CLASS IX (2019-20)
SCIENCE (CODE 086)
SAMPLE PAPER-3

Time : 3 Hours **Maximum Marks : 80**

General Instructions :

(i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
(ii) All questions are compulsory.
(iii) Internal choice is given in each sections.
(iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
(v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
(vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
(vii) This question paper consists of a total of 30 questions.

Section A

1. What is the ultimate source of energy in an ecosystem? [1]

Ans : Sunlight is an ultimate source of energy in an ecosystem.

2. Which of the following method is used to separate a mixture of salt and camphor? [1]

(a) Distillation (b) Filtration
(c) Sublimation (d) Centrifugation

Ans : (c) Sublimation

3. Which of the following organisms has tube feet as its locomotory organs? [1]

(a) Starfish (b) Jellyfish
(c) Cuttlefish (d) Silver fish

Ans : (a) Starfish

or

Pteridophyta do not have :

(a) Root (b) Stem
(c) Flowers (d) Leaves

Ans : (c) Flowers

4. Why can't solids be compressed? [1]

(a) The movement of the constituent particles are not restricted.
(b) The inter particle attractive forces are very weak.
(c) The constituent particles are closely packed.
(d) None of the above.

Ans : (c) The constituent particles are closely packed.

5. The valency of silicon is [1]

(a) 2 (b) 4
(c) 6 (d) 8

Ans : (b) 4

or

The isotope deuterium of hydrogen has :

(a) No neutrons and one proton
(b) One neutrons and two protons
(c) One electron and two neutron
(d) One proton and one neutron

Ans : (d) One proton and one neutron

6. Cell wall is mainly composed of [1]

(a) Glucose (b) Fructose
(c) Sucrose (d) Cellulose

Ans : (d) Cellulose

7. Which is not true with respect to cathode rays ? [1]

(a) A stream of electrons.
(b) Charged particles
(c) Move with same speed as that of light.
(d) Can be deflected by magnetic field

Ans : (c) Move with same speed as that of light.

8. Rohu and Catla are types of : [1]

(a) Marine water fish (b) Freshwater fish
(c) Both A and B (d) None of these

Ans : (b) Freshwater fish

9. Barometer is an instrument that is used to measure : [1]

(a) Velocity (b) Gaseous pressure
(c) Atmospheric Pressure (d) Temperature

Ans : (c) Atmospheric Pressure

or

Air shows the property of :

(a) N_2 (b) O_2
(c) Both (a) and (b) (d) None of these

Ans : (c) Both (a) and (b)

DIRECTION : For question numbers 10 and 11, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

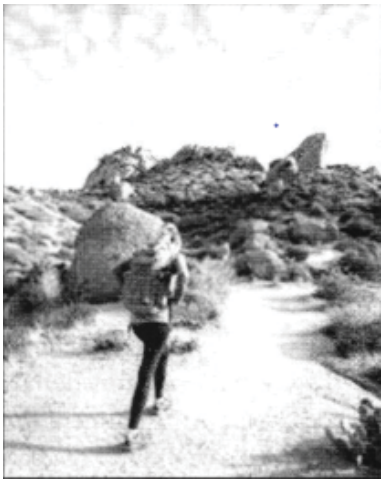
(a) Both A and R are true and R is correct explanation of the A.
(b) Both A and R are true but R is not the correct explanation of the A.
(c) A is true but R is false.
(d) Both A and R are false.

10. **Assertion (A) :** The value of acceleration due to gravity of earth does not depend upon mass of the body.
Reason (R) : Acceleration due to gravity is a constant quantity. [1]
Ans : (c) A is true but R is false.

11. **Assertion (A) :** The smell of incense can be felt in another room.
Reason (R) : With the increase in temperature of particles, their kinetic energy also increases. [1]
Ans :
Both A and R are true and R is correct explanation of the A.

12. Write the molecular formula for following compounds: [1]
(a) Hydrogen sulphide (b) Calcium hydroxide
Ans :
(a) H_2S
(b) $Ca(OH)_2$

13. Answer question numbers 13.1–13.4 on the basis of your understanding of the following paragraph and the related studied concepts.
Sneha visited Egypt with her parents where she went on a tour of the Sahara desert. She didn't know that plants can grow also in the desert. She went and tore a leaf from one plant but they were very thick. When she was finally able to tear one small part, she found that the inside of the leaf was fresh and watery.



13.1 Why are the leaves of plants that grow in desert thick ? [1]
Ans : The desert plant leaves have a coating of thick waterproof wax on them, that does not allow the water to transpire, hence helps in storing a lot of water.

13.2 Sneha sees that there is a waxy coating on the epidermis of the leaf. What is the name of this coating and what is its function ? [1]
Ans : Cutin.

13.3 Define transpiration. [1]
Ans : The process by which the leaves lose water in the form of vapour to the environment is called transpiration.

13.4 Should Sneha be careful while touching a plant that grows in the deserts ? [1]
Ans : Sneha should be careful because we can find many thorns on most of the plants in deserts.

14. Questions 14.1 to 14.4 are based on the Table A. Study this table and answer the following questions :

Table A

Distance (m)	Height above the base of the mountain (m)	Uniform speed (m/s)
0-500	100	2
500-2000	250	3
2000-4000	450	1.5
4000-5000	500	0.5

Alok is travelling to Vaishnodevi on foot. He starts from the base of the mountain and the temple is at a distance of 5 km from the base and at a vertical height of 500 m. He also notes his uniform speed, distance and height from the base at regular intervals (shown in table). Alok weighs 50 kg.

14.1 Find the kinetic energy in the 500 − 2000 interval. [1]
Ans :
Kinetic energy in the 500 − 2000 interval
$$= \frac{1}{2}mv^2 = \frac{1}{2} \times 50 \times (3)^2$$
$$= 225\ \text{J}$$

14.2 Find his potential energy at the end of 2000-4000 interval. [1]
Ans :
Potential energy of Alok at the end of 2000-4000 interval = mgh
$$= 50 \times 10 \times 450$$
$$= 225000\ \text{J}$$

14.3 How much work has Alok done against the gravity when he reaches the summit? [1]
Ans :
Work done against the gravity $= F \cdot s$
Here, $F = -mg$
and s = height at the end = 500 m
Therefore,
$$\text{Work Done} = -mgh = -50 \times 10 \times 500$$
$$= -250000\ \text{J}$$

14.4 State the law of conservation of energy. [1]
Ans :
According to law of conservation of energy. Energy can neither be created nor destroyed, it can only be converted from one form to another form.

Section -B

15. (a) Why does a passenger jumping out of a rapidly moving bus fall forward with his face downwards ?
(b) Why is it difficult for a fireman to hose, which ejects large amount of water at a high velocity ?[3]

Ans :

(a) A man getting down a running bus falls forward because due to inertia of motion upper part of body continues to be in motion in forward direction while feet come to rest as soon as they touch the road.

(b) **Newton's third law of motion :** Every action has an equal and opposite reaction. When the fireman holds the hose, it has an opposite reaction on his body. This backward and an equal reaction on the fireman makes him unstable and finds it difficult to hold the hose. Thus, due to the opposite reaction of the water with high velocity a fireman finds it difficult to hold the hose.

16. Define isotopes and isobars and also give examples. [3]

Ans :

Isotopes : The atoms that possess same atomic number but different mass number are known as isotopes. **Example :** $_1H^1$–Hydrogen, $_1H^2$–Deuterium and $_1H^3$–Tritium

Isobars : The atoms with same mass number but different atomic number are known as isobars. **Example :** Calcium = Atomic No. = 20, Mass No. = 40, Argon = Atomic No. =18 and Mass No. = 40

17. Classify the kind of manures based on the kind of biological material used. [3]

Ans :

Based on the kind of biological material used, manure can be classified into following two categories :

(a) **Compost and vermi – compost :** Farm waste materials like livestock excreta, (cow dung etc.), vegetable waste, animal refuse, domestic waste, sewage weeds, etc. are decomposed in compost pits to form manure. These are known as compost pits and the manure is known as compost. Compost preparation is also hastened by introducing earthworms into plant and animal refuse. This is called vermi – compost.

(b) **Green Manure :** Prior to the sowing of the crop seeds, some plants like sun hemp or guar are grown and then mulched by ploughing them into the soil. These green plants thus turn into green manure which helps in enriching the soil in Nitrogen and Phosphorous.

18. A mass of 10 kg is at a point A on the table. It is moved to a point B. If the line joining A and B is horizontal, what is the work done on the object by the gravitational force? Explain your answer. [3]

Ans :

The work done on the object by the gravitational force is zero. Since, the motion of object is in the horizontal direction whereas the gravitational force i.e., acting vertically downwards is at right angles to the direction of motion of object.

or

Ashish had a pain in his ear as he pricked it with a pin. He then goes to the doctor; the doctor advised we should take proper care of our ears and protect them from damage. Read the above passage and answer the following questions :

(a) Why we must not prick with hard and pointed things inside our ears ?

(b) What values you have learnt from the given passage?

Ans :

(a) We must not prick with hard and pointed things inside our ears, as they can tear the eardrum.

(b) From the given passage, I have learnt that proper care should be taken of delicate parts of our body.

19. Define : [3]

(a) Bilateral symmetry,

(b) Coelom, and

(c) Triptoblastic.

Ans :

(a) **Bilateral symmetry :** Body can be divided into two similar halves only by one plane that passes through the central or median axis e.g., tortoise, humans.

(b) **Coelom :** It is the body cavity which is lined externally as well as by regular layer of mesoderm.

(c) **Triploblastic :** When the body of an animal develops three germ layer – ectoderm, mesoderm and endoderm, it is called triploblastic.

20. (a) Birds and mammals share one common feature. Give details.

(b) Name the phylum in which animals has soft bodies covered with a hard shell.

(c) Ingestion of solid food occurs in which type of nutrition ? [3]

Ans :

(a) Both birds and mammals are warm-blooded in nature.

(b) Mollusca has animals that have soft bodies covered with a hard shell.

(c) Ingestion of solid food occurs in holozoic type of nutrition.

or

(a) Which structure is found in plant cells but absent in animal cell ?

(b) What is the functional segment of DNA ?

(c) Name the pigment that imparts red and yellow colour to flowers.

Ans :

(a) Plant cell have chloroplast and cellulose wall, which is absent in animal cell.

(b) Gene is segment of DNA, a unit of heredity that is transferred from a parent to offspring.

(c) Xanthophyll are coloured pigments just like chlorophyll. Chlorophyll imparts green colour to leaves and xanthophyll imparts red and yellow colour to flowers.

21. What are the differences between the mass of an object and its weight ? [3]

Ans :

S.No.	Mass	Weight
1.	Mass is a property of matter. The mass of an object is the everywhere.	Weight depends on the effect of gravity. Weight increases or decreases with higher or lower gravity.

S.No.	Mass	Weight
2.	Mass can never be zero.	Weight can be zero if no gravity acts upon an object, as in space.
3.	Mass does not change according to location.	Weight varies according to location.
4.	Mass is a scalar quantity. It has magnitude.	Weight is a vector quantity. It has magnitude and is directed toward the centre of the earth or other gravity well.
5.	Mass may be measured using an ordinary balance.	Weight is measured using a spring balance.
6.	Mass usually is measured in grams and kilograms.	Weight often is measured in Newton's, a unit of force.

22. (a) What is the combining capacity of an element called ?
(b) How many moles does 24 g of Mg contain ?
(c) What is the difference between sodium atom and sodium ion ? [3]

Ans :

(a) Valency is the combining capacity of an element
(b) 24g of Mg contain 1 mol. [Atomic mass of Mg = 24 u]
(c)

S. No.	Sodium Atom	Sodium ion
1.	Na has 11 electrons in its shells.	Na^+ has 10 electrons in its shells.
2.	Na is neutral.	Na^+ is a positively charged particle or cation.

or

Convert into mole :
(a) 20 g of water (Atomic masses of hydrogen and oxygen are 1 and 16 respectively).
(b) 22 g of carbon dioxide (Atomic masses of carbon and oxygen are 12 and 16 respectively).

Ans :

(a) Atomic mass of water $(H_2O) = 1 \times 2 + 16 = 18$ u
Number of moles in 20 g of water = 20/18 = 1.1.
(b) Atomic mass of carbon dioxide $(CO_2) = 12 + 2 \times 16 = 44$ u.
Number of moles in 22 g of carbon dioxide = 22/44 = 0.5 mol.

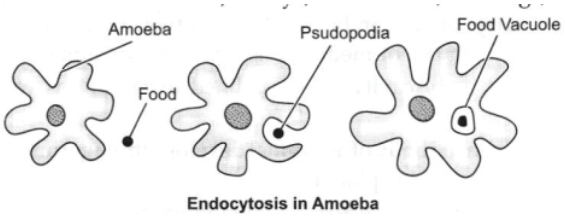
23. What is SONAR? Write two uses of SONAR technique. [3]

Ans :

The acronym SONAR stands for Sound Navigation And Ranging. SONAR is a device which uses ultrasonic waves to measure the distance, direction and speed of under water objects. Uses of SONAR technique are :
(a) It is used to determine the depth of the sea.
(b) It is used to locate under water hills, valleys, submarines, ice-bergs, sunken ships, etc.

24. Describe the way Amoeba consumes its food with the help of diagrams. [3]

Ans :



Endocytosis in Amoeba

Amoeba consumes its food by a process known as endocytosis.
(a) Initially the plasma membrane of the cell folds inward forming a cavity around the target particles.
(b) The pocket then pinches off with the help of specialized proteins, leaving the target particles trapped inside the cell.
(c) The target particles are trapped inside the cell forming a new food vacuole, which are further digested for nutritional purposes.

Section -C

25. (a) A. truck starts from rest and rolls down the hill with constant acceleration. It travels a distance of 500 m in 25 seconds. Find the force acting on it if its mass is 6 metric tons.
(b) State Kepler's law of planetary motion. [5]

Ans :

(a) According to the question
Initial velocity of truck $u = 0$
Distance, $s = 500$ m and time, $t = 25$ s
Mass of truck = 6 metric tons = 6000 kg

we have, $S = ut + \frac{1}{2}at^2$

$$500 = 0 \times 25 + \frac{1}{2}a \times (25)^2$$

$$500 \times 2 = a \times 25 \times 25$$

$$a = 1.6\ \text{m/s}^2$$

Therefore, $F = ma$

$$= 6000 \times 1.6$$

$$= 9600\ \text{N}$$

(b) Kepler derived three laws governing the planetary motion.
(i) The orbit of a planet is an ellipse with the sun at one of the foci.
(ii) The line joining the planet and the sun sweeps equal areas in equal intervals of time.
(iii) The cube of mean distance of a planet from the sun is directly proportional to square of

orbital period, i.e., r^3/T^2 = constant.

or

(a) (i) Seema buys few grains of gold at the poles as per the instruction of one of her friends. She hands over the same when she meets her at the equator. Will the friend agree with the weight of gold bought? If not, why ?

(ii) If the moon attracts the earth, why does the earth not move towards the moon ?

(b) Sound requires a medium to travel. Justify experimentally.

Ans :

(a) (i) No, her friend will not agree with the weight of gold bought because weight at poles is greater than the weight at equator.

(ii) We know that the gravitational force is always attractive; still the moon does not fall on the earth because the gravitational force between earth and the moon works as the necessary centripetal force for the moon to make it revolving around the earth.

(b) (i) Take a bell jar and suspend an electric bell in it.

(ii) The bell jar is connected to a vacuum pump.

(iii) Till the air is present inside the bell jar, the sound of the electric bell can be heard clear and loud.

(iv) Now, with the help of vacuum pump, suck out the air from the bell jar.

26. (a) What was Thomson's model of an atom ?

(b) Write any two observations of Rutherford's model of atom. [5]

Ans :

(a) **Thomson's model of an atom :**

(i) Atom consists of positive charge uniformly distributed.

(ii) Electrons are embedded in positively charged sphere like seeds in watermelon.

(iii) Atom is neutral.

(iv) Mass of atom is also uniformly distributed.

(b) (i) Most of alpha rays passed through gold foil undeviated.

(ii) Some alpha rays deviated through larger angles.

27. What are the different aspects of maintaining a good health ? [5]

Ans :

Different aspects of maintaining a good health are :

(a) **Community health :** It involves all the factors relating to personal health along with the service necessary for providing good health for the community.

(b) **Personal health (hygiene) :** It is the science of preserving and promoting health mainly through the active efforts of an individual. It is practiced through active, sanitary habits and healthy way of life.

(c) **Exercise, relaxation and sleep :** Regular exercise is very necessary to keep the body fit. Proper sleep of about 6-8 hours is essential. Relaxation is also very essential for good health.

(d) **Nutrition :** Optimum nutrition is essential for maintenance of good health. One should take sufficient and balanced food for maintaining good health.

or

What are the limitations in the approach of treating the infectious diseases ? Also mention the principles of prevention.

Ans :

There are three limitations in the treatment approach of an infectious disease.

(a) If someone has a disease, their body functions are damaged and may never recover completely.

(b) A treatment will take time, which means that someone suffering from a disease is likely to be bedridden for some time even if he is given proper treatment.

(c) The person suffering from an infectious disease can serve as the source from where the infection may spread to other people.

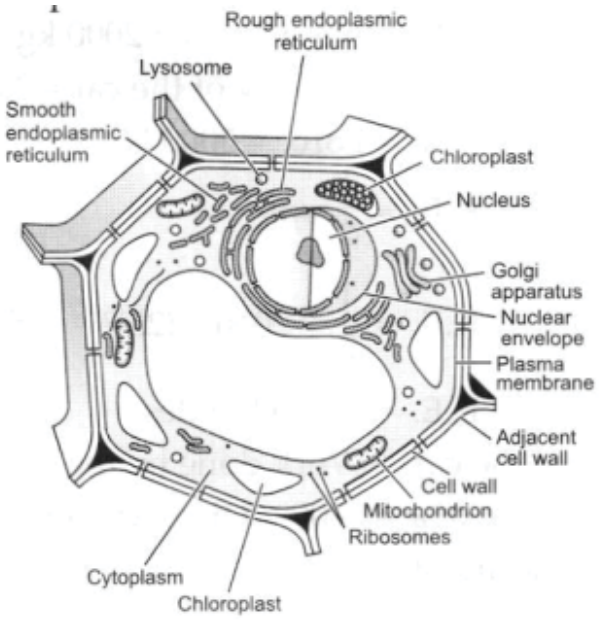
There are two ways to prevent a disease, one is general and one is specific to each disease.

(a) The general way of preventing a disease is to prevent our body's exposure to microbes. For example, we can prevent exposure to air borne microbes by providing living conditions that are not overcrowded. We can prevent exposure to water borne microbes by providing safe drinking water.

(b) The second principle is based on the strength of our immune system to fight the diseases. For a proper functioning immune system, availability of proper and sufficient food for everyone is very important.

28. Draw the diagram of a plant cell. Label all the important parts and write a short definition of each part. [5]

Ans :



(a) **Plasma membrane :** It acts as a semipermeable membrane and allows only selective substances to pass through it.

(b) **Chromosomes :** They carry hereditary characters

from parents to offspring, that is, from one generation to another.

(c) **Lysosomes :** They act as 'digestive bags' which fight against any infection inside the cell.

(d) **Ribosomes :** They help in protein synthesis.

(e) **Nucleus :** It controls all metabolic activities of the cell.

(f) **Mitochondria :** It is the power house of the cell which stores and releases energy in the form of ATP.

(g) **Chloroplast :** It carries out photosynthesis in plants and synthesizes food by trapping solar energy. They are also known as the 'kitchen of the cells'.

(h) **Cytoplasm :** Cytoplasm is a thick solution composed of water, salts and proteins that fills the cells. It is surrounded by cell membrane.

(i) **Rough endoplasmic reticulum :** Ribosomes are attached on RER. The proteins manufactured by them are distributed to the different sites through rough endoplasmic reticulum.

(j) **Smooth endoplasmic reticulum :** The SER helps in the manufacture and distribution of fat molecules and lipids to different sites inside the cell.

(k) **Golgi apparatus :** It helps in the formation of Lysosomes. It also helps in storing and distributing the material synthesized by Endoplasmic Reticulum.

29. Iron filings and sulphur were mixed together and divided into two parts, A and B. Part A was heated strongly while part B was not heated. Dilute hydrochloric acid was added to both the parts and evolution of gas was seen in both the cases. How will you identify the gases evolved? [5]

Ans :

As part 'A' is heated, a compound feS is formed lay the reaction between iron fillings and Sulphur. When dilute HCl is added to part A, FeS will react with dilute HCl to form H_2S gas which gas smell of rotten eggs and will turn lead acetate paper black

$$Fe(s) + S(s) \xrightarrow{\text{heat}} FeS(s)$$

$$FeS(s) + 2HCl(\text{dill}) \longrightarrow FeCl_2(aq) + H_2S \uparrow (g)$$

As part 'B' is not heated, so B is a mixtune of iron filings and sulphur powder. When dilute. HCl is added to it, iron filings react with dil. HCl to form H_2 (g) which burns with a 'pop'sound if burning match stick is brought near it.

$$Fe(s) + 2HCl \longrightarrow FeCl_2 + H_2 \uparrow$$

or

(a) While diluting a solution of salt in water, a student by mistake added acetone (boiling point 56°C).What technique can be employed to get back the acetone? Justify your choice.

(b) Rohit mixed starch with water, boiled the mixture well and stirred it. What did he observe ?

(c) What name is given to process of rusting of an article made up of iron and what type of change is it?

Ans :

(a) Acetone can be obtained back by simple distillation of the mixture because the difference in the boiling points of the two liquids is more than 25° C.

[Note : Boiling point of acetone = 56° C, Boiling point of water = 100°C]

(b) He observed that starch forms a translucent mixture (colloid).

(c) The process is called corrosion and it is a chemical change because rust is a chemical compound (hydrated iron oxide, $Fe_2O_3 \cdot x\,HeO$) totally different from element iron. The reaction is

$$4Fe + 3O_2 + x\,H_2O \longrightarrow 2Fe_2O_3 \cdot x\,H_2O \text{ (rust)}$$

30. A 2000 kg car is moving at 25 m/s when brakes are applied. If the average force exerted by the brakes is 5000 N, find the distance travelled by the car before it comes to rest? [5]

Ans :

Given, mass of car, $m = 2000$ kg

velocity of the car, $v = 25$ m/s

Force, $F = 5000$ N

$$\text{K.E.} = \frac{1}{2}mv^2$$

$$\text{K.E.} = \frac{1}{2} \times 2000 \times (25)^2$$

$$\text{K.E.} = 625000 \text{ Joules}$$

$$\text{Now, K.E. of the car} = \text{Work done by the car}$$

$$= \text{Forec} \times \text{Displacement}$$

$$625000 = 5000 \times \text{Displacement}$$

$$\text{Displacement} = 125\,\text{m}$$