CBSE SAMPLE PAPER – 03
SUMMATIVE ASSESSMENT – I
Class-IX SCIENCE

Time: 3 Hrs **MM: 90**

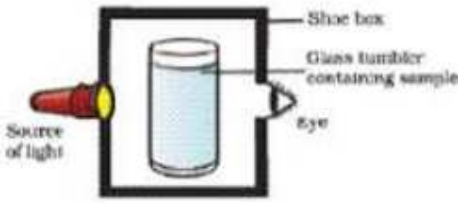
General Instructions

(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. Define density and give its SI unit.
2. Name the tissue responsible for movement in our body.
3. Define force of friction.
4. Animals of colder regions and fisher of cold water have thick layer of subcutaneous fat. Explain, why?
5. Why are lysosomes known as suicide bags?
6. The earth and the moon are attracted to each other by gravitational force. Does the earth attract the moon with a force that is greater or smaller or the same as the force with which the moon attracts the earth? Why?
7. What do you understand by the term 'latent heat of fusion'? How much is the latent heat of fusion of ice?
8. Describe the functions of epithelium tissue.
9. What are the major functions of blood?
10. Why does an athlete puts some sands or cushion on the ground while high jumping?
11. What are the advantages of composite fish culture?
12. Calculate the mass of sodium sulphate required to prepare its 20% (mass per cent) solution in 100 g of water.

13. A solution contains 30 g of glucose, 20 g of sugar in 500 mL of water. Calculate the mass per cent of glucose and sugar (density of water = 1 g /mL).
14. How does weight of a rocket change as it moves from earth to moon?
15. A bullet of mass 10 g travelling horizontally with a velocity of 150 m s^{-1} strikes a stationary wooden block and comes to rest in 0.03 s. Calculate the distance of penetration of the bullet into the block. Also calculate the magnitude of the force exerted by the wooden block on the bullet.
16. A car moving with a certain velocity comes to a halt if the retardation was $5m/s^2$, find the initial velocity of the car?
17. You want to wear your favorites shirt to a party, but the problem is that it is still wet after a wash. What steps would you take to dry it faster?
18. Mr Rajinder has this unique habit of planting saplings wherever he can in his neighborhood area to stop soil erosion. Due to his constant efforts, once barren and unused land of village Rampur has got changed into green plantation.
    (i) What is soil erosion?
    (ii) What are agents that cause soil erosion?
    (iii) What are the methods of reducing and preventing soil erosion?
    (iv) Which characteristics do you find in Mr Rajinder that can be emulated?
19. What is crystallization? Where is it used? Why is this better than simple evaporation technique?
20. What are cell organelles? Write the names of different cell organelles.
21. A group of students took an old shoe box and covered it with a black paper from all sides. They fixed a source of light (a torch) at one end of the box by making a hole in it and made another hole on the other side to view the light. They placed a milk sample contained in a beaker/tumbler in the box as shown in the figure. They were amazed to see that milk taken in the tumbler was illuminated. They tried the same activity by taking a salt solution but found that light simply passed through it.
    (a) Explain why the milk sample was illuminated. Name the phenomenon involved.
    (b) Same results were not observed with a salt solution. Explain.
    (c) Can you suggest two more solutions which would show the same effect as shown by the milk solution?

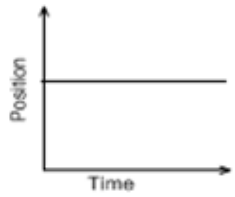


22. What happens to the force between two objects, if
    (i) the mass of one object is doubled?
    (ii) the distance between the objects is doubled and tripled?
    (iii) the masses of both objects are doubled?
23. Discuss the preventive measures for the storage of grains.
24. A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10 m s-2, with what velocity will it strike the ground? After what time will it strike the ground?

Section B

25. If the temperature of a place is increase then evaporation:-
    (a) decrease (b) increase
    (c) remain same (d) none of the above
26. Cooking of food and digestion of food:-
    (a) are both physical processes
    (b) are both chemical processes
    (c) cooking is physical whereas digestion is chemical
    (d) cooking is chemical whereas digestion physical
27. Plasmolysis in a plant cell is defined as –
    (a) Break down (lysis) of plasma membrane in hypotonic medium
    (b) Shrinkage of cytoplasm in hypertonic medium
    (c) Shrinkage of nucleoplasm
    (d) None of these
28. You have been provided with narrow thick – walled living cells, elongated in shape and possessing thickening of cellulose and pectin these cells belong to:
    (a) Parenchyma (b) collenchymas
    (c) sclerenchyma (d) none of the above
29. Which of the following is the position time graph for a body at rest?

(a)



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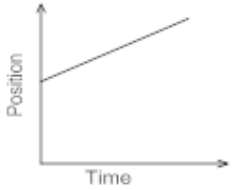

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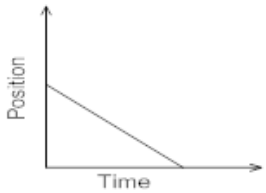
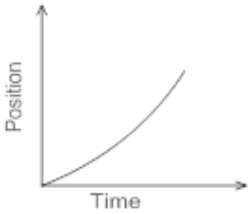


(d)



30. If the initial velocity is zero then the force acting is :-

(a) Retarding

(b) Acceleration

(c) Both

(d) None

31. Weeds affect the crop plants by:

(a) Killing of plants in field before they grow

(b) Dominating the plants to grow

(c) Competing for various resources of crops (plans)

(d) All the above

32. 'Operation Flood' in India refers to:

(a) Controlling floods during rainy season

(b) Increase in milk production by development of co-operative dairy on a large scale

(c)Increase in fish production during floods

(d) Large increase in egg production

33. Which of the following gives both direction and magnitude:

(a) scalar (b) vector

(c) Both (d) None

34. In an experiment to establish the relationship between weight of a wooden cuboid with face A of area $30\times20m^2$, face B of area $20\times10m^2$ and face C of area $30\times10m^2$ lying on the horizontal surface and the minimum force required to move it, which of the three faces of cuboid should be in contact with the surface?

35. Identify two clear and transparent solution from the following mixtures:

(a) Milk and water

(b) Sugar and water

(c) Chalk powder and water

(d) Starch and water

36. List two precautions you must take while finding the melting point of ice.

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Answers

Section A

1. Density of a substance is defined as the mass per unit volume. Its SI unit is kgn T^3.
2. Muscle/muscular tissue.
3. The force acting between any two surfaces in contact and tending to oppose motion is called force of friction.
4. Thick layer of subcutaneous fat act as insulator. It prevents body heat to release in surrounding. Hence, keep their body warms.
5. Lysosomes are cell organelles filled with hydrolytic (digestive) enzymes. When a cell is damaged, its lysosomes may burst out and its enzymes digest up its own cell. Due to this, we can say that lysosomes are suicide bags.
6. The earth and the moon are attracted to each other by same gravitational force because for both of them formula to calculate force of attraction is the same

   F= $G\frac{Me\times Mm}{d^2}$, d is also same for both.
7. The amount of heat that is required to change 1 kg of solid into liquid at atmospheric pressure without any change in temperature at its melting point, is known as latent heat of fusion. The latent heat of fusion of ice in SI unit is $3.35\times10^5\ J/kg$.
8. Functions of epithelial tissue:
   (i) Epithelial cells protect the underlying cells from drying, injury and chemical effects. They also protect the body from viral or bacterial infection.
   (ii) It helps in the absorption of water and nutrients.
   (iii) It performs secretary function by secreting useful chemicals like sweat, saliva, enzymes from the food, etc., in the body.
9. Functions of blood are-
   (a) Transport food materials
   (b) Transports oxygen and carbon – dioxide
   (c) Transports excretory products to the kidneys, from where they are eliminated
   (d) Regulates temperature by distributing heat within the body

10. When a high jumper falls on a soft landing site (such as cushion or a heap of sand), then the jumper takes a longer time to come to stop. The rate of change of momentum of athlete is less due to which a smaller stopping force acts on the athlete. And the athlete does not get hurt. Thus, the cushion or sand, being soft, reduces the athlete's momentum more gently. If however, a high jumping athlete falls from a height on to hard ground, then his momentum will be reduced to zero in a very short time. The rate of change of momentum will be large due to which a large opposing force will act on the athlete. This can cause serious injuries to the athlete.
11. The advantages of composite fish culture are:
    (a) The species are selected in such a way that they do not compete for food among themselves, and have different types of food habits. Duetothis, the food available in all parts of the pond is used. For example, Catlas are surface feeders, Rohu feed in the middle-zone of the pond, while Mrigals and common carps are bottom feeders. Also, Grass Carps feed on the weeds.
    (b) All these species together use all the food in the pond without competing with each other.
    (c) This increases the fish yield from the pond.
12. Let the mass of sodium sulphate required be x g
    The mass of solution would be = (x + 100)g

$$20 = \frac{x}{x+100} \times 100$$

    20x+2000=100x
    80x=2000

$$x = \frac{2000}{80}$$

    = 25g
    So, the mass of sodium sulphate required is 25 g.
13. Mass of glucose present in the solution = 30 g
    Mass of sugar present in the solution = 20 g
    Mass of water = 500 g
    Total mass of the solution = (30 + 20 + 500)g = 550 g
    Mass of glucose
    (a) Mass % of the glucose = $\frac{Mass\ of\ glucose}{Total\ mass\ of\ solution} \times 100$

$$\frac{30}{550} \times 100 = 5.45\%$$

    (b) Mass % of sugar = $\frac{Mass\ of\ glucose}{Total\ mass\ of\ solution} \times 100$

$$\frac{20}{550} \times 100 = 3.64\%$$

14. The acceleration due to gravity on earth and on the moon is different and for a body of mass 'm' its weight on earth = mg earth and on Moon, weight = mg moon

Now, $g_{earth} = \frac{GM\ earth}{R^2\ earth}$; $g_{moon} = \frac{GM_{moon}}{R^2_{moon}}$

Putting the values of G, M, R for earth & Moon it is found that $W_{moon} = \frac{1}{6} W_{earth}$ i.e. the weight of the object will be less on the earth than on the moon.

15. v =u + at

$0 = 150 + a \times 0.03s$

$a = \frac{-150}{0.03} = -5000 m/s^2$

the distance of penetration of the bullet into the block (s) = $ut + \frac{1}{2}at^2$

$= 150 \times 0.03 + \frac{1}{2}x - 5000 \times 0.03^2$

= 4.5 - 2.25

= 2.25 m

the magnitude of the force exerted by the wooden block on the bullet

m = 10g = 0.01kg

$F = m \times a$

$= 0.01kg \times -5000 m/s^2$

= -50N

16. V=0 (comes to rest) V= final velocity

S= 62.5m

$a = -5 m/s^2$ (retardation)

U=?

From 3rd equation of motion,

$v^2 - u^2 = 2as$

$O^2 - u^2 = 2 \times (-5) \times 62.5$

$-u^2 = 10 \times 62.5$

$u^2 = 625$

u= $\sqrt{625}$ [u=25m/s]

17. Conditions that can increase the rate of evaporation of water are:
    (a) An increase in the surface area by spreading the shirt.
    (b) An increase in the temperature by putting the shirt under the sun.
    (c) Increase in the wind speed by spreading it under the fan.
18. (i) The fine particles of top layer soil is being carried away by mean of wind or water is called soil erosion.
    (ii) Deforestation, desertification.
    (iii) Afforestation, terrace farming, shelter belts.
19. Crystallization is a process that separates a pure solid in the form of crystals from its solution.

It is used to purify solids. For e.g. salt from sea water is purified using crystallisation.
It is a better technique than simple evaporation because:-
(a) Some solid may decompose or get charred on heating to dryness during evaporation.
(b) On evaporation, some of the impurities still remain dissolved in the solution.

20. Cell organelles - organelles are the intracellular structures present in due cytoplasm various cell organelles are -
1. Mitochondrion - It produces energy
2. Endoplasmic reticular - synthesize lipids and proteins
3. Golgi apparatus - Storage, packaging and dispatch various substance.
4. Lysosomes - Digest intracellular substances
5. Ribosomes - Synthesize proteins
6. Vacuoles – Provide turgidity and store house of various organic substances

21. (a) Milk is a colloid. If a beam of light is put on a milk sample contained in a beaker the path of light beam is illuminated and becomes visible when seen from the other side. This is because the colloidal particles are big enough to scatter light falling on them. This scattered light enters our eyes and we are able to see the path of light beam.
(b) Salt solution is a true solution. If a beam of light is put on a salt solution kept in a beaker in a dark room, the path of light beam is not visible inside the solution when seen from the other side. This is because salt particles present in it are so small that they cannot scatter light rays falling on them.
(c) Detergent solution, sulphur solution.

22. Suppose two objects of masses m_1 and m_2 are lying at a distance 'r' from each other. The force of gravitation between two objects is given by

$$F = \frac{Gm_1m_2}{r^2} \qquad \text{..... (1)}$$

(i) The mass of one object is doubled, i.e., mass $m'_1 = 2m_1$

$$F_1 = \frac{G(2m_1)m_2}{r^2} = 2\frac{Gm_1m_2}{r^2} = 2F$$

The gravitational force also doubles, i.e., it becomes twice the original value.

(ii) When the distance between the objects is doubled, i.e., r' = 2r; the gravitational force,

$$F_2 = \frac{Gm_1m_2}{(2r)^2} = \frac{Gm_1m_2}{4r^2} = \frac{1}{4}F$$

The gravitational force becomes one-fourth of the original value.
When the distance between the objects is tripled, i.e., 3r; the gravitational force is given by $F_3 = \frac{Gm_1m_2}{(3r)^2} = \frac{Gm_1m_2}{9r^2} = \frac{F}{9}$

The gravitational force becomes $\frac{1}{9}$th of the original force.

(iii) The masses of both objects are doubled, mass of the object, $m'_1 = 2m_1$

Mass of second object, $m'_2 = 2m_2$

The gravitational force is given by

$$F_4 = \frac{G(2m_1)(2m_2)}{r^2} = \frac{4Gm_1m_2}{r^2} = 4F$$

The gravitational force becomes four times the original value.

23. Preventive measure for the storage of grains are
    (a) Drying - For Storage of grains, the moisture Content of grains should be reduced below 14 percent. This can be done by drying in sun followed by drying in shade.
    (b) Maintenance of hygiene - Godowns and stores should be properly cleaned. Dirt, rubbish, webs or refuse of the previously stored grains should be removed. Cracks and holes in the walls, floor or ceiling should be sealed and made water proof. New gunny bags should be used for storing food grains. After filling the gunny bag, its mouth should be tightly stitched.
    (c) Improved storage structure - For storage of grains and seeds, proper improved storage structure should be used. In such structure temperature, moisture, Oxygen and Carbon-dioxide can be manipulated as desired.
24. Let us assume, the final velocity with which ball will strike the ground be 'v' and time it takes to strike the ground be 't'
    Initial Velocity of ball u =0
    Distance or height of fall s=20 m
    Downward acceleration a=10 ms^{-2}
    As we know, $v^2 = u^2 - 2as$
    2as = $v^2 - u^2$
    $v^2 = 2as + u^2$
    = $2 \times 10 \times 20 + 0$
    v= $\sqrt{400} ms^{-1}$
    ∴ Final velocity of ball, v= 20 ms^{-1}
    t = $\frac{(v-u)}{a}$
    ∴ Time taken by the ball to strike= $\frac{20-0}{10}$
    =2 seconds

Section B

25. (b)
26. (b)
27. (b)
28. (b)
29. (a)
30. (a)
31. (c)
32. (b)

33. (b)
34. Face B with area $20 \times 10 m^2$ should be in contact with the surface with the surface because frictional force acting on body depends on area of contact. More the area of contact, more in the frictional force. Hence, less force is applied when area is least.
35. Clear and transparent solutions are (b) and (e).
36. The two precautions are:
    (i) Ice should be crushed and very minute sized.
    (ii) Thermometer should not touch the bottom or wall of container.