CBSE SAMPLE PAPER – 05
SUMMATIVE ASSESSMENT – I
Class-IX SCIENCE

Time: 3 Hrs **MM: 90**

General Instructions

(i) The question paper comprises of two Sections, A and B. You are to attempt both the sections.
(ii) All questions are compulsory.
(iii) Question numbers 1 to 3 in Section-A are one mark questions. These are to be answered in one word or in one sentence.
(iv) Question numbers 4 to 6 in Sections-A are two marks questions. These are to be answered in about 30 words each.
(v) Question numbers 7 to 18 in Section-A are three marks questions. These are to be answered in about 50 words each.
(vi) Question numbers 19 to 24 in Section-A are five marks questions. These are to be answered in about 70 words each.
(vii) Question numbers 25 to 36 in Section-B are multiple choice questions based on practical skills. Each question is a one mark question. You are to select one most appropriate response out of the four provided to you.

Section – A

1. Which of the following diffuses faster? Water vapour, wax or, ethyl alcohol.
2. Which blood cells deal with immune reaction?
3. Define electrostatic force.
4. If a potted plant is covered with a glass jar, water vapour appears on the wall of the glass jar. Why?
5. Describe the microscopic structure of the cell.
6. Calculate the force of gravitation between the earth and the Sun, given that the mass of the earth = 6×10^{24} kg and of the Sun = 2×10^{30} kg. The average distance between the two is 1.5×10^{11} m.
7. Differentiate between physical and chemical change?
8. Write a short note on epithelial tissue.
9. Draw a labelled diagram of a neuron.
10. Why do you fall in the forward direction when a moving bus brakes to a stop and fall backwards when it accelerates from rest?
11. Discuss why pesticides are used in very accurate concentration and in very appropriate manner.
12. Write a method to separate different gases from air.
13. Classify each of the following as a physical or a chemical change. Give reasons.

(a) Drying of a shirt in the sun.

(b) Rising of hot air over a radiator.

(c) Burning of kerosene in a lantern.

(d) Change in the colour of black tea on adding lemon juice to it.

14. Prove that if a body is thrown vertically upward, the time of ascent is equal to the time of descent.

15. State Newton's second law of motion and derive it mathematically?

16. The velocity of a body in motion is recorded every second as shown-

time(s)	0	1	2	3	4	5	6	7	8	9	10
Velocity(m/s)	62	54	48	42	36	30	24	18	12	6	0

Calculate the –
(a) Acceleration (b) distance travelled and draw the graph.

17. Comment on the following statements:

(a) Evaporation causes cooling.

(b) Rate of evaporation of an aqueous solution decreases with increase in humidity.

(c) Sponge though compressible is a solid.

(d) Ice is solid at 0°C, while water is liquid at room temperature.

(e) Sugar crystals dissolve faster in hot water than cold water.

18. Raghu switched from traditional to modern farming practices in which he used large amounts of fertilizers and pesticidesto gain an increase in profit.

(i) What are the adverse effects of modern farming?

(ii) What issoil pollution?

(iii) What do you think will be effect on the soil in long run?

(iv) What alternative method could be more beneficial for farming?

19. Why does the temperature of a substance remain constant during its melting point or boiling point?

20. Draw a plant cell and label the parts:

(a) Synthesize food

(b) produce energy

(c) Store house of organic substances like protein, organic acids

(d) Packages material coming from endoplasmic reticulum

(e) Determine function and development of the cell.

21. (a) What happen to sugar when it is dissolved in water? Where does the sugar go? What information do you get about the nature of matter from the dissolution of sugar in water?
(b) Which type of compounds can be purified by sublimation?

22. A ball thrown up vertically returns to the thrower after 6 s. Find
(a) the velocity with which it was thrown up.
(b) the maximum height it reaches, and
(c) its position after 4s.

23. Why are improved poultry breeds developed? Describe the desirable traits for which new varieties are developed.

24. An athlete completes one round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 minutes and 20 seconds?

Section B

25. 300k will have its corresponding temperature in degree centigrade as:-
(a) 30° (b) 300° (c) 27° (d) 673°

26. Blood and sea water are:-
(a) both mixtures
(b) both are compound
(c) blood is a mixture whereas sea water is a compound
(d) blood is a compound and sea water is a mixture

27. Amoeba acquires its food through a process, termed
(a) Exocytosis (b) endocytosis
(c) Plasmolysis (d) Exocytosis and endocytosis both

28. In desert plants, rate of water loss gets reduced due to presence of:
(a) cuticle (b) stomata
(c) lignin (d) suberin

29. If a body starts from rest, what can be said about the acceleration of body?
(a) Positively accelerated (b) Negative accelerated
(c) Uniform accelerated (d) None of the above

30. Which law explains swimming?
(a) Newton's first law (b) Newton's second law
(c) Newton's third law (d) All of these

31. To solve the food problem of the country, which among the following is necessary?

(a) Increased production and storage of food grains

(b) Easy access of people to the food grains

(c) People should have money to purchase the grains

(d) All the above

32. Preventive and control measures adopted for the storage of grains include:

(a) Strict cleaning (b) proper disjoining

(c) fumigation (d) all the above

33. What does slope of position time graph give?

(a) speed (b) acceleration

(c) uniform speed (d) Both (a) and (c) depending upon the type of graph.

34. Which would require a greater force-accelerating a 2 kg mass at 5 ms^{-2} or a 4 kg mass at 2 ms^{-2}?

35. In experiment to demonstrate the boiling point of water, state reason for following precautions

(a) The bulb of thermometer should not touch the sides of the beaker.

(b) Pumice stone should be added while boiling water.

36. Sheema was asked to prepare four separate mixtures in four beakers A, B. C, D by mixing sugar, fine sand, thin paste of starch and chalk powder respectively in water and then categories each as stable or unstable. What will be the correct categorization?

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ANSWERS

1. Water vapour.
2. WBC (White blood cell).
3. The force exerted by an electrically charged body is called electrostatic force.
4. This happens because of transpiration due to which, water is released from the plant in the form of water vapour which appears on the glass jar.
5. The cork cells were the first cells to be observed. They were composed of box-like compartments, forming a honeycomb structure. Cell organelles are found embedded in the cytoplasm. These are smaller in size and bounded by plasma membrane.
6. $F = G\frac{Mm}{d^2}$

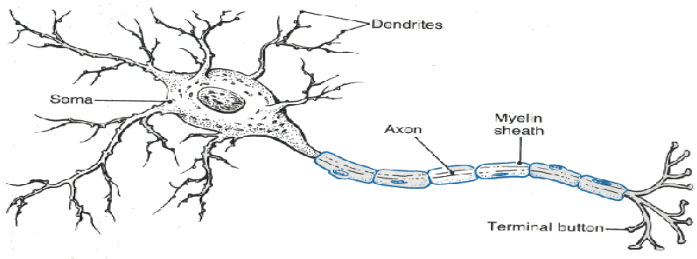
$$\frac{6.7\times10^{-11}\times2\times10^{30}\times6\times10^{24}}{\left(1.5\times10^{11}\right)^2}$$

$$35.73\times10^{21}\,N$$

7.

Physical change	Chemical change
It is not permanent and can easily be reserved	It is permanent and cannot be easily reversed.
It does not lead to formation of new substances.	It leads to the formation of new substances.
No change in mass is noticed.	There is a change in mass of reactants and products.
The energy changes observed are small.	Large energy changes are observed.

8. The covering or protective tissue in the animal body are epithelial tissues. Epithelial tissue cells are tightly packed and form a continuous sheet. They have only a small amount of cementing material between them and almost no intercellular spaces. Epithelium covers most organs and cavities within the body. It forms a barrier to keep different body systems separate. The skin, the lining of the mouth, the lining of blood vessels, lung alveoli and kid tubules are all made of epithelial tissue.
9.



10. When a moving bus brakes to a stop we fall in the forward direction because we are also moving with the speed of bus due to the inertia of motion and when suddenly it puts brakes

i.e. comes to rest the lower half of our body also comes to rest but the upper half of our body not being in close contact with bus is still in the phase of motion so we fall in the forward direction.

When the bus accelerates from rest, we are also at rest being on the resting seat as the engine applies force in forward direction we fall backwards due to the inertia now.

11. Pesticides are used in very accurate concentration and in a very appropriate manner because if used in excess it:
(a) harms the soil and causes loss of fertility,
(b) checks the replenishment of organic matter,
(c) kills the microorganism of soil,
(d) causes air, water and soil pollution.

12. Air is a homogeneous mixture of various gases.
It can be separated from its various components by fractional distillation.
(a) First compress and cool the air by increasing the pressure and decreasing the temperature.
(b) We obtain the liquid air; now allow the liquid air to warm up slowly in fractional distillation column.
(c) The various gases separates from each other according to their boiling points at various heights of the fractionally column.

13. (a) It is a physical change because water is converted from its liquid state to gaseous state because of the sun's heat.
(b) It is a physical change because water in the radiator is converted from a liquid state to gaseous state.
(c) It is a chemical change because combustion of kerosene occurs and new products are formed.
(d) It is a chemical change because there is a reaction between the citric acid in the lemon and the compounds of tea resulting in formation of new products.

14. Upward motion

$\upsilon = u - gt_1$

$0 = u - gt_1$

$t_1 = \frac{u}{g}$ ... (i)

Downward motion

$\upsilon = u + gt_2$

$\upsilon = 0 + gt_2$

As the body falls back to the earth with the same velocity it was thro* vertically upwards.

Therefore, $\upsilon = u$

$u = 0 + gt_2$

$h = \frac{u}{g}$ ..... (ii)

From (1) and (2), we get $t_1 = t_2$

⇒ Time of ascent = Time of descent

15. According to Newton's second Law of motion, rate of change of momentum is equal to the force acting on it and both take place in the same direction

Mass of Body = m kg

Initial velocity = u

Force = F
Let the direction of the force be the same as the direction of motion of the body.
Let force act for time = t sec
Final velocity = V
Initial Momentum = Pi = mv
Final momentum = Pf
Change in Momentum = Pf – Pi = mv – mu
Rate of change in Momentum = $\frac{m(v-u)}{t} \rightarrow (1)$

Now, Acceleration = $a = \frac{v-u}{t} \rightarrow (2)$

Use (2) in (1)
Rate of change in Momentum = ma from Newton's second law of motion,
F = ma

16. (a) Acceleration =slope of the velocity time graph

$a = \frac{V_2 - V_1}{t_2 - t_1}$

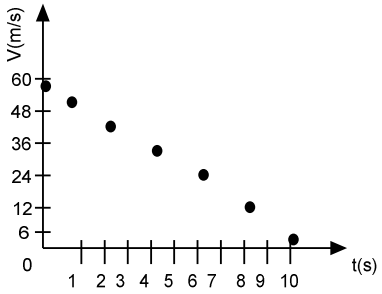
$a = \frac{54-24}{1-6} = \frac{30}{-5} = -6 m/s^2$

(b) Distance $\Rightarrow$

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

$= 60 \times 10 + \frac{1}{2}(-6) \times (10)^2 = 600\text{-}300 = 300\text{m}$

(c)

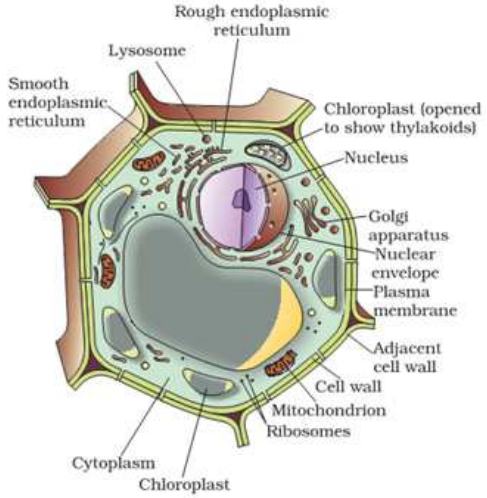


17. (a) Evaporation produces cooling as the particles at the surface of the liquid gain energy from the surroundings and change into vapour, thereby producing a cooling effect.
(b) Air around us cannot hold more than a definite amount of water vapour at a given temperature which is known as humidity. So, if the air is already rich in water vapour, it will not take up more water; therefore, rate of evaporation of water will decrease.
(c) A sponge has minute holes in which air is trapped. Also the material is not rigid. When we press it, the air is expelled out and we are able to compress.
(d) Ice is solid at $0°C$ because it has a definite volume and definite shape due to strong intermolecular forces. Water is liquid at room temperature because it has definite volume and no definite shape due to weak intermolecular forces of attraction.
(e) Sugar crystals dissolve faster in hot water than cold water because hot water molecules contain more kinetic energy. Due to this, they strike faster on the particles of sugar than cold water molecules. As a result, hot water will dissolve them faster than cold water.

18. (i) The adverse effects of modern farming involve the use of fertilizers and pesticides which leads to soil pollution.
(ii) The removal of useful components from the soil and addition of another substance which affect the fertility of the soil and kill the diversity of the organization that live in it, is called soil pollution.
(iii) In a long run it will destroy the soil structure by killing the soil micro-organism which recycle nutrients in the soil.
(iv) Alternative method: organic farming.

19. The temperature of a substance remains constant at its melting and boiling points until all the substance melts or boils because, the heat supplied is continuously used up in changing the state of the substance by overcoming the forces of attraction between the particles. This heat energy absorbed without showing any rise in temperature is given the name latent heat of fusion/latent heat of vaporisation.

20. (a) Chloroplast
(b) Mitochondrion
(c) Vacuole
(d) Dictyosomes
(e) Nucleus



21. (a) When sugar is dissolved in water, its crystals breaks into tiny particles. The sugar particles go into the spaces between the particles of water and mix with them to form sugar solution. The sugar particles occupies the space between water particles.
From the dissolution of sugar in water, we infer that
(i) The matter consisting of sugar and water is made up of small particles.
(ii) The particles of matter have space between them.
The compound which can undergo sublimation themselves but contain impurities which cannot sublime can be purified by the process of sublimation.

22. (a) Total time = 6s
Time taken to achieve maximum height, t = 3s
Acceleration a = - g for upward motion, initial velocity u = ?
Final velocity = velocity at highest point = 0
From relation $v = u + at$, we have
$v = u - at$
$\Rightarrow 0 = u + (-9.8\ ms^{-2})3s$
$u = 9.8 \times 3\ ms^{-1} = 29.4\ ms^{-1}$
So, velocity with which it was thrown up = $29.4\ ms^{-1}$

(b) We know, maximum height s = H, a = - g

From relation $v^2 = u^2 + 2as$, we have $v^2 = u^2 - 2Gh$

$$H = \frac{u^2 - v^2}{2g} = \frac{\left(29.4ms^{-1}\right)^2 - 0}{2 \times 9.8ms^{-2}}$$

$$Or, H = \frac{-864.36m^2s^2}{-19.6ms^2}$$

Or, H = 44.1m

So, the maximum height it reached = 44.1 m.

(c) After 3s the ball reaches its maximum position (h=44.1 m). When it starts its downward motion;

Initial velocity, $u = 0$.

Acceleration due to gravity, g = +9.8 ms^{-2}

Distances travelled from the top in is (i.e., 4s - 3s) is given by

$$s = ut + \frac{1}{2}gt^2$$

$$= 0 + \frac{1}{2}\left(9.8ms^2\right) \times \left(1s\right)^2$$

=4.9m

23. Poultry farming is undertaken to raise domestic fowl for egg production and chicken meat. For this, improved poultry breeds are developed and farmed to produce layers for eggs and broilers for meat.

The cross-breeding programmes between Indian (indigenous like Aseel) and foreign (exotic like Leghorn) breeds for variety improvement are focused on developing new varieties for the following desirable traits:

(a) The number and quality of chicks.

(b) Dwarf broiler parent for commercial chick production.

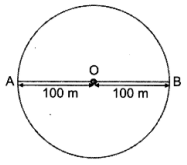
(c) Tolerance to high temperature.

(d) Low maintenance requirements.

(e) Reduction in the size of the egg-laying bird possessing the ability to utilise more fibrous and economical diet that are formulated using agricultural by-products.

24. Here, the diameter of circular track = 200 m.

Radius of circular track, r = 100 m.



Let the athlete start moving from A which is treated as reference point.

The distance covered by the athletes in 40 s = circumference of the circle.

$= 2\pi r - 2\pi \times 100m$

$= 200\pi m$

∴ The distance traversed in one second

$$\frac{200\pi}{40} = 5\pi$$

Distance covered by athletes in 2 minutes and 20 seconds i.e., 140 s

$= 5\pi \times 140$

$= 5 \times \frac{22}{7} \times 140 = 2200$ m

Number of complete rounds done by the athlete

$\frac{2,200}{200\pi} = \frac{2200}{200 \times \left(\frac{22}{7}\right)}$

$\frac{2200 \times 7}{200 \times 22} = \frac{7}{2}$

$=3.5$

$= \left(3 + \frac{1}{2}\right)$round

Therefore, the final position of athletes at the end of 2 minutes and 20 seconds or just after three and a half rounds is B.

The displacement at the end of 2 minutes and 20 seconds.

= AB; the shortest distance between initial and final position.

= diameter of track

= 200 m

Section B

25. (c)
26. (a)
27. (b)
28. (a)
29. (a)
30. (c)
31. (a)
32. (d)
33. (a)
34. Here, $m_1 = 2$ kg, $a_1 = 5\ ms^{-1}$, $m_2 = 4$kg, $a_2 = 2\ ms^{-2}$

    $F_1 = m_1 a_1 = 2 \times 5 = 10$N

    $F_2 = m_2 a_2 = 4 \times 2 = 8$ N

    $F_1 > F_2$

    Thus, accelerating a 2 kg mass at 5 ms^{-2} acceleration would require a greater force.
35. (a) Sides of a beaker could be at higher temperature.

    (b) Pumice stones prevent the bumping of water.
36. The mixture in beaker A and C will be stable.

    The mixture in beaker B and D will be unstable.