuous note. This note cannot be heard by a person having a normal hearing range. This note must then be passing through.

a) wax b) vac	uum
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c) water d) empty vessel

- 4. If the speed of a wave is 340ms^4 and its frequency is 1700 Hz, then wavelength λ for this wave in cm will be
 - a) 34 b) 20

c) 15 d) 0.2

5. Which of the following statement best describes frequency?

a) the number of complete vibrations per second.

- b) the distance travelled by a wave per second.
- c) the distance between one crest of wave and the new one.
- d) the maximum disturbance caused by a wave.

6. The maximum speed of vibration which produces audible sound will be in

- b) ground glass a) sea water
- d) human body c) dry air
- 7. The sound waves travel faster
 - a) in liquids b) in gases
 - c) in solids d) in vacuum

8. When the pitch of note by a harmonium is lowered, then the wave length of the note

- a) first decreased and then increases b) decreases
- c) remains the same d) increases
- 9. The speeds of sound in four different media are given below which of the following is the most likely speed in ms⁻¹ with which the two under water whales in a sea can talk to each other when separated by a large distance.
 - a) 5170 b) 1280 d) 1530 c) 340
- 10. Which of the following can produce longitudinal waves as well as transverse waves under different conditions?

a) TV transmitter	b) tuning fork
	1\ 1' 1

- c) water d) slinky
- 11. The velocities of sound waves in four media P,Q,R and S are 18000 km/h, 900 km/h, 0 km/h and 1200 km/h respectively. Which could be a liquid medium?
 - a) R b) Q
 - c) P **d**) **S**

II. Fill in the blanks:

- 1. Vibration of objects produces sound.
- 2. Sound is a mechanical wave and needs a material medium to travel.
- 3. Number of vibrations produced in one second is frequency.
- 4. The velocity of sound in solid is greater than the velocity of sound in air.
- 5. Loudness in proportional to the square of the **amplitude**.
- 6. A sound wave has a frequency of 4 k Hz and wave length 2 m. Then the velocity of sound is <u>8000m.s⁻¹</u>
- 7. Stethoscope is a medical instrument used for listening to sounds produced in the body.
- 8. The repeated reflection that results in persistence of sound is called reverberation.
- 9. Ultrasounds can also be used to detect cracks and flaws in metal blocks.
- 10. In the inner ear, the pressure variations are turned into electrical signals by the cochlea.

III. Match the following:

- 1. Tuning fork
- a) The point where density of air is maximum.
- 2. Sound
- b) Maximum displacement from the equilibrium position.
- 3. Compressions
- c) The sound whose frequency is greater than 20,000 Hz.
- 4. Amplitude
- d) Longitudinal wave e) production of sound 5. Ultrasonics

Ans: 1-e ; 2-d ; 3-a ; 4-b ; 5-c.

IV. Matrix matching:

1. Loudness a. Number of vibrations produced in unit time A. Decibel		A. Decibel
2. Time period b. The amount of sound produced/ received B. Metre		B. Metre
3. Amplitude c. Distance travelled by sound in unit time C. Hertz		C. Hertz
4. Velocity of	d. The time required to produce one complete	D. Metre per
sound	wave	second
5. Frequency e. The maximum displacement from the mean E. Second		E. Second
	position	

Ans: 1-b-A; 2-d-E; 3-e-B; 4-c-D; 5-a-C

V. Short Questions & Answers:

- **1. Name the device which is used to produce sound in laboratory experiments.** Tuning fork is used to produce sound in laboratory experiments.
- **2. Through which medium does sound travel faster, iron or water? Give reason.** Sound travels faster in iron medium. One of the conditions for the velocity of sound is density. The density of iron is greater than the density of water. So sound travels faster in iron.
- 3. What should an object do to produce sound?

To produce sound, the object should vibrate.

- **4. Can sound travel through vacuum?** No, sound cannot travel through vacuum.
- **5.Name the physical quantity whose SI unit is 'hertz' Define.** The SI unit of frequency is hertz (Hz). A complete cycle product
- The SI unit of frequency is hertz (Hz). A complete cycle produced in one second is called hertz.
- 6. What is meant by supersonic speed? When the speed of any object exceeds the speed of sound in air (330 ms⁻¹), it is said to be supersonic speed.
- 7. How does the sound produced by a vibrating object in a medium reach your cars?

When an object vibrates, it sets the particles of the medium around to vibrate. But, the vibrating particles do not travel. A particle of the medium in contact with the vibrating object is displaced from its equilibrium position. It then exerts a force on an adjacent particle which gets displaced from its position of rest. After that the first particle comes back to its original position. This process continues in the medium till the sound reached our ears.

8. You and your friend are on the moon. Will you be able to hear any sound produced by your friend?

No. As there is no medium like air on the moon, the sound waves do not travel.

3. Universe

The collection of all the things that exist in space is known as the **universe**. The universe contains the Earth, planets, stars, space and the galaxies. About 13.7 billion years ago, an explosion occurred and ejected all the matter in all directions in the form of galaxies. Immediately after the Big Bang many galaxies formed from hydrogen and helium. A galaxy is a massive collection of gas, dust and billions of stars and their solar system. Our Sun and all the planets in the solar system are in the Milky Way galaxy. As it appears as milky band of light it got this name. Andromeda galaxy is our closest neighbouring galaxy.

Stars are built with hydrogen gas. Hydrogen atoms fuse together to form helium atoms and in this process they produce large amount of heat. Hot stars are white or blue whereas cooler stars are orange or

red in colour. The sun and the celestial bodies which revolve around it form the **solar system**. Most of the energy emitted by the Sun is visible light and a form of radiation known as infrared rays, which we feel as heat. Eight planets revolve around the Sun. Mercury, Venus, Earth and Mars are called **inner planets**. The four large planets Jupiter, Saturn, Uranus and Neptune which orbit the Sun slowly are called **outer planets**.

Mercury is the planet closest to the Sun. It is very hot during day but very cold at night. Venus is the hottest planet in the solar system. Next to the moon it is brightest heavenly body in night sky. It always appears in the horizon of eastern or western sky. The Earth is the only planet in our solar system that supports like. As it is at the right distance from the Sun it has the right temperature, presence of water and atmosphere and a blanket of ozone.

The earth rotates on its axis from west to east. So the sun appears to rise on the east and set in the west. Mars appears red in colour and hence it is called the red planet. It has two natural satellites Deimos and Phobos. **Jupiter** is called the Giant planet as it is the biggest of all planets. Its moon Ganymede is the largest moon of our solar system Jupiter rotates faster than any other planet. **Saturn** is known for its bright, shiny rings. It rotates fast and it has a large moon called Titan. **Uranus** is a cold giant has a tilted axis of rotation. As a result in its orbital motion it appears to on its side. **Neptune** appears as Greenish star. It is windiest planet. It has big moon called Triton. Triton is the only moon is our solar system that moves in the opposite direction to the direction in which its planet spins.

Asteroids are pieces of rocks found in the gap between the orbits of Mars and Jupiter. The biggest asteroid is **Ceres**, 946 km across Comets are lumps of dust and ice that revolve around the sun. Halley's come to appears after nearly **75 - 76** years. **Meteors** are small pieces of rocks scattered in oughout the solar system. Some of them fall to the earth without being burnt completely. They are called meteorites. A body moving around a planet is called **satellite**. In 1956 Sputnik was sent into space. It was the first artificial satellite sent to space. India's first satellite Aryabhatta was launched on 19th April 1975. Artificial satellites which move around the earth at the speed of the earth are called geo-stationary satellites. ISS is a large spacecraft which can house astronauts. It is also a science laboratory. Its main purpose is to provide a lab for conduction experiments in space with the space environment.

I. Choose the correct answer:

- 1. Which of the following statement is correct?
 - A) There are eight planets in our solar system.
 - B) Except Mars all other planets revolve around the Sun in elliptical orbits.
 - a) A only b) B only
 - c) Both A and B d) None
- 2. Who proposed the heliocentric model of the universe?
 - a) Tycho Brahe b) Nicolaus Copernicus
 - c) Ptolemy d) Archimedes
- 3. Which of the following is not a part of outer solar system?

a) Mercury	b) Saturn
c) Uranus	d) Neptune

- 4. Ceres is a _____a) Meteorb) Star
 - c) Planet d) Asteroid

- 5. The period of revolution of planet A around the Sun is 8 times that of planet B. How many times is the distance of planet A as great as that of planet B?
 - a) 4
 - c) 2 d) 3
- _____ years ago. 6. The Big Bang occurred _____

b) 5

- a) 13.7 billion b) 15 million d) 20 million
- c) 15 billion

II. Fill in the blanks:

- 1. The speed of Sun in km/s is 250km/s.
- 2. The rotational period of the Sun near its pole is <u>36 days.</u>
- 3. India's first satellite is Aryabhatta.
- 4. The third law of Kepler is also known as the law of Harmonies.
- 5. Triton is the only moon in the solar system that moves in the opposite direction to the direction in which its planet spins.
- 6. The number of planets in our solar system is eight.

III. True or False:

1. The distance between Saturn and Uranus is about 10 times as that between Earth and Mars.	- True
2. ISS is a proof for international cooperation.	- True
3.Halley's comet appears after nearly 67 hours.	- False
4. Satellites nearer to the Earth should have lesser orbital velocity.	- False
5. Mars is called the red planet.	- True

IV. Match the following:

1. Jupiter	a) 17.2 hours

- b) 10.7 hours 2. Mercury
- 3. Venus c) 87.97 days d) 9 hours 55 min
- 4. Saturn 5. Mars
 - e) 243 days f) 87.97 days
 - g) 24 hours 37 min

Ans: 1- d; 2- c; 3-e; 4- b; 5- g

V. Short Questions & Answers:

1. What is solar system?

The Sun and the celestial bodies which revolve around it form the solar system.

2. What is a cosmic year?

The Sun travelling at a speed of 250 km per second (9 lakh km/h) takes about 225 million years to complete one revolution around the Milky Way. This period is called a cosmic year.

3. Define orbital velocity.

The horizontal velocity that has to be imparted to a satellite at the determined height so that it makes a circular orbit around the planet is called orbital velocity.

4. Define time period of a satellite.

Time taken by the satellite to complete one revolution round the Earth is called time period.

Time period, $T = \frac{\text{Distance covered}}{\text{Orbital velocity}}$

5. What is a satellite? What are the two types of satellites?

A body moving in an orbit around a planet is called satellite. The two types of satellites they are: 1) Natural satellites

2) Manmade (or artificial) satellites.

6. Write a note on the inner planets.

The four planets grouped together in the inner solar system are Mercury, Venus, Earth and Mars. They are called inner planets. They have a surface of solid rock crust and so are called terrestrial or rocky planets. Their insides, surfaces and atmospheres are formed in a similar way and form similar pattern. Our planet, Earth can be taken as a model of the other three planets.

7. Write about comets in brief.

Comets are lumps of dust and ice that revolve around the Sun in highly elliptical orbits. Their period of revolution is very long. When approaching the Sun, a comet vaporizes and forms a head and tail. Some of the biggest comets ever seen had tails 160 million (16 crores) km long. This is more than the distance between the Earth and the Sun. Many comets are known to appear periodically. One such comet is Halley's Comet, which appears after nearly every 76 years. It was last seen in 1986, it will next be seen in 2062.

8. First Law – The law of Ellipses:

The path of the planets about the Sun is elliptical in shape, with the center of the Sun being located at one of the foci.

Second Law – The Law of Equal Areas:

An imaginary line drawn from the center of the Sun to the center of the planet will sweep out equal areas in equal intervals of time.

Third Law – The Law of Harmonies:

The ratio of the squares of the periods of any two planets is equal to the ratio of the cubes of their semi major axis from the Sun.

9. Write short notes on Gaganyaan,.

The Indian Space Research Organization (ISRO) had proposed its Indian Human Spaceflight Programme to be done by 2021/2022 according to ISRO Chairman, K.Sivan. The first crew is to consist of three astronauts to be taken to space with a spacecraft called Gaganyaan on a GSLV-III rocket.V.R.Lalithambika, a specialist in advanced launcher technologies, will help the project as Director of the Human Space Flight Project.

10. What factors have made life on Earth possible?

The Earth where we live is the only planet in the solar system which supports life. Due to its right distance from the Sun it has the right temperature, the presence of water and suitable atmosphere and a blanket of ozone. All these have made continuation of life possible on the Earth.

4. Planets in Orbit

A planet revolves around the Sun along a definite elliptical path which is called an orbit. The time taken by a planet to complete one revolution is called its period of revolution. The period of revolution increases as the distance of the planet from the Sun increases. T for Earth is 365.30 days; T for Neptune is 164.80 years.

A planet also rotates on its own axis like a top. The time taken by a planet to complete one rotation is called its period of rotation. The period of rotation of the Earth is 23 hours and 56 minutes.

The planets are spaced unevenly. The four planets grouped together in the inner solar system are Mercury, Venus, Earth and Mars. They are called inner planets. The four large planets Jupiter, Saturn, Uranus and Neptune are outer planets.

Mercury: Mercury is a rocky planet nearest to the Sun. It is very hot during day but very cold at night. It moves around the Sun faster than any other planet – one year being only 87.97 Earth days and rotates very slowly. One day is equal to 58.65 days. Mercury can be more easily observed thorough telescope than by naked eye, since it is very faint and small, it always appears in the eastern horizon or western horizon of the sky.

Venus: Venus is a special planet from the Sun, almost the same size as the Earth. It is the hottest planet in our solar system. After our moon, it is the brightest heavenly body in our night sky. A day on this planet is longer than its year. A day on this planet is 243 Earth days and a year is only 224.7 Earth days. This planet spins in the opposite direction to all other planets and so unlike Earth, the sun rises in the west and sets in the east here. Venus can be seen clearly through naked eye. It always appears in the horizon of eastern or western sky.

The Earth: The Earth where we live is the only planet in the solar system which supports life. Due to its right distance from the Sun it has the right temperature, the presence of water and suitable atmosphere and a blanket of ozone. All these have made continuation of life possible on the Earth. It moves around the Sun in 365.25 days and rotation period is 23.93 hours. The axis of rotation of the Earth is not perpendicular to the plane of its orbit. The tilt is responsible for the change of seasons on the Earth. From space, the Earth appears blush green due to the reflection of light from water and land mass on its surface.

The Earth rotates on its axis from west to east, so the Sun appears to move in its opposite direction that is from east to west. Life on Earth as we know would not be possible without the Sun. The solar energy from the Sun has supported and sustained terrestrial existence on Earth since the beginning of time.

Mars: The first planet outside the orbit of the Earth is Mars. It appears slightly reddish and therefore it is called the red planet. It has two small natural satellites (Seinos and phobos). A natural satellite of any planet is called moon. One day on this planet is of 24 hours 37 minutes 22 seconds, and one year is 686.98 days, i.e. 687 Earth days.

Jupiter: Jupiter is called the Giant planet. It is the largest of all planets (about 11 times larger and 318 times heavier than Earth). It has 3 rings and 65 moons. Its moon Ganymede is the largest moon of our solar system. Rotating faster than any other planet, Jupiter has the shortest days – one day lasting only 9 hours 55 minutes 30 seconds. One year in Jupiter equals our 11.862 years.

Saturn: Known for its bright shiny rings, Saturn appears yellowish in colour. It is the second biggest and a giant gas planet in the outer solar system. It rotates very fast – the rotation period being 10.7 hours but revolves slowly around the sun – the revolution period being 29.46 Earth years. At least 60 moons are

present – the largest being Titan. Titan is the only moon in the solar system with clouds. Having least density of all (30 times less that Earth), this planet is so light.

Uranus: Uranus is a cold gas giant and it is the seventh planet from the Sun in the solar system. It can be seen only with the help of large telescope. It has a greatly tilted axis of rotation. As a result, in its orbital motion it appears to roll on its side. Its revolution period is 84 Earth years and the rotation period is 17.2 hours. Due to its peculiar tilt, it has the longest summers and winters each lasting 42 years,

Neptune: It appears as Greenish star. It is the eighth planet from the Sun and is the windiest planet. Every 248 years, Pluto crosses its orbit. This situation continues for 20 years. It has 13 moons – Triton being the largest. Triton is the only moon in the solar system that moves in the opposite direction to the direction in which its planet spins.

The horizontal velocity that has to be imparted to a satellite at the determined height so that it makes a circular orbit around the planet is called orbital velocity.

VI. Conceptual questions & Answers:

1. Why do some stars appear blue and some red?

Stars appear to be in different colours depending on their temperature. Hot stars are white or blue whereas cooler stars are orange and red in colour. Stars produce heat, light, ultraviolet rays, x-rays and other forms of radiation.

2. Why are we able to see the moon even though it is not a luminous body?

The moon is a satellite of the Earth. It moves around the Earth once in 27.3 days in an approximate circular orbit of radius 3.85×10^5 km. The moon is not a luminous body but it reflects the light of the sun. So we are able to see the moon.

3. How is a satellite maintained in nearly circular orbit?

Artificial satellites are made to revolve in an orbit at a height of few hundred kilometers. At this altitude, the friction due to air is negligible. The satellite is carried by a rocket to the desired height and released horizontally with a high velocity, so that it remains moving in a nearly circular orbit.

4. Why are some satellites called geostationary?

At an altitude of 200 kilometers, the required orbital velocity is little more than 27,400 kph. That orbital speed and distance permit the satellite to make one revolution in 24 hours, since Earth also rotates once in 24 hours, a satellite stays in a fixed position relative to a point on Earth's surface. Because the satellite stays over the same spot all the time, this kind of orbit is called 'geostationary'.

5. A man weighing 60 kg in the Earth will weigh 1680 kg in the Sun. Why?

Weight of a man in the Earth = 60 kg

We know Sun's gravity is 28 times that of the earth.

So, man weighing 60 kg in Earth will weigh $(28 \times 60) = 1680$ kg in the Sun.

5. Carbon and its Compounds

Antoine Lavoisier named Carbon from the Latin word 'Carbo' meaning coal. This is because carbon is the main constituent of coal. Coal is a fossil fuel developed from prolonged decomposition of buried plants and animal. So it is clear that all the life forms contain carbon. Large number of things which we use in our daily life are made up of carbon compounds. The most vital photochemical reaction of plants involve carbon compound. Carbon chemistry is also called Living Chemistry.

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Compounds of carbon can be classified into two types namely organic carbon compounds and nonorganic carbon compounds. Friedrich Wohler is called father of Modern Organic Chemistry. Catenation, Tetra Valency, multiple bonds, isomerism and Allotropy are the unique features of carbon. Catenation is binding of an element to itself or with other elements through covalent bonds to form open chain or closed chain compounds.

Carbon has the tendency to share its four electrons with other atoms to complete its octet. This is called tetravalency. Tetravalent covalent carbon is able to combine with other elements or with itself through single bond, double bond and triple bond. Isomerism is found in catenated organic compounds. Organic compounds having same molecular formula but different structural formula exhibit isomerism.

Allotropy is a property by which an element can exist in more than one form that are physically different and chemically similar. Carbon is in the allotropic forms of diamond, graphite and charcoal. In diamond atoms are arranged in repeated tetrahedral fashion. In graphite each carbon atom is bonded to three other carbon atoms through covalent bonds in hexagonal fashion. Buckminster fullerene consists of 60 carbon atoms joined together in a series of 5- and 6- membered to form spherical molecule resembling a soccer ball.

Plastics are a major class of catenated organic carbon compounds. They are made from long chain organic compounds called polymer resins with chemical additives that give them different properties. Different kinds of polymers are used to make different types of plastics. The resin codes are numbered from 1 to 7. There unsafe plastics are resin code #3, #6, #7. One time use plastic causes health problems for humans, plants and animals. Government of Tamilnadu has taken a step forward to ban the usage of some kind of plastic items. (Environment and Forest department T.N.G.O No. 84 dated 25-06-2018). A lot of plastic does not get recycled and ends up polluting the environment.

I. Choose the correct answer:

- 1. A phenomenon in which an element exists in different modification in same physical state is called
- a) Isomerism c) Catenation b) Allotropy d) Crystallinity
- 2. Number of free electron(s) in each carbon of graphite is
 - a) one b) two
 - c) three d) four
- 3. The carbon atoms in fullerene are arranged in mixed
 - a) Tetragon and Pentagon b) Pentagon and Hexagon
 - c) Hexagon and Heptagon d) Heptagon and Octagon
- 4. Carbon forms large number of organic compounds due to
 - a) Allotropy b) Isomerism
 - c) Tetravalency d) Catenation

5. Diamond is not a good conductor of electricity because

- a) it is very hard **b) it has no free electron**
- c) its structure is uniform d) it is insoluble in water
- 6. Which of the following does not contain double bond.
 - a) CO₂

- b) C₂H₄ d) O₂
- c) HCl

7 Which of the following is highly	toxic?	
a) Carbon dioxide	b) Carbon monoxide	
c) Calcium carbonate	d) Sodium bicarbonate	
8. Raagav brings his lunch every da	v to school in a plastic container which has resin code number 5. The	
container is made of	y	
a) Polystyrene	b) PVC	
c) Polypropylene	d) LDPE	
9. Plastics made of Polycarbonate ()	PC) and Acrylonitrile Butadiene Styrene (ABS) are made of resin code	
······································		
\overline{a} 2	b) 5	
c) 6	d) 7	
10. Which of the following plast	ic items are banned by the Government of Tamil Nadu as of 1 st	
January2019?		
a) Plastic sheets	b) Plastic tea cups	
c) Plastic water packets	d) All the above	
11. Graphite is used as lubricant in	machines because	
a) it is good conductor of electri	city.	
b) it is made of slippery layers	and has high melting point.	
c) it has high density		
d) it is strong and soft		
12. The lead pencil contains		
a) graphite	b) diamond	
c) lead	d) charcoal	
13. Graphene is one atom thick laye	r of carbon obtained from	
a) Diamond	b) Fullerene	
c) Graphite	d) Gas Carbon	
14. Plastic resin codes are shown as three chasing arrows in a with a number in the middle or		
letters (an acronym of that plast	ic type)	
a) Logo	b) Recycling symbol	
c) Square	d) Triangle	
15. The legal measures to prevent p	lastic pollution come under the Protection Act 1988.	
a) Forest	b) Wildlife	
c) Environment	d) Human Rights	

II. Fill in the blanks:

- 1. <u>Antoine Lavoisier</u> named carbon.
- 2. Buckminster Fullerene contains <u>60</u> carbon atoms.
- 3. Compounds with same molecular formula and different structural formula are known as **Isomers.**
- 4. Different methods of formation of carbon is the main reason for its catenation.
- 5. There are **seven** plastic resin codes.

III. Match the following:

1. Alkyne	a) Bucky Ball
2. Andre Geim	b) Oxidation
3. C ₆₀	c) Graphene

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4. Thermocol	d) Triple bond
5. Burning	e) Polystyrene
Ans: 1- d; 2- c; 3-a	a; 4- e; 5-b.

IV. Answer the following by rearranging the jumbled letters:

- 1. It is the hardest allotrope of carbon. Mnodaid **Ans: diamond**
- 2. Organic compounds having double bond between carbon atoms are Knelaes Ans: alkenes
- 3. Reaction of carbon with oxygen gives Osdiexs Ans: oxides
- 4. In this molecule, carbon is attached with four hydrogen atoms. Emathen **Ans: methane**
- 5. Carbon combines with other elements through _____ bond. Inaocvet Ans: covalent
- 6. It is used as gun powder. Ocahrcla Ans: charcoal
- 7. Plastics made of ______ are represented by resin code #6. Sytlopynere Ans: polystyrene
- 8. One-time use plastics are also known as _____ plastic. Awyrhotwa Ans: throwaway
- 9. One-time use plastics cause ______ damage. Imvomenialne Ans: environmental
- 10. Expanded polystyrene is commercially know as Mthreolco Ans: thermocol

V. Short Questions & Answers:

- **1. How many valence electrons are there in carbon?** There are four valence electrons in carbon.
- **2. Who is called 'Father of Modern Organic Chemistry'?** Friedrich Wohler is called the 'Father of Modern Organic Chemistry'.
- 3. Which three resin codes are unsafe?

Resin code #3

Resin code #6

Resin code #7

4. Differentiate graphite and diamond.

Graphite	Diamond
Each carbon has three covalent	Each carbon has four covalent bonds.
bonds.	
Soft, slippery to touch and opaque.	Hard, heavy and transparent.
It has planar layer of hexagon	It has tetrahedral units linked in three
units.	dimension.
It is conductor of heat and	It is non-conductor of heat and electricity.
electricity.	

5. What are saturated and unsaturated compounds called?

Saturated compounds are compounds which contain carbon-carbon and carbon-hydrogen single bonds. Unsaturated compounds contain carbon-carbon double bonds or triple bonds.

6. Carbon does not form Ionic compounds. Why?

Carbon has the tendency to share its four electron with other atoms to complete its octet. This is called tetravalency. Thus carbon can form four covalent bond with other elements. Hence it does not form Ionic compounds.

Carbon possesses a net charge which is due to strong electro negative atom present in compound.

- 7. What is the valency of carbon in carbon monoxide? The valency of carbon in carbon monoxide is two.
- 8. Why are one-time use and throw away plastics harmful? One-time use and throwaway plastics cause short and long term environmental damage. Half of all the plastics made today is used for throw away plastic items. These plastics block drains and pollute water bodies. One time use plastic causes health problems for humans, plants and animals.
- 9. Why does carbon exist mostly in combined state?

Carbon is found in both Free State and combined state. There are millions of organic compounds of carbon. As the same time carbon is constituent of many inorganic compounds. More than 5 million compounds are known at present. The number of carbon compounds alone is more than number of compounds of all the elements taken together because carbon has some unique feature such as catenation, Tetra valency, Multiple bonds, isomerism, Allotropy.

10. When a carbon fuel burns in less aerated room, it is dangerous to stay there, Why?

When carbon fuels undergo incomplete combustion (insufficient supply of oxygen), it results in the formation of carbon monoxide. It is released into the atmosphere from various sources like vehicle fuels, domestic fuels, industries, furnaces etc. Cigarette smoking also is a source of carbon monoxide. When carbon fuel burns in less aerated room it releases carbon monoxide. This carbon monoxide is a toxic gas. It enters human body through breathing and affects the function of hemoglobin. Carbon monoxide displaces oxygen from hemoglobin and it stops its function leading to death.

11. Explain how dioxins are formed, which plastic type they are linked to and why they are harmful to humans.

Dioxins are formed by burning industries and domestic plastic wastes. They are linked to #3 PVC plastics.

In human beings they cause productive and developmental problems. They damage the immune system, interfere with hormones and also cause cancer.

12. Yugaa wants to buy a plastic water bottle. She goes to the shop and sees four different kinds of plastic bottles with resin code 1, 3, 5 and 7. Which one should she buy? Why?

She should buy plastic bottles with resin code #5 Name: Polypropylene

Code: PP

It is one of the safest plastics.

6. Applied Chemistry

Food, medicines, cosmetics, dress materials and gold covering ornaments are some of the items used in our day to day life. They may differ in nature and application. But all these are associated with chemistry. They are made of synthetic / natural chemicals or involve chemical principles and theories. The chemical principles and theories are applied to various fields in order to achieve specific results or to

solve real-world problems. This is called **applied chemistry**. There are various branches of applied chemistry.

Nanochemistry is a branch of Nanoscience that deals with the chemical applications of nanomaterials in nanotechnology. It deals with materials which are smaller than 100 nanometres and so it is called by the name. a nanometer (mm) is 10^{-9} or 0.000 000 001 metre. Pharmaceutical chemistry deals with the preparation of drugs and study of the chemical composition, nature, behavior, structure and influence of the drug in an organism. The following are different types of drugs used by us.

Anesthetics: They are drugs which cause loss of sensation.

Antipyretics: These drugs are used for the purpose of reducing fever.

Antiseptic: It is the substance that prevents infections caused by disease causing microorganisms.

Antibiotics: These drugs inhibit the growth or metabolism of some other disease causing microorganisms **Antacid**: This drug provides relief from burning sensation in the stomach or food pipe.

Electrochemistry is a branch of chemistry which deals with the relation between electrical energy and chemical change. We use so many electronic devices like mobile phone an electrical devices like torch light in our daily life. Electricity produced by the battery is the key factor which makes these devices to function. The chemical reactions that take place in the battery produce electricity. **Dye chemistry** is the study of dyes, the organic compounds that are used as colourants. The dyes are all organic compounds originating from plants and insects, fungi and lichens. Dye chemistry provides us information on theory, structure, synthesis and applications of synthetic dyes.

Radiochemistry is the study of chemistry of radioactive and non-radioactive isotopes. It includes both natural and artificial isotopes. It mainly deals with application of radio isotopes to various fields. A radio carbon C-14 isotope is sued to determine the age of fossil wood or animal. This is called radio carbon dating. The nature of some of the chemical reactions can be studied using radio tracer. A radio isotope Iodine-131 is used to locate and treat brain tumor. Cobalt-60 is used in the detection of cancer. Iron-59 is used in the diagnosis of anemia and pregnancy disorder. Agricultural chemistry involves the application of chemical and biochemical knowledge to agricultural production, the processing of raw produces into foods and beverages, and environmental monitoring and remediation.

Food Chemistry is the chemistry of foods which involves the analysis, processing, packaging and utilization of materials including bioenergy for food safety and quality. Carbohydrates, proteins and vitamins are some essential chemicals in our food. They are required for the growth physiological and metabolic activities of body. The chemicals added to food for specialized functions are called food additives. **Forensic chemistry** applies scientific principles, techniques and methods to the investigation of crime. Many of the advantages of applied chemistry are around us. Applied chemistry makes a major contribution to our society. The products of applied chemistry are so widespread that they are used to make our lives comfortable.

I. Choose the correct answer:

1. One Nanometre is

- a) 10^{-7} metre b) 10^{-8} metre
- c) 10⁻⁶ metre **d) 10⁻⁹ metre**
- 2. The antibiotic penicillin is obtained from _____a) plantb) microorganism

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c) animal	d) sunlight		
3. 1% solution of Iodoform is used as			
a) antipyretic	b) anti malarial		
c) antiseptic	d) antacid		
4. The cathode of an electro	chemical reaction involves		
a) oxidation	b) reduction		
c) neutralization	d) catenation		
5. The age of a dead animal	can be determined by using an isotope of		
a) carbon	b) iodine		
c) phosphorous	d) oxygen		
6. Which of the following d	oes not contain natural dyes?		
a) potato	b) beetroot		
c) carrot	d) turmeric		
7. The type of food protects	7. The type of food protects us from deficiency diseases.		
a) carbohydrates	b) vitamins		
c) proteins	d) fats		
8. Radiochemistry deals with			
a) oxidants	b) batteries		
c) isotopes	d) nanoparticles		
9. The groups responsible for the colour of an organic compound are called			
a) isotopes	b) auxochrome		
c) chromogen	d) chromophore		
10. Chlorinated hydrocarbons are used as			
a) fertilizers	b) pesticides		
c) foodcolourants	d) preservatives		

II. Fill in the blanks:

- 1. <u>Galvanic cell</u> is an electrochemical cell which converts electrical energy into chemical change (reaction).
- 2. Painkiller drugs are called <u>Analgesics.</u>
- 3. Aspirin is an **Antipyretic.**
- 4. <u>Nitrogen</u>, <u>Phosphorus</u> and <u>Potassium</u> are macronutrients required for plant growth.
- 5. Ninhydrin is a chemical used in finger print analysis.

III. Match the following:

- 1. Antipyretics
- a) Large surface area
- Corrosion prevention
 Hyperthyroidism
- b) Iodine 131 c) Fever
- 4. Nanoparticle
- d) Cancer cell identification
- 5. Nanorobotics
- e) Electroplating
- Ans: 1- c; 2- e; 3-b; 4-a; 5-d
- IV. Short Questions & Answers:
 - 1. What is Chemotherapy?

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Chemotherapy is the treatment of certain diseases by destroying the invading organism without damaging the cells of the host, by the use of certain organic compounds.

2. What are called Anaesthetics? How are they classified?

The drugs which cause loss of sensation are called anaesthetics. They are given to patients when they undergo surgery.

Anaesthetics can be classified into two types namely:

1. General Anaesthetics; 2. Local Anaesthetics.

General anaesthetics bring about loss of all modalities of sensation, particularly pain along with reversible loss of consciousness. The patient loses consciousness for specific period of time. Local anaesthetics prevent the pain sensation in localized area without affecting the degree of consciousness.

3. What is the need for chemical fertilizers in crop fields?

Fertilizers are chemical compounds added to crop field for supplying essential micro and macro nutrients required for crop growth. Ammonium nitrate, calcium phosphate, urea, NPK (Nitrogen, Phosphorus and potassium) etc., are some of the fertilizers. Depending on the nature of soil these fertilizers are used singly or as minutes.

4. What is Forensic Chemistry related to?

Forensic chemistry applies scientific principles, techniques and methods to the investigation of crime. It is related to (i) Finger print analysis (ii) Biometrics (iii) Alcohol test and (iv) Forensic Toxicology.

5. Batteries that are used in mobile phone can be recharges. Likewise, can you recharge the batteries used in watches? Justify your answer.

In watches alkaline batteries are used. It is a non rechargeable battery. Recharging this battery can result in rupture and leakage.

- 6. Sudha met with a fire accident. What kind of drug(s), must she take? Sudha met with a fire accident she must take drugs like Bacitracin and Silver sulfadiazine.
- **7.** The soil pH of a crop land is **5.** What kind of fertilizers should be used in that land? pH value 5 shows that the soil is acidic. To neutralize it we should add pulverized limestone. Limestone acts as a soil acid neutralizer.

Types of	Function of the additive	Example
additive		
Preservatives	They protect food from spoilage Vinegar, Sodium benzoate	
	by microorganisms in storage.	benzoic acid, sodium nitrite
Colourants	They give pleasant colours to	Caroteniods, Anthocyanin,
	food.	Curcumin
Artificial	They add sweet taste to food	Saccharin, Cyclamate
Sweetners		
Flavor enhancers	They are used to enhance the	Monosodium glutamate,
	flavor of food items.	calcium diglutamate
Antioxidants	They prevent the oxidation of	Vitamin C, Vitamin E,
	food. They protect us against	Carotene
	cardiovascular disease	

8. Name various food additives and explain their factions.

7. Environmental Science

Environmental science provides knowledge about natural processes, effects of human intervention and solutions to overcome such environmental issues. It is defined as the study of patterns, processes in the natural world and their modifications by human activities. All resources of biosphere can be grouped

into (i) Biotic and (ii) Abiotic factors. Biotic or living factors include plants, animals and all other living organisms. Abiotic or non-living factors include all factors which affect ability of organisms to survive and reproduce like water, soil, air and sunlight.

Cyclic flow of nutrients between non-living environment and living organisms are termed as biogeochemical cycles. Nitrogen fixation, ammonification and nitrification are the processes that occur in Nitrogen cycle. Animals and plants are adapted to live in their habitat to suit their environmental conditions. On the basis of availability of water, plants have been classified as (i) Hydrophytes (ii) Xerophytes and (iii) Mesophytes. Hydrophytes are plants growing in or near water. Plants like acacia and opuntia that grow in dry habitat are called xerophytes. Mesophytes are plants that grow in common land which is neither too wet nor too dry.

Water conservation is the preservation, control and management of water resource. Farm pond is a dugout structure with proper inlet and outlet structure for collecting the surface runoff water flowing from the farm area. Water recycling is reusing treated waste water for beneficial purposes such as agricultural and landscape irrigation, industrial processes, toilet flushing and ground water recharge.

IUCN (International Union for Conservation for Nature and National Resources) is the global authority on the status of the natural world and the measures to safeguard it. It was founded on 5th October 1948 at Gland, Switzerland. The vision of IUCN is 'A just world that values and conserves nature'.

I. Choose the correct answer:

1. All the factors of biosphere which affect the ability of organisms to survive and reproduce are called as

a) biological factors b) abiotic factors c) biotic factors d) physical factors 2. The ice sheets from the north and south poles and the icecaps on the mountains, get converted into water vapour through the process of _ b) condensation a) evaporation c) sublimation d) infiltration 3. Free living soil bacteria such as Pseudomonas sp. Are responsible for the _____ process in the nitrogen cycle. a) ammonification b) nitrogen fixation c) nitrification d) denitrification 4. The atmospheric carbon dioxide enters into the plants through the process of a) photosynthesis b) assimilation c) respiration d) decomposition 5. Increased amount of ______ in the atmosphere, results in greenhouse effect and global warming. a) carbon monoxide b) sulphur dioxide c) nitrogen dioxide d) carbon dioxide 6. Which of the following is not an adaptation of hydrophytes? a) poorly developed root system b) reduced plant body c) water storing parenchymatous tissues d) finely divided submerged leaves 7. In some xerophytes, leaves are modified into spines as an adaptation ______

- a) to reduce transpiration rate
- b) to store water
- c) to reduce consumption of water d) all of the above
- 8. Identify the incorrect statement with respect to adaptations of earthworm.
 - a) Earthworm has a stream lined body with no antennae or fins.
 - b) Each segment of earthworm has setae.
 - c) many earthworms became inactive in a process called hibernation, during winter season.
 - d) Earthworms remain in its burrow during day time, to avoid sunlight.
- 9. What of the following is one of the strategies to conserve water?

a) water recycling

- b) using large overhead water tanks
- c) increasing the number of bore wells
- d) watering the plants using hose
- 10. Specific constituents such as nitrogen, phosphorus, suspended solids and heavy metals found in the wastewater are removed during ______ treatment of water recycling process.
 - a) primary
- b) secondaryd) none of the above
- c) tertiary
- II. Match the following:
 - 1. Nitrogen fixation
- a) Nitrosomonas
- 2. Ammonification
- b) Azotobacter
- 3. Nitrification
- c) Pseudomonas species
- 4. Denitrification
- d) Putrefying bacteria
- Ans: 1- b; 2 –d; 3- a; 4-c.

III. State whether the statements are true or false. Correct the false statements:

- 1. Nitrogen is a greenhouse gas. Ans: False - Carbon-di-oxide is a greenhouse gas.
- 2. Poorly developed root is an adaptation of mesophytes.
 Ans: False -Poorly developed root is an adaptation of hydrophytes.
 (Well developed root is an adaptation of mesophytes)
- 3. Bats are the only mammals that can fly. **Ans: True**
- 4. Earthworms use the remarkable high frequency system called echoes. Ans: False - Bats use the remarkable high frequency system called echoes.
- 5. Aestivation is an adaptation to overcome cold condition. Ans: False - Aestivation is an adaptation to overcome dry conditions.

IV. Short Questions & Answers:

- 1. What are the two factors of biosphere?i) Biotic or living factor.ii) Abiotic or non-living factor.
- **2.** According to you, which process of water cycle is adversely affected by human activities? Infiltration and percolation of water is adversely affected by human activities.
- 3. How do human activities affect nitrogen cycle?

Burning fossil fuels and application of nitrogen based fertilizers increase available nitrogen in air ecosystem. Nitrogen (fertilizer) applied to agricultural fields enters rivers and marine systems. It alters the biodiversity, changes the food web structure and destroys the general habitat.

4. What is adaptation?

Any feature of an organism or its part that enables it to exist under conditions of its habitat is called adaptation.

5. What are the challenges faced by hydrophytes in their habitat?

Hydrophytes face the following challenges in their habitat

- (i) Availability of more water than needed.
- (ii) Water current may damage the plant body.
- (iii) Water levels may change regularly.
- (iv) Maintain buoyancy in water.

6. How does Hydrilla plant adapt itself to its habitat?

Hydrilla plants adapt itself to its habitat as its roots are poorly developed. The submerged leaves are narrow or finely divided.

7. Why is it important to conserve water?

i) It creates more efficient use of the water resources.

- ii) It ensures that we have enough usable water.
- iii) It helps in decreasing water pollution.
- iv) It helps in increasing energy saving.

8. List some of the ways in which you could save water in your home and school?

All of us have the responsibility to conserve water. We can conserve water by the following activities. i) Using a bucket of water to take bath instead of taking a shower.

- ii) Using low flow taps.
- iii) Using recycled water for lawns.
- iv) Repairing the leaks in the taps.
- v) Recycling or reusing water wherever it is possible.

9. What is grey water?

Grey water is reusable waste water from residential, commercial and industrial, bathroom sinks, bath tub, shower drains and washing of clothes.

10. What are the uses of recycled water?

Recycled water is used in the following activities:

- Agriculture
- landscape
- Public parks
- Golf course irrigation
- Toilet flushing
- Dust control
- Construction activities
- Cooling water for power plant and oil refineries.

11. What is IUCN? What is the vision of IUCN?

IUCN is International Union of Conservation of Nature and Natural Resources. The vision of IUCN is 'A just world that values and conserves nature'.

V. Give reason:

1. Roots grow very deep and reach the layers where water is available. Which type of plants develop the above adaptation? Why?

Xerophytes develop the above adaptation: To absorb as much water as they can get from the surroundings the roots grow very deep and reach the layers where water is present.

- **2. Why are streamlined bodies and presence of setae considered as adaptations of earthworm?** The cylindrical, elongated and segmented body helps the earthworm to live in narrow burrows underground. The streamlined body allows for easy penetration into the soil. The setae help the earthworm to move through the soil and provide anchor in the burrows.
- **3.** Echolocation serves as an adaptation in bats. Justify the given statement. Bats fly around and hunt for insects in the dark. They use a remarkable high-frequency system called echolocation. These sounds are reflected back from its prey and perceived by the ear. Bats use these echoes to locate and identify the prey.
- 4. Farm ponds serve as an excellent water conservation strategy. Why is it impossible for all farmers to construct it in their fields?

Farm ponds reduce water flow to other tanks and to ponds situated in lower lying areas. Moreover, ponds occupy a large portion of farmer's land. So it is impossible for all farmers to construct farm ponds in their fields.

8. Economic Biology

The gift of nature is almost unlimited and thus a variety of useful products are obtained from plants. Economic uses of plants are varied and therefore the scope for improvement and their cultivation is immense to meet our ever growing demands with the advancement of civilization.

Horticulture is a branch of agriculture that deals with cultivation of fruits, vegetables and ornamental plants.

The four main classes of horticulture are:

- i) Pomology (fruit farming)
- ii) Olericulture (vegetable farming)
- iii) Floriculture (flowers farming)
- iv) Landscape gardening

The Organic manures are predominantly derived from plant debris, animal faces and microbes. They make the soil fertile by adding nutrients like nitrogen. All the major system of medicines such as Ayurvedic, Yoga, Unani, Siddha, Homeopathy (AYUSH) use drugs obtained from plants.

Aquaculture is the rearing of economically important aquatic organisms like fishes, prawns, shrimps, crabs, lobsters, edible oysters, pearl oysters and sea weeds under controlled and confined environmental conditions using advanced technologies.

Hydroponics is the method of growing plants without soil, using mineral nutrients solutions in water. In the aeroponic system the growth of plants takes place with air as their growth medium. The process of rearing fish in ponds, lakes, rivers and paddy fields is known as Pisciculture.

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I. Choose the correct answer:

1. The production and manag	ement of fish is called		
a) Pisciculture	b) Sericulture		
c) Aquaculture	d) Monoculture		
2. Which one of the followin	2. Which one of the following is not an exotic breed of cow?		
a) Jersey	b) Holstein – Friesan		
c) Sahiwal	d) Brown Swiss		
3. Which one of the followin	g is an Italian species of honey bee?		
a) Apismellifera	b) Apisdorsata		
c) Alis florae	d) Apiscerana		
4. Which of the following are	e Indian cattle?		
i. Bosindicus	ii. Bosdomesticus		
iii. Bosbubalis	iv. Bos vulgaris		
a) i and ii	b) i and iii		
c) ii and iii	d) iii and iv		
5. Which one of the followin	g is not an Indian major carp?		
a) Rohu	b) Catla		
c) Mrigal	d) Singhara		
6. Drones in the honey bee co	plony are formed from		
a) unfertilized egg	b) fertilized egg		
c) parthenogenesis	d) both b and c		
7. Which of the following is	an high milk yielding variety of cow?		
a) Holstein – Friesan	b) Dorset		
c) Sahiwal	d) Red Sindhi		
8. Which one of the followin	g is referred as red worms?		
a) Eisenia fetida	b) Eudriluseugieniae		
c) Periomyx excavates	d) Lampitomauritii		
9. Which Indian variety of ho	oney bee is commonly used in apiculture?		
a) Apisdorsata	b) Apis florae		
c) Apismellifera	d) Apis indica		
10. Mehsana is a breed of			
a) cow	b) buffalo		
c) goat	d) sheep		
11. Binomial name of Nilave	mbu is		
a) Leucasaspera	b) Andrographis paniculata		
c) CrotolariaJuncea	d) Cassia fistula		
12 is the method	of growing plants without soil.		
a) Horticulture	b) Hydroponics		
c) Pomology	d) None of these		
13. The symbiotic association	n of fungi and vascular plants is		
Learning Leads To Ruling			

	a) Lichen	b) Rhizobium	
	c) Mycorhizae	d) Azotobacier	
14.	4. The plant body of mushroom is		
	a) Spawn	b) Mycelium	
	c) Leaf	d) All of these	

II. Fill in the blanks:

- 1. <u>**Rhizobium**</u> is a modulating type of microorganism associating symbiotically with the root of legume plants.
- 2. Quinine drug is obtained from Cinchona officinalis Cinjona maram.
- 3.Carica Papaya leaf can cure **Dengue** disease.
- 4. Ganodermalucidum, is commonly known as **lingzhi** mushroom.
- 5. Apiculture (bee keeping) is the maintenance of bee colonies in modern lives.
- 6. Vermicompost is a type of soil made by <u>earthworm</u> and microorganisms.
- 7. Marine water aquaculture refers to the culture of prawns, pearl and edible oysters.
- 8. The fertile female in a honey bee hive is **<u>queen honey bee</u>**.
- 9. <u>Formic acid</u> is a preservative in honey.
- 10. <u>Poly culture / composite fish culture</u> is the method of culturing different variety of fish in a water body.
- 11. Pasturage is related to availability of flowers to bees for nectar and pollen grains.

III. State whether true or false. If false, correct the given statement.

- 1. Medicinal plants contain compounds that can be used for therapeutic purpose. Ans: True
- 2. Anthraquinones is obtained from Ocimum sanctum.

Ans: False - Essential oil is obtained from Ocimum sanctum.

3. Mycorrhiza is an algae,

Ans: False - Mycorrhiza is a fungus.

4. Aquaponics is a technique of growing plants with their roots supplied with moisture present in the air.

Ans: False - Aeroponics is a technique of growing plants with their root supplied with moisture present in the air.

5. Milch animals are used in agriculture and transport.

Ans: False - Draught breeds are used in agriculture and transport.

6. Apis florae is a rock bee.

Ans: False - Apisdorsata is a rock bee.

7. Ongole is an exotic breed of cattle.

Ans: False - Ongole is an indigenous breed of cattle.

8. Sheep manure contains higher nutrients than farmyard manure.

Ans: True <u>III. Match the following:</u>

Column A	Column B	
1. Lobsters	a) Marine fish	
2. Catla	b) Pearl	
3. Sea bass	c) Shell fish	
4. Oysters	d) Paddy	
5. Pokkali	e) Fin fish	
6. Pleurotussps	f) Psoriosis	
7. Sarpagandha	g) Oyster mushroom	
8. Olericulture	h) Reserpine	
9. Wrightatinctoria	i) Vegetable farming	
Ans: 1-c ; 2- e;3-a ; 4-b ; 5-d ;6 -g ; 7-h ; 8-i ; 9- f		

IV. Define the following:

- a. **Pisciculture**: Pisciculture is the culture and rearing of fishes under controlled conditions.
- b. Apiculture: Apiculture is the rearing of honey bee for honey. It is also called Bee keeping.
- c. Vermiculture: It si the artificial rearing or cultivation of earthworms for the production of vermicompost.
- d. **Mariculture**: Mariculture is the culture of fishes and other aquatic organism in marine water near the sea coast.
- e. Floriculture: Floriculture is the production of ornamental plants.
- f. **Compost**: Compost is soil conditioner, fertilizer, natural pesticides, a decomposed organic mater which is rich in nutrients.
- g. **Pomiculture**: It deals with the development of fruit cultivation. It is concerned with enhancement of fruit quality, cultivation techniques, regulation of production and reduction of production cost of fruits.
- h. **Pinning**: Mycelium starts to form little buds which will develop into mushroom. Those little white buds are called pins. The process of formation of mushroom buds is called pinning.

V. Differentiate the following:

a) Exotic breed and Indigenous breed.

Exotic breeds are those animals which are imported from foreign countries. These breeds are selected for long survival and better yields. Indigenous breeds are natives of India. Their yield depends on survival periods. They show excellent resistance to disease.

b) Pollen and Nectar

Pollen is a yellow powdery substance and it is the male part of the flower. Pollen grains are essential for fruit formation. The pollen grains of flowers are gathered by the bees and stored in for future use as food. They in turn form bee pollen.

Nectar is a sweet viscous secretion secreted by the flower of plants. It is collected by bees for formation of honey.

c) Shrimp and prawn

Penaeid prawns are called shrimps. Non-penaeid prawns are called prawns.

d) Fin fish and Shell fish

Fin fish have well developed fins. They serve as oars to help swim and to keep afloat. They belong to class Pisces. They have a developed vertebral column.

Shell fish is a crustacean belonging to the phylum Arthropoda. Due to their great taste they are cherished as a delicacy and served as food.

e) Farmyard manure and sheep manure

Farmyard manure is a mixture of cattle dung, urine, litter material and other dairy wastes. It contains nitrogen, phosphoric acid and potash.

Sheep manure contains more nutrients than farmyard manure. It contains nitrogen, phosphoruspentoxide and potassium oxide.

VI. Short Questions & Answers:

1. What are secondary metabolites?

Plants produce secondary metabolites for protection, competition and species interaction. eg. Alkaloids, terpenoids, flavonoids.

2.What do you know about AYUSH?

It is a system of medicines such as Ayurveda, Yoga, Unani, Siddha and Homeopathy. All these combined are called AYUSH. They are drugs obtained from plants and animals.

3. What are the types of vegetable garden?

i) Kitchen gardening: Growing of vegetable sin small scale at household.

ii) **Commercial gardening**: Production of vegetables in large scale to be sold in markets.

iii) **Vegetable forcing**: It is the method of growing vegetables in buildings, green houses, cold farms or under other artificial conditions.

4. Mention any two mushroom preservation methods.

i) Drying

ii) Canning

5. Why do we call Haryana and Kankrej breed of cattle as dual purpose breeds?

These cattle breed provide milk and they are useful for farm work. These are favoured by farmers as the cow are fairly good milk yielders and their bullocks are good for draught work.

6. How is division of labour observed in honey bees?

Honey bees are social insects. The nest of honeybee is known as the bee hive. They live in colonies and show division of labour. The Queen bee is responsible for laying eggs. The drones are useful in fertilizing the eggs produced by the queen bee.

The sterile female worker bees are the smallest members of the colony. Their function is to collect honey, look after the young ones, clean the comb, defend the hive and maintain the temperature of the bee hive.

7. What is the nutritional importance of fish liver oils? Name any two marine fishes which yield these oils.

Fish liver oils are of great medicinal value and are rich in vitamin A, D and E.

The marine fishes which yield this oil are Cod, Shark.

8. Enumerate the advantages of vermicompost over chemical fertilizer.

- Vermicompost is a rich source of nutrients essential for plant growth. It makes the soil fertile.
- It improves soil structure, texture, aeration and water holding capacity and helps to prevent soil erosion.
- It contains valuable vitamins, enzymes and growth regulator substances for increasing growth, vigour and yield of plants.
- It enhances decomposition of organic matter in soil.
- Vermicompost is free from pathogens and toxic elements.

9. What are the species of earthworm used for vermiculture?

Perionyx excavates (Indian blueworm)

Eiseniafetida (Red worms)

Eudriluseugeniae (African night crawler).

10. List the medicinal importance of honey.

- Honey has an antiseptic and antibacterial property. It is a blood purifier.
- It helps in building up of hemoglobin content in the blood.
- It is sused in Ayurvedic and Unani system of medicines.
- It prevents cough, cold, fever and relives sore throat.
- It is remedy for ulcers of tongue, stomach and intestine.
- It enhances digestion and appetite.

VII. Assertion and Reason:

Direction: In each of the following questions, a statement of Assertion is given and a corresponding statement of Reason is given just below it. Of the statement given below, mark the correct answer as a) if both Assertion and Reason are true and Reason is the correct explanation of Assertion.

- b) If both Assertion and Reason are true and Reason is not the correct explanation of Assertion.
- c) If Assertion is true but Reason is false.
- d) If both Assertion and Reason are false.
- Assertion: Hydroponics can be defined as a soilless growing system in which plants grow in water.
 Reason: If a plant is provided with water, minerals and required nutrients, it will grow well and yield more even in the absence of soil.

Ans: a) if both Assertion and Reason are true and Reason is the correct explanation of Assertion.

- 2. Assertion: Fish and other varieties of aquatic animals are used as food.
 Reason: Fish and other varieties of sea food constitute good source of nutrition.
 Ans: a) if both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- **3.** Assertion: The production of food from animal sources has increased greatly in the last few decades.
 Reason: Operation flood and blue revolution production has increased in the recent years.
 Ans: a) if both Assertion and Reason are true and Reason is the correct explanation of Assertion.

VIII. Thinking Skills:

1. Biomanuring plays an important role in agriculture. Justify.

Biomanures are dereived from plant debris, animal faeces and microbes. They make soil fertile by adding nutrients like nitrogen, animal manure, farmyard manure and sheep and goat manure are some of the biomanures. Biomanuring improves plant growth and it does not spoil the soil with toxic chemicals. So it plays an important role in agriculture.

- 2. Arun and Akash were given fertilizers and earthworm compost both to be used in the fields. Akash preferred to use earthworm compost. Why he did not select the fertilizers? Fertilizers contain chemicals which spoil the soil with toxic residues. So Akash preferred to use earthworm compost which is safe for plants and soil.
- 3. What is pasturage and how is it related to honey production? Each bee hive consists of hexagonal cells. Name the material in which the cell is formed and mention the significance of the hexagonal cells.

The availability of flowers to bees for nectar and pollen collection is called pasturage. The collection and availability of honey will be high only if the pasturage is high. The comb of the bees is formed by the secretion of wax glands in the abdomen of the worker bee. It contains hexagonal cells. The storage cells contain honey and pollen. The brood cells contain the young stages of the honey bee. The brood chamber has i) Worker chamber ii) Drone chamber and iii) Queen chamber. The larvae which later develop into worker, drone and queen are reared here.

9. World of Microbes

Microbes are living organisms of microscopic size and they include bacteria, fungi, algae, protozoa and viruses. They may be unicellular like bacteria, multicellular like fungi and acellular like virus. Bacteria are microscopic, single celled prokaryotic organisms without nucleus and other cell organelles. They may be spherical (cocci), rod shaped (bacilli) or spiral shaped (spirilla). Autotrophic bacteria synthesize their own food from inorganic sources, e.g. Nitrosomonas sp. Heterotrophic bacteria depend on other organic matter for food. They may be parasitic (living on live hosts) saprophytic (living on dead organic matter) or symbiotic (living inside a host).

Viruses are non-cellular self-replicating parasites. A simple virus particle is often called virion. They grow and multiply only in living cells. Plant viruses infect plants and cause diseases. Animal viruses infect animals and they cause diseases as influenxa, HIV and polio. Viruses that infect bacterial cells are called Bacteriophage (T4 bacteriophage). Fungi lack chlorophyII and they depend on living or dead organic matter for their nutritional needs. Microorganisms are used as biocontrol agents in agriculture to control harmful pests in plants. Some microorganisms are used as microfertilizers. They enrich the soil with nutrients. Bacterial, cyanobacteruia and fungi are the main sources of biofertilizers.

Microorganisms are useful in the production of fermented beverages. They are used for curing coffee beans, tea leaves and tobacco leaves. They are useful in the production of curd, organic acids, enzymes and vitamins. Some micro organisms are used as antibiotics in medicine. These antibiotics are

used to control diseases like cholera, diphtheria, pneumonia, typhoid etc. Vaccines are prepared from certain microorganisms and they stimulate the body to produce antibodies against the disease causing antigens.

Microbes spread a number of diseases. Tuberculosis, diphtheria and whooping cough are caused by bacteria. Viruses cause common cold. Influenza, measles, mumps and chicken pox. Cholera and typhoid are waterborne diseases. Malaria, Filaria, Chikungunya and Dengue are vector borne diseases, swine flue and avian influenza are spread by animals. AIDS, syphilis and genital warts are sexually transmitted diseases. Immunization is a process of developing resistance to infections by administration of antigens or antibodies. Vaccination is used to prevent diseases. Live vaccines are prepared from living organisms eg.,BCG vaccine, oral polio vaccine. Killed or inactivated vaccines are prepared from microorganisms killed by heat or chemicals eg.,Typhoid vaccine, cholera vaccine.

I. Choose the correct answer:

1.	Mycology	is the bra	nch of biolo	gy that deals	with the	study of
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a) algae	b) virus	
c) bacteria	d) fungi	
2. The major constituent of vinegar is		
a) citric acid	b) acetic acid	
c) oxalic acid	d) hydrochloric acid	
3. Bacterial involved in curd formation is		
a) Lactobacillus acidophilus	b) Nitosomonas	
c) Bacillus ramous	d) none of the above	
4. Which of the following is transmi	tted through air?	
a) Tuberculosis	b) Meningitis	
c) Typhoid	d) Cholera	
5. The most fatal form of Malaria is caused by		
a) Plasmodium ovale	b) Plasmodium falciparum	
c) Plasmodium malariae	d) Plasmodium vivax	
6. One of the means of indirect transmission of a disease is		
a) sneezing	b) coughing	
c) vectors	d) droplet infection	
7. Syphilis is caused by		
a) Treponema polliadum	b) leptospira	
c) Pasteurella	d) Vibrio cholera	
8. Mosquito borne viral disease are		
a) malaria and yellow fever	b) dengue and chikungunya	
c) filariasis and typhus	d) kalaazar and diphtheria	
9. Diptheria affects the		
a) Lungs	b) throat	

c) blood	d) liver
10 Which are of the following is a	u) iivei
10. Which one of the following is a p	
a) Filariasis, AIDS	b) Common cold, AIDS
c) Dysentery, Common cold	d) Typhoid, Tuberculosis
11. Which of the following disease is	s spread by animal bite?
a) Pneumonia	b) Tuberculosis
c) Cholera	d) Rabies
12. The primary organ infected durin	ng tuberculosis is
a) bone marrow	b) intestine
c) spleen	d) lungs
13. Microbes that generally enter the	e body through nose are likely to affect
a) gut	b) lungs
c) liver	d) lymph nodes
c) liver14. The organ affected by Jaundice i	d) lymph nodes s
c) liver14. The organ affected by Jaundice ia) liver	d) lymph nodessb) lungs
 c) liver 14. The organ affected by Jaundice i a) liver c) kidney 	 d) lymph nodes b) lungs d) brain
 c) liver 14. The organ affected by Jaundice i a) liver c) kidney 15.Severity of diseases symptom dep 	 d) lymph nodes s b) lungs d) brain bends upon
 c) liver 14. The organ affected by Jaundice i a) liver c) kidney 15.Severity of diseases symptom dep a)number of microbes 	 d) lymph nodes s b) lungs d) brain b) target organ
 c) liver 14. The organ affected by Jaundice i a) liver c) kidney 15.Severity of diseases symptom dep a)number of microbes c) both a and b 	 d) lymph nodes s b) lungs d) brain b) target organ d) none of these
 c) liver 14. The organ affected by Jaundice i a) liver c) kidney 15.Severity of diseases symptom dep a)number of microbes c) both a and b 16. Poliomyelitis virus which causes 	 d) lymph nodes b) lungs d) brain b) target organ d) none of these infantile paralysis enters the body though
 c) liver 14. The organ affected by Jaundice i a) liver c) kidney 15.Severity of diseases symptom dep a)number of microbes c) both a and b 16. Poliomyelitis virus which causes a) skin 	 d) lymph nodes s b) lungs d) brain b) target organ d) none of these infantile paralysis enters the body though b) mouth and nose
 c) liver 14. The organ affected by Jaundice i a) liver c) kidney 15.Severity of diseases symptom dep a)number of microbes c) both a and b 16. Poliomyelitis virus which causes a) skin c) ears 	 d) lymph nodes s b) lungs d) brain b) target organ d) none of these infantile paralysis enters the body though b) mouth and nose d) eye

II. Fill in the blanks:

1. <u>Putrefying bacteria and fungi</u> break down organic matter and animal waste into ammonia.

- 2. The hyphae with branches form a complex network called **<u>mycelium</u>**.
- 3. First antibiotic **<u>Penicillin</u>** was developed by <u>Alexander Fleming</u>.
- 4. Baker's yeast is saccharomyces.
- 5. The two non symbiotic nitrogen fixing bacteria are **<u>nitrosomonas</u>** and **<u>azotobacter</u>**.
- 6. Typhoid fever is caused by Salmonella typhi.
- 7. H1N1 virus causes Swineflue.
- 8. <u>Aedes egypti</u> is a vector of viral disease dengue.
- 9. **<u>B.C.G</u>** vaccine gives considerable protection against tuberculosis.

10. Cholera is caused by vibrio cholera and malaria is caused by plasmodium sp.

III. Expand the following:

- 1. ORS Oral Rehydration Solution
- 2. **HIV** Human Immunodeficiency Virus
- 3. **DPT** Diphtheria, Pertussis and Tetanus.

- 4. WHO World Health Organisation
- 5. BCG Bacillus Calmette Guerin

IV. Pick out the odd one form the following:

- i) AIDS, Retrovirus, Lymphocytes, BCG
 - Ans: Lymphocytes
- ii) Bacterial disease, Rabies, Cholera, Common cold and influenza Ans: Rabies
- iii) Sporozoites, Merozoites, Trophozoites, Gametocytes (infective stages of plasmodium in human) Ans: Sporozoites

V. State whether True or False, if false write the correct statement:

- 1. Glycogen and oil globules are stored form of food in fungi.
- 2. One of the differences between virus and viroid is the presence of protein coat in viroid and its absence in virus.

Ans: False - One of the differences between virus and viroid is the presence of a protein coat in virus and its absence in viroid.

- 3. Rhizobium, associated with root nodules of leguminous plants fixes atmospheric nitrogen. True
- 4. Lophotrichous is a cluster of polar flagellae.
- 5. Non-infectious diseases remain confined to the person who develops the disease and do not spread to other. True
- 6. The process of vaccination was developed by jenner in the year 1796.
- 7. Hepatitis B is more dangerous than Hepatitis A. True

VI. Match the following:

Swine flu
 Genital warts
 AIDS
 Tuberculosis
 Ans: 1- d; 2- a; 3- b; 4- c
 Human Papilloma Virus
 Human Immunodeficiency Virus
 Mycobacterium
 Influenza virus H1N1

VII. Short Questions & Answers:

- **1. Name the chronic diseases associated with respiratory system.** Whooping cough & Tuberculosis
- 2. Name the scientist who first discovered penicillin antibiotic . Can you name any other known antibiotic?

Alexander Flemming in 1929

Learning Leads To Ruling

- True

- True

- True

Some other antibiotics : Streptomycin, Erythromycin, Bacitracin, Cephalosproin.

3. Name the organism causing diarrhoeal diseases and give one precaution against it. Rota virus

Proper sanitation and hygiene.

- 4. Name the common mosquitoes and the diseases they transmit. Aedesaegypti – Chikungunya Female Anopheles – Malaria
- **5.** Name one disease that is transmitted by houseflies. Mention their causative pathogen. Cholera – Vibrio cholera
- 6. Distinguish between Virion and Virold.

Virion is a complete viral particle (functional virus) comprising of nucleic acid (DNA or RNA) surrounded by protective protein coat.

Viroids are smaller than viruses with self replicating RNA and do not bear protein coat and they infect plant cells.

7.A baby is suffering from diarrhea, while other babies in the same locality do not. Mention the possible causes that you think. What would be the possible solutions for this?

The bay might have taken contaminated food and water through oral route and through houseflies. Hygienic sanitary condition is essential. Oral Rehydration Solutions must be given.

8. Name the vector of the malarial parasite. Mention the species of malarial parasite which causes malignant and fatal malaria.

Vector of malarial parasite – Female Anopheles mosquito.

Malignant and fatal malaria – Plasmodium falciparum

- **9.** What is triple antigen? Mention the disease which can be prevented by using the antigen. DPT is Triple antigen. It is a combined vaccine for protection against Diphtheria, Pertussis (whooping cough) and Tetanus.
- 10. Sanjay had an attack of chicken pox and has just recovered. The health officer of his locality says that the disease would not occur again for him. What would be the reason for this? Sanjay's body has developed immunity to chicken pox. So he would not be affected once again by the disease thereafter.
- 11. Suggest the immunization schedule for a new born baby till 12 months of age. Why is it necessary to follow the schedule?

Age	Vaccine	Dosage
New born	BCG	1 st dose
15 days	Oral Polio	1 st dose
6 th week	DPT and Polio	1 st dose
10 th week	DPT and Polio	1 st dose
14 th week	DPT and Polio	1 st dose
9-12 moths	Measles	1 st dose

New-born children have less immunity and they are vulnerable to infections. In order to safeguard the infants from tuberculosis, polio, diphtheria, whooping cough and tetanus it is necessary to follow the schedule.

Prepared By www.winmeen.com

General Science

12. Name the causative agent of typhoid in human. How does the pathogen gain entry into the human body? Write the diagnostic symptoms and mention the organ that is affected in severe cases.

Bacteria Salmonella typhi is the causative agent of typhoid in human. The bacteria enters through food and water contaminated with faeces of infected persons. Infected persons show symptoms of fever, weakness and vomiting. The small intestine is affected.

13. Some human diseases are transmitted only when the blood of a patient comes in close contact with the blood of a healthy person. In one such disease, there is a progressive decrease in WBC of the patient.

a. Name the disease and its causative agent.

AIDS – Acquired Immune Deficiency Syndrome.

HIV - Human Immunodeficiency Virus

Retrovirus (RNA virus)

b. Name the type of WBC affected during infection.

Lymphocytes (T- lymphocytes)

c. How does the blood of a patient come in contact with blood of healthy patient?

Transfusion of unscreened blood, by surgical equipments (infected needles and syringes), material – foetal transmission (frominfected mother to the foetus).

d. Suggest three methods that help in preventing such infections

i) Disposable syringes and needles should be used.

- ii) There should be protected and safe sexual contact.
- iii) Screening of blood before blood transfusion is essential.
- iv) Avoid sharing shaving blades/razors.
- v) People should be educated about AIDS transmission.

VIII. Define the following:

- 1. Pathogen: A pathogen is a biological agent that causes disease to its host. Eg. Bacteria, virus etc.
- 2. Bacteriophages: Virus that infect bacterial cell, eg., T4 bacteriophage.
- 3. Plasmid: Circular form of genome genetic material (DNA or RNA) is called a plasmid.
- 4. Vaccines: Preparation of antigenic proteins of pathogens (weakened or killed) which on inoculation into a healthy person provides temporary/ permanent immunity against a particular disease.
- 5. Prions: Viral particles which contain only proteins. They do not contain nucleic acid.

IX. Assertion and Reason:

Direction: In each of the following questions, a statement of Assertion (A) is given and a corresponding statement of Reason (R) is given just below it. Mark the correct answer as

a) if both A and R are true and R is the correct explanation of A.

b) If both A and R are true and R is not the correct explanation of A.

c) If A is true but Ris false.

- d) If both A and R are false.
- 1. Assertion: A patient with cholera is given oral rehydration therapy for rapid replacement of fluid and electrolytes.

Reason: Cholera can be diagnosed by the microscopic examination of the stool to identify the bacteria. **Ans: b) If both A and R are true and R is not the correct explanation of A.**

- 2. Assertion: Chicken pox is a disease indicated by scars and marks in the body.
 Reason: Chicken pox causes rashes on face and further spreads throughout the body.
 Ans: a) if both A and R are true and R is the correct explanation of A.
- 3. Assertion: Dengue can be treated by intake of antibiotics.
 Reason: Antibiotics blocks the multiplication of viruses.
 Ans: b) If both A and R are true and R is not the correct explanation of A.

X. Questions based on thinking skills:

- 1. We are advised to take bland and nutritious food when we are sick. What is the reason? When we are sick our digestive system becomes weak. So we are asked to take bland and nutritious food. The bland diet makes digestion easy and nutritious food helps us for speedy recovery by boosting our immunity system.
- 2. Suggest precautionary measures you can take in your school to reduce the incidence of infectious disease.

We should breathe clean air. We should drink water that is clean and safe. We should avoid eating snacks which are exposed and contaminated.

3. Tejas suffered from typhoid while, Sachin suffered from tuberculosis. Which disease could have caused more damage and why.

Tuberculosis caused more damage than typhoid. Tuberculosis affects the lungs and causes persistent cough and chest pain. It takes much longer time to get cured that typhoid fever. Moreover tuberculosis causes irreparable damage to some organs in the respiratory system.

4. How will you differentiate hepatitis A from hepatitis B?

Hepatitis A is caused by eating contaminated food or water. Hepatitis B is a sexually transmitted infection. People infected with Hepatitis A can be sick for a few weeks or months but most of them recover without liver damage. Hepatitis B can become a serious or lifelong condition.

10. Hardware and Software

The computer consists of hardware and software. Both of them when combined make the computer functional. Hardware helps to enter input information. The software processes the input data and gives the output in the monitor. Thus hardware and software act as body and soul.

The parts of the computer we can touch and feel are parts of hardware Cabinet, Hard Disk, Mother Board, SMPS, CPU, RAM, CD Drive and Graphics card are devices of hardware. Software are

programmed and coded applications to process the input information. The software processes the data by converting the input information into coding or programmed language.

There are two types of software. **System software** makes the hardware devices process the data and to display the results on the monitor. **Application software** is designed for the use of end user to work on computer. The following are examples of application program. Video player, Audio Player, Word processing software, Drawing tools, Editing software etc.

The operating system and application software are available in two forms. They are (1) Free and open source (2) Paid and Proprietary software. Free and Open software is available free of cost. It can be shared by many end users. Paid and Proprietary software needs license to use it. It should be purchased. The end users are legally prohibited to steal the software programme. Pirated version of such software is treated as an offence.

I. Choose the correct answer:

1. Find out the part that is not found in CPU?		
a) Mother board	b) SMPS	
c) RAM	d) Mouse	
2. Which of the following is correct?		
a) Free and open source	b) Free and traditional software	
c) Passive and open source	d) Passive and Traditional sourc	
3. LINUX is a		
a) Paid Software	b) Licensed Software	
c) Free and proprietary software	d) Free and open source software	
4. Find out the Paid and Proprietary software from the given list		
a) Windows	b) MAC OS	
c) Adobe Photoshop	d) All the above	
5. Is an Operating System		
a) Android	b) Chrome	
c) Internet	d) Pen drive	

II. Match the following:

- 1. MAC OSa) Free and Open Source Software
- 2. Software b) Paid and Proprietary software
- 3. Hardware c) Input Device
- 4. Keyboard d) RAM
- 5. LINUX e) Geogebra

Ans: 1- b; 2-e; 3-d; 4-c; 5-a.

III. Short Questions & Answers:

1. What is Hardware and Software?

A hardware is a device that helps to enter input information. It includes input and output devices. Software's are programmed and coded applications to process the input information. They process the data by converting the input information into coded or programmed language.

2. What do you mean by Operating System? How does it work?

An Operating System (OS) is system software that manages computer hardware and software resources and provides common services for computer programs. It performs basic tasks as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the storage drives and controlling peripheral devices such as printers.

3. What is Free and Open Source Software? Give any two examples.

Free and Open Source software is available free of cost and can be shared by many end users. It is editable and customizable by the user and this leads to updation or development of new software. Examples of Free and Open Source software are LINUX, Open office, Geogebra.