CBSE SAMPLE PAPER – 01
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. Name the process which occurs when a drop of Dettol is added to water.
2. Where is apical meristem found?
3. Which law of motion gives the measure of force?
4. Give reasons why the smell of hot sizzling food reaches you several meters away, but to get the smell from cold food you have to go close.
5. Why the cell is called the structural and functional unit of life?
6. Gravitational force acts on all objects in proportion to their masses. Why then, a heavy object does not fall faster than alight object?
7. What are the characteristics of the particles of matter?
8. What is the utility of tissues in multi-cellular organisms?
9. What are the functions of areolar tissue?
10. Differentiate between mass and weight?
11. How do biotic and abiotic factors affect crop production?
12. A solution contains 60g of NaCl in 400g of water. Calculate the concentration in term of mass by mass percentage of the solution.
13. Write a method to separate a mixture of salt and ammonium chloride?
14. The radius of earth is 6370Km and of mars is 3400 Km. If an object weighs 200N or earth, what will be its weight on mars. The mass of mars is 0.11 that of earth.

15. A 8000 kg engine pulls a train of 5 wagons, each of 2000 kg, along a horizontal track. If the engine exerts a force of 40000 N and the track offers a friction force of 5000 N, then calculate:
    (a) the net accelerating force;
    (b) the acceleration of the train; and
    (c) the force of wagon 1 on wagon 2.
16. Derive the second equation of motion $S = ut + \frac{1}{2}at^2$ graphically?
17. A solution of H_2SO_4 is labeled 40%. The density of the solution is 1.3gm/l. what is the concentration of the solution in % (m/v)?
18. Ravi Prasad, a farmer has 25 acres of land. He noticed some infection on the leaves of his crops. He called his friend Raghav, who advised him to use DDT. However, Ravi preferred to use dry powder of neem leaves as an insecticide.
    Answer the following questions based on the above information:
    (a) Why did Ravi Prasad prefer using neem powder?
    (b) In your opinion, did he take the right decision?
    (c) Write the values associated with decision taken by Ravi Prasad.
19. What is distillation and fractional distillation? What is the basic property that separates the two methods?
20. Draw a labelled diagram of mitochondria. Write the functions mitochondria.
21. Show diagrammatically how water is purified in the waterworks system and list the processes involved.
22. Derive expression for force of attraction between two bodies and then define gravitational constant.
23. Why is crop variety improvement important in cultivation? Describe the important factors for which variety improvement is done.
24. The driver of train A travelling at a speed of 54 kmh^{-1} applies brakes and retards the train uniformly. The train stops in 5 seconds. Another train B is travelling on the parallel with a speed of 36 kmh^{-1}. Its driver applies the brakes and the train retards uniformly; train B stops in 10seconds.
    Plot speed-time graphs for both the trains on the same axis. Which of the trains travelled farther after the brakes were applied?

Section B

25. If the humidity in the air increase then the rate of evaporation:-

    (a) decrease (b) increase

    (c) remain same (d) both (b) and (a) depending upon the temperature

26. Which of the following solution scatter light?

    (a) colloidal solution (b) suspension

    (c) both (a) and (b) (d) none of these

27. A cell in placed in hypotonic solution will:

    (a) Swell up (b) Not undergo any change (c) Shrink (d) Show plasmolysis

28. A person met with an accident in which two long bones of hand were dislocated. Which among the following may be possible reason?

    (a) tendon break

    (b) break of skeletal muscles

    (c) ligament break

    (d) Areolar tissue break

29. Which of the following statements is correct?

    (a) both speed and velocity are same

    (b) speed is a scalar and velocity is a vector

    (c) speed is a vector and velocity is scalar

    (d) none of these

30. A batsman hits a cricket ball which then rolls on a level ground. After covering a short distance, the ball comes to rest. The ball slows to a stop because

    (a) the batsman did not hit the ball hard enough.

    (b) velocity is proportional to the force exerted on the ball.

    (c) there is a force on the ball opposing the motion.

    (d) there is no unbalanced force on the ball, so the ball would want to come to rest.

31. Which macronutrient is required in largest quantity by plant?

    (a) Nitrogen (b) Molybdenum

    (c) Potassium (d) Copper

32. 'Blue Revolution' refers to increase in –

    (a) Milk Production (b) Egg Production

    (c) Grain Production (d) Fish production

33. Which of the following statements is correct?

(a) speed distance are scalar, velocity and displacement are vector

(b) speed distance are vector, velocity and displacement are vector

(c) speed and velocity are scalar, distance and velocity are vector

(d) speed and velocity are vector, distance and displacement are scalar

34. Suppose a ball of mass 'm' is thrown vertically upwards with an initial speed 'v', its speed decreases continuously till it becomes zero. Therefore, the ball begins to fall downward and attains the speed 'v' again before striking the ground. It implies that the magnitude of initial and final momenta of the ball are same. Yet, it is not an example of conservation of momentum. Explain Why.

35. Tissue A and tissue B constitute tissue C. A carries water while B carries food for the plants. Identify A, B, C.

36. You are given two samples of water labelled as 'A' and 'B Sample 'A' boils at $100°C$ and sample 'B' boils at $102°C$. Which sample of water will not freeze at $0°C$? Comment.

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Answers

Section A

1. When dettol is added to water, diffusion takes place.
2. The apical meristem is found at the apex (growing tips) of the stem and roots.
3. Newton's second law of motion.
4. Since hot sizzling food has temperature higher than cold food and at higher temperature diffusion rate (movement) of particles is very fast due to this the smell of hot sizzling reaches us from several meters away.
5. All living organisms are made up of cells so cell is the basic building unit of a living organism and all the activities performed by a living organism are sum total of activities performed by its cells hence cell is called the structural and functional unit of life.
6. In free fall of objects the acceleration in velocity due to gravity is independent of mass of those objects hence a heavy object does not fall faster than alight object.
7. The characteristics of particles of matter are as follows:
   (i) particles of matter have gap between them.
   (ii) particles of matter are in continuous motion
   (iii) particles of matter have an attraction force between them to keep them together.
   (iv) Matter is composed of very small particles like atoms or molecules.
8. There is a clear cut division of labour in multicellular organisms i.e. different parts of the body of a multicellular organism perform specific functions. For example brain controls all other parts of body, heart pumps blood to all parts of body, kidneys remove waste materials from body, sense organs collect information from external sources for sensory perception etc. All these functions would never be possible without formation of tissues in multicellular organisms.
9. Areolar tissue is a kind of filler tissue found between skin and muscles, around our blood vessels and nerve cells and also in the bone marrow. Its functions are therefore
   (i) To fill the space inside organs.
   (ii) To help in repair and maintenance of nearby tissues/organs.
   (iii) To support and prevent injuries to internal organs.
10.

Mass	Weight
It is the matter contained by a body	It is force which the body exerts on the earth.
It remains the same	It changes from place to place.
It is always positive.	It can be positive and zero.
It is a scalar quantity	It is a vector quantity

11. The biotic factors include living organisms like honey bees and earthworms who help in better crop production while pests(insects and rodents) and microbes that produce bad effect on crop production.
    The abiotic factors are the climatic conditions and non living natural resources like soil, water and air. They also affect crop production since favourable conditions of temperature, humidity and mineral nutrition improve crop production.
12. Mass of solute (NaCl) = 60g
    Mass of solvent (water) = 400g
    Mass of solution = Mass of solute + Mass of solvent
    = 60 + 400 = 460g
    Mass percentage of solution = $\frac{Mass\ of\ solute}{Mass\ of\ solution} \times 100$
    = $\frac{60}{460} \times 100 = \frac{300}{23} = 13.4\%$
13. A mixture of salt and ammonium chloride can be separated by the process of sublimation.
    Since ammonium chloride changes directly from solid into gaseous state on heating and salt does not so this principle is used to the mixture of two.
    (1) The mixture of NH_4Cl (ammonium chloride) and salt is taken in a china dish inside an inverted funnel.
    (2) The mixture is heated and because NH_4Cl sublimates thus changes into vapours directly.
    (3) Salt which is non-sublimable substance settles into the inverted funnel.
    Separation of NH_4Cl salt by sublimation
14. Let m = Mass of the body
    Me = Mass of earth
    Mm = Mass of Mars
    re = Radius of earth
    r_m = Radius of Mars
    G = Universal gravitational constant
    Weight of body on earth = Fe = $\frac{GMem}{(r_e)^2}$

Weight of body on Mars = Fm = $\frac{GMmm}{(r_e)^2}$

Divide one equal by another

$$\frac{Fm}{Fe} = \frac{GMmm \times (r_e)^2}{(r_m)^2 \times GMem}$$

$$\frac{Fm}{Fe} = \frac{Mm(r_e)^2}{Me(r_m)^2}$$

As, M, = 0.11 Me

Fe = 200N

r_e = 6370Km

r_m = 3400Km

$$\frac{Fm}{200} = \frac{0.11Me \times \left(6.37 \times 10^6\right)^2}{Me \times \left(3.4 \times 10^6\right)^2}$$

$$Fm = \frac{0.11 \times \left(6.37 \times 10^6\right)^2 \times 200}{\left(3.4 \times 10^6\right)^2}$$

Fm = 77.22N

Weight of the body on Mars = 77.22N

15. (a) The net accelerating force = Force exerted by engine - frictional force of track

= 40000 — 5000 = 35000 N

(b) the acceleration of the train = $a = \frac{F}{m}$

$= \frac{35000}{5 \times 2000}$

$= \frac{35000}{10000} = 3.5 m/s^2$

(c) the force of wagon 1 on wagon 2

Wagon 1 will have to exert force on all 4 wagons next to it

so mass of other 4 wagons = 2000x4 = 8000kg

F = ma = $8000kg \times 3.5 m/s^2$

= 28000N

16. let at time T=0 body moves with initial velocity u and at time 't' body has final velocity 'v' and un time 't' it covers a distance's.

AC=v, AB=u, OA= t, DB=OA=t, BC=AC-AB =V-u

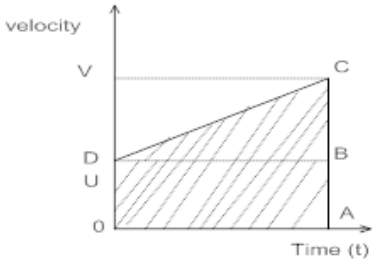
Area under a v-t curve gives displacement so,

S= Area of ΔDBC + Area of rectangle OABD …….. (i)

Area of $\Delta DBC = \frac{1}{2} \times Base \times height$

$= \frac{1}{2} \times DB \times BC$

$= \frac{1}{2} \times t \times (v - u)$ ..... (ii)



Area of rectangle OABD = length×Breadth

= OA ×BA

= t×u ..... (iii)

S = $ut + \frac{1}{2} \times t \times (v - u)$

S = $ut + \frac{1}{2} t \times at$ ($\therefore$ use V-u=at)

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

17. Concentration of the solution is 40%

This means that

100gm of the solution contains 40g of H_2So_4

Density = $\frac{mass}{volume}$

$1.3gm/l = \frac{100g}{volume}$

Volume of the solution = $\frac{100}{1.3}$

$= \frac{100}{1.3} ml$

$\frac{100}{1.3} ml$ of solution contains 40 g of H_2So_4

$\therefore$ 100ml of the solution will contain

$\frac{100 \times 40 \times 1.3}{100} g\ H_2So_4$

$= 52g\ H_2So_4$

The concentration is 52%(m/v)

18. (a) Neem Powder is a natural disinfectant whereas DDT is a chemical disinfectant and has harmful effects when it enter the body of any living being.

(b) Yes, because neem leaves are not harmful in any way.

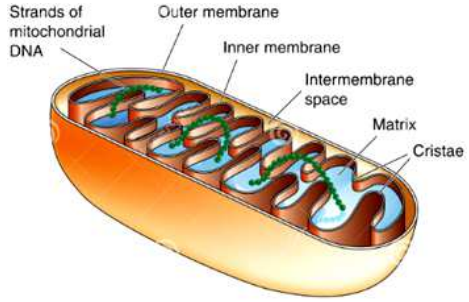
(c) Environmental concern and empathy.

19. Distillation is used for the separation of components of a mixture containing two miscible liquid that boil without decomposition and have sufficient difference in their boiling points.

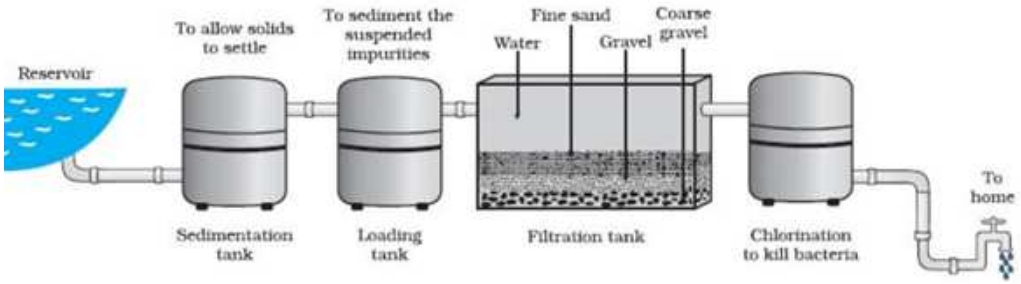
Fractional distillation is used for the separation of components of a mixture containing more than two miscible liquids for which the difference in their boiling points is less than 25k.

The property that separates the two processes is difference in the boiling points of the components of the mixture i.e. if difference in boiling points is large then we use distillation but if difference in boiling points is less, we use fractional distillation.

20. The mitochondria are the main sites for cellular respiration, the process in which the cell converts sugars and oxygen into ATP. ATP is used by various bodies as a source of energy to perform functions.



21.



Sedimentation, Loading, Filtration and Chlorination.

22. "Everybody in the universe attracts every other body with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between them."

Let us consider two bodies A and B of masses m_1 and $m_2$which are separated by a distance r. Then the force of gravitation (F) acting on the two bodies is given by

$F \propto m_1 \times m_2$ ... (1)

and $F \propto \frac{1}{r^2}$ ... (2)

Combining (1) and (2), we get

$F \propto \frac{m_1 \times m_2}{r^2}$

or $F = G \times \frac{m_1 m_2}{r^2}$ ... (3)

where G is a constant known as universal gravitational constant.

Here, if the masses m_1 and $m_2$ofthe two bodies are of 1kg and the distance(r) between them is 1 m, then putting m_1 = 1 kg, m_2 = 1 kg and r = 1 m in the above formula, we get

G = F

Thus, the gravitational constant G is numerically equal to the force of gravitation which exists between two bodies of unit masses kept at a unit distance from each other.

23. As we know, weather conditions, soil quality and availability of water are the main factors on which crop yield depends. As weather conditions like drought and flood situation are unpredictable, it is important to have varieties that can grow in adverse climatic conditions. In the same way, varieties that are tolerant to high soil salinity have also been developed. Some of the factors for which crop variety improvement is done are as follows:
    (a) **High Yield:** To increase the productivity of the crop per acre.
    (b) **Improve Quality:** Quality considerations of crop products vary from crop to crop. For instance, baking quality is important in wheat, protein quality in pulses; oil quality in oilseeds and preserving quality in fruits and vegetables.
    (c) **Biotic and Abiotic Resistance:** Crop production can fall due to biotic and abiotic stresses under different situations. Thus, varieties resistant to these stresses can improve crop production.
    (d) **Change in Maturity Duration:** The shorter the duration of the crop from sowing to harvesting, more economical is the variety. It reduces the cost of crop production and allows the farmers to grow multiple crops in a year.
    (e) **Wider Adaptability:** Developing varieties for wider adaptability helps in stabilising the crop production under different environmental conditions. Also, one variety can then be grown under different climatic conditions in different areas.
    (f) **Desirable Agronomic Characteristics:** Height and profuse branching are desirable characteristics for fodder crops. Dwarfness is desired in cereals such that fewer nutrients are consumed by these crops. Thus, developing varieties of desired agronomic characters also help in higher yield.

24. For train A, the initial velocity,

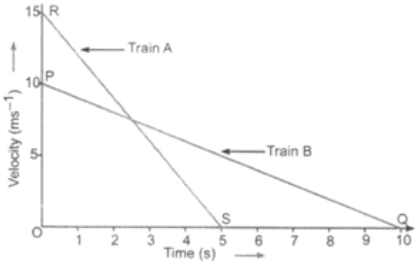
    u = 54 kmh^{-1} $= 54 \times \frac{5}{18} = 15 ms^{-1}$

    Final velocity, $v = 0$ and time, t = 5s

    For train B, u = 36 $kmh^{-1} = 36 \times \frac{5}{18} = 10 ms^{-1}$

    $v = 0$; t = 10 s

    Speed-time graph for train A and B are shown in the figure.



    Distance travelled by train A

    = Area under straight line graph RS

    = Area of ΔORS

$= \frac{1}{2} \times OR \times OS = \frac{1}{2} \times 15\ ms^{-1} \times 5s = 37.5\ m$

Distance travelled by train B = Area under PQ= Area of ΔOPQ

$= \frac{1}{2} \times OP \times OQ = \frac{1}{2} \times 10\ ms^{-1} \times 10s = 50\ m$

Thus, train B travelled farther after the brakes were applied.

Section -B

25. (a)
26. (c)
27. (a)
28. (c)
29. (b)
30. (c)
31. (a)
32. (d)
33. (a)
34. Law of conservation of momentum is applicable to isolated system (no external force is applied). In this case, the change in velocity is due to the gravitational force of earth.
35. A. Xylem
    B. Phloem
    C. Vascular bundles
36. Sample 'B' will not freeze at $0°C$ because it is not pure water. At 1 atm, the boiling point of pure water is $100°C$ and the freezing point of pure water is $0°C$.