CBSE Class 09
Science
Sample Paper 1 (2019-20)

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

i. The question paper comprises three sections - A, B and C. Attempt all the sections.

ii. All questions are compulsory. Internal choice is given in each section.

iii. 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.

iv. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.

v. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.

vi. This question paper consists of a total of 30 questions.

Section A

1. What are canal rays?

2. What is Dalton?

3. **Irrigation**

   The process of supplying water to crop plants through human efforts by means of canal, wells, reservoirs, tube-wells etc., is known as irrigation. Most agriculture in India is dependent on timely monsoons and sufficient rainfall spread through most of the growing season. However, the extra water required by crops is met through irrigation.

   Sources of Irrigation

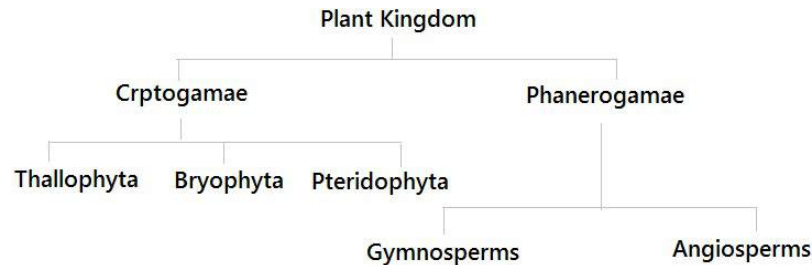   Some most commonly used sources of irrigation are the following:

i. **Wells: T**hese are of two types:

Dug wells where water is collected from water-bearing strata through bullock-operated devices or by pumps.

Tube wells where water is collected from underground through diesel or electricity run pumps.

ii. **Canal system:** Water from the main river or reservoir is carried by a canal into the field which is divided into branch canals having further distributed to irrigate fields.

iii. **River lift system:** In this system, water is directly drawn from the river for supplementing irrigation. It is used where the insufficient flow from canals occur.

iv. **Rainwater harvesting:** Rainwater is collected and recycled into the ground by digging canals.

v. **Watershed management:** Small check dams are built up in watershed areas to increase percolation of water into the ground, reduce the flow of rainwater to prevent soil erosion.
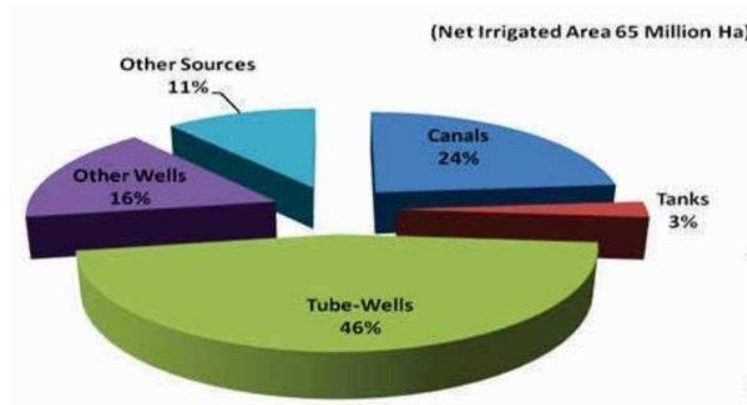
Based on the pic chart answer the following questions;

i. Which is the most common source of irrigation?

ii. Mention the various sources of irrigation.

iii. Which is the least use source of irrigation?

iv. What are the other sources of irrigation?

4. Kingdom Plantae includes green, brown and red algae, liverworts, mosses, ferns and seed plants with or without flowers. They have the following characteristics:

   ○ They are a multicellular organism with walled and frequently vacuolate eukaryotic cells.

- These contain photosynthetic pigment in plastids. The principle mode of nutrition is photosynthesis.
- They are primarily non-motile and live anchored to a substrate.
- Reproduction is primarily asexual or sexual. The reproductive organs are multicellular.

Plant Kingdom
- Crptogamae
  - Thallophyta
  - Bryophyta
  - Pteridophyta
- Phanerogamae
  - Gymnosperms
  - Angiosperms

Answer the following questions:

  i. Name the organisms which are included in kingdoms Plantae.

  ii. Mention the mode of nutrition found in them.

  iii. Are they unicellular or multicellular?

  iv. Which division is the most primitive and advanced based on the given flowchart?

5. A force of 5N gives a mass m1 an acceleration of 10ms-2 and mass m2 an acceleration of 20ms^{-2}. What acceleration would if give it both the masses were tied together?

  a. 7.65ms^{-2}

  b. 7.00ms^{-2}

  c. none of these

  d. 6.67ms^{-2}

OR

Action reaction forces act

  a. on the same body

  b. on different bodies

  c. in the same direction

  d. along different bodies

6. A solid iron cuboid is kept on a table top. The mass of cuboid is 6 kg and its

dimensions are 30 cm × 15 cm× 10 cm. Force and pressure exerted by the cuboid on table top if it made to lie on the table top with its side dimensions 30m × 15 cm are

 a. 1306.66 N, 58.8 N

 b. 58.8 N, 1306.66 N

 c. 58.8 N, 1960 N

 d. 58.8 N, 3900 N

7. What is the work done to be done to increase the velocity of a car from 30km h^{-1} to 60 kmh^{-1} if the mass of the car is 1500kg?

 a. 16535J

 b. 155874 J

 c. 15637J

 d. 16537J

8. A slinky, 5 m long, is tied to the hook in a wall and its other end is held tightly. It is then pulled as shown, and released suddenly.

Direction of pull
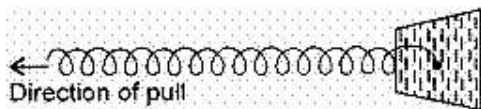
The disturbance created on the slinky are :

 a. Longitudinal waves

 b. Transverse pulse

 c. Transverse waves

 d. Longitudinal pulse

OR

Explain the universal law of gravitation.

9. The Principal cereal crop of India is

a. Maize

b. Rice

c. Sorghum

d. Wheat

10. The aqueous mixture of salt and sand can be separated by the following method

a. Sublimation

b. Condensation

c. Melting

d. Filtration

11. Which of the following statement is incorrect?
A. Infectious diseases are caused by micro-organisms.
B. Antibiotics work against viral infections.
C. Vaccines develop immunity in children.
D. Female anopheles is a causal organism of malaria.

a. B and D

b. A, B and D

c. All of these

d. A and C

12. Chlorine occurs in nature in two isotopic forms, with masses 35 u and 37 u in the ratio of 3:1. Then what is the average atomic mass of chlorine?
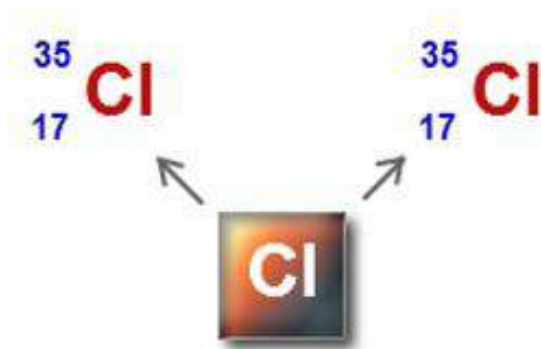
a. 35.5

b. 17

c. 34

d. 35

OR

Which of the following is not a chemical change?
(A) Changing of milk into curd
(B) Freezing of water
(C) Burning of paper
(D) Mixing of iron filling & sand

a. (B) and (D) are correct

b. All of these

c. (A) and (B) are correct

d. (A), (B) and (C) are correct

13. **Assertion:** Solids have fixed shape but rubber band being solid can change its shape.

Reason: When force is applied, then the rubber band changes its shape and regain its shape.

a. Both assertion(A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

c. Assertion (A) is true but reason (R) is false.

d. Assertion (A) is false but reason (R) is true.

14. **Assertion:** Weight of an object is the force with which a body attracted towards the earth.

    Reason: Its direction is vertically upwards.

    a. Both assertion(A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

    b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

    c. Assertion (A) is true but reason (R) is false.

    d. Assertion (A) is false but reason (R) is true.

15. i. What is mariculture?
     ii. Why fish culture is done with a combination of rice?
    iii. Manures contain large quantities of organic matter and small quantities of nutrients. Justify the statement.

16. What is the mass of:

    (a) 1 mole of nitrogen atoms?

    (b) 4 moles of aluminium atoms (Atomic mass of aluminium= 27)?

    (c) 10 moles of sodium sulphite (Na_2SO_3)?

    OR

    Draw a sketch of Bohr's model of an atom with three shells.

17. A mass of 10 kg is at a point A on a 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.

18. A news item, telling about mysterious disease affecting people of nearby village, inspired Rahul to find out the cause behind it. On investigation, he discovered that the only source of water for the village is a small river on whose banks three paper factories are situated. Rahul along with villagers made efforts and got those factories closed.

    i. What values are promoted by Rahul?
   ii. What role should the government play in protecting the environment?
  iii. Do you identify with the cause Rahul fought for?

<div align="center">OR</div>

    i. How do forests play an important role in maintaining the water cycle?
   ii. State the role of symbiotic bacteria in the nitrogen cycle of nature.
  iii. Name two organisms, which play a vital role in nitrogen-fixation.

19. What is the role of ribosomes and Golgi body?

20. Draw a labelled diagram of the neuron.

21. Which of the component in a solution will act as solute and which as solvent when both are in the same physical states?

22. What happens to the magnitude of the force of gravitation between two objects, if

    i. distance between the objects is tripled?
   ii. mass of both objects is doubled?
  iii. mass of both objects as well as the distance between them is doubled?

23. The following is the distance-time table of an object in motion:

Time (in second)	Distance (in metre)
0	0
1	1

2	8
3	27
4	64
5	125
6	216
7	343

    i. What conclusion can you draw about the acceleration? Is it constant, increasing, decreasing or zero?

    ii. What do you infer about the force acting on the object?

24. Two boys A and B weighing 60 kg and 40 kg respectively, climb on a staircase each carrying a load of 20 kg on their head. The staircase has 10 steps, each of height 50 cm. If A takes 20 s to climb and B takes 10 s to climb, then

    i. who possesses greater power?

    ii. find the ratio of their powers.

OR

Na^+ has completely filled K and L shells. Explain.

25. Which separation techniques will you apply for the separation of the following?

    i. Sodium chloride from its solution in water.

    ii. Ammonium chloride from a mixture containing sodium chloride and ammonium chloride.

    iii. Small pieces of metal in the engine oil of a car.

    iv. Different pigments from an extract of flower petals.

    v. Butter from curd.

    vi. Oil from water.

    vii. Tea leaves from tea.

    viii. Iron pins from sand.

    ix. Wheat grains from husk.

    x. Fine mud particles suspended in water.

OR

Classify each of the following as a physical or a chemical change. Give reasons.

i. Drying of a shirt in the sun.
ii. Rising of hot air over a radiator.
iii. Burning of kerosene in a lantern.
iv. Change in the colour of black tea on adding lemon juice to it.
v. Churning of milk cream to get butter.

26. A driver of a car travelling at 52 km h^{-1} applies the brakes and accelerates uniformly in the opposite direction. The car stops in 5s. Another driver going at 3 km h^{-1} in another car applies his brakes slowly and stops in 10s. On the same graph paper, plot the speed versus time graphs for the two cars. Which of the two cars travelled further after the brakes were applied?

27. Differentiate between various types of muscular tissues. Draw appropriate diagrams.

28. Mr. Iyer had cold and throat infection. Doctor prescribed an antibiotic.

i. Which pathogen could have caused the infection?
ii. What is the mode of action of antibiotics? Mr. Iyer recovered from cold but he still had throat infection. Would the doctor continue the antibiotic further? State yes or no giving reason.

OR

Give one example of each of the following:

i. A reptile with a four-chambered heart.
ii. An egg-laying mammal.
iii. A fish with a skeleton made entirely of cartilage.
iv. Some fungal species live in a permanent mutually dependent relationship with blue-green algae (cyanobacteria).
v. Amphibian of the plant kingdom.

29. A stone is dropped from the edge of a roof.

i. How long does it take to fall 4.9 m?

ii. How fast does it move at the end of that fall?

iii. How fast does it move at the end of 7.9 m?

iv. What is its acceleration after 1s and after 2 s?

30. A number of electrons, protons, and neutrons in chemical species A, B, C, and D are given below.

Chemical species	Electrons	Protons	Neutrons
A	2	3	4
B	10	9	8
C	8	8	8
D	8	8	10

Now answer the following questions.

i. What is the mass number of A and B?

ii. What is the atomic number of B?

iii. Which two chemical species represent a pair of isotopes and why?

iv. What is the valency of element C? Also, justify your answers.

OR

Write the chemical formulae of the following by showing their symbol and valency.

(a) Magnesium chloride

(b) Calcium oxide

(c) Copper(II) nitrate

(d) Aluminium chloride

(e) Calcium carbonate.

Solution

Section A

1. Canal rays also called anode rays, are seen moving from the anode towards the cathode in the specially designed discharge tube. However, they do not originate from the anode. They were discovered by Goldstein in 1886.

2. One u (unified mass) is also known as one Dalton.

   One atomic mass unit or unified mass (u) =$1.66 \times 10^{-27} kg$.

3. i. The most common source of the irrigation is tube wells.
   ii. The various sources of irrigation are canals, tanks, tube wells, other wells and other sources like rainwater harvesting.
   iii. The least source of irrigation tanks.
   iv. The other sources include rainwater harvesting and watershed management.

4. i. Green, brown, red algae, liverworts and mosses, ferns and seed plants with or without flowers.
   ii. Photosynthetic(autotrophic).
   iii. Multicellular.
   iv. Primitive-Thallophyta and advanced-Angiosperm

5. (d) 6.67ms^{-2} **Explanation:**
   $M_1 = 5N/10 \, ms^{-2} = 0.5 \, kg, \; m_2 = 5 \, N/ \, 20 \, ms^{-2} = 0.25 \, kg.$
   Total mass = 0.5 + 0.25 = 0.75 kg.
   Acceleration produced when both masses are tied together = 5 N/ 0.75 kg
   =$6.67 \, ms^{-2}$.

   OR

   (b) on different bodies
   Explanation: Reaction from a body is caused due to action of some another body on it.

6. (b) 58.8 N, 1306.66 N

Explanation: Thrust = Force× Weight of cuboid = 6 × 9.8 = 58.8N

and pressure exerted = $\dfrac{Thrust}{Base\ area} = \dfrac{58.8}{0.30 \times 0.15} = \dfrac{58.8}{0.045} = 1306.66N$

7. (b) 155874 J

   Explanation: Initial velocity (u) = 30 km/h = $30 \times \dfrac{5}{18} = \dfrac{25}{3}$ m/s.

   final velocity (v) = 60 = $\dfrac{50}{3}$ m/s.
   mass = 1500 kg.

   Work done = change in kinetic energy = $\dfrac{1}{2} \times m(v^2 - u^2) = \dfrac{1}{2} \times 1500\ [(16.67)^2 - (8.37)^2]$ =
   750 × (277.8889– 70.0569) = 155874 j .

8. (a) Longitudinal waves

   Explanation: The wave formed because of the oscillation; parallel to the disturbance; is called longitudinal wave. Longitudinal wave are formed compressions and rarefactions.

   OR

   Everybody in this 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 distance between their centres.

   $F_1 = F_2 = G\dfrac{m_1 \times m_2}{r^2}$
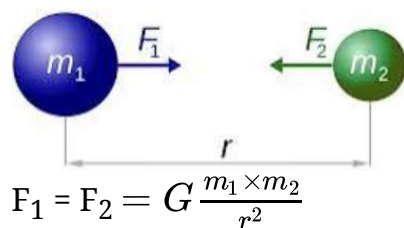
9. (b) Rice

   Explanation: Rice is the principal cereal crop of India. It is grown in most of the part of India and used by most of the people as staple food.

10. (d) Filtration

    Explanation: Filter the solution to get sand separated. Now the filterate, on evaporation will give salt back.

11. (a) B and D

    Explanation: B and D are incorrect. Antibiotics are the chemicals that kill or stop the growth of certain kinds of microbes like the bacteria. Antibiotics do not work against

viral infections because viruses have very few biochemical mechanisms of their own. Viruses enter host cells and use the machinery of the host cell for their life processes. The causal organism of malaria is plasmodium. Female anopheles is a vector of malaria. Animals that carry infecting agents from a sick person to another potential host are called vectors.

12. (a) 35.5

Explanation: Average atomic mass of chlorine = $(35 \times 75/100) + (37 \times 25/100)$

= 105/4 + 37/4

= 142/4

= 35.5 u

The average atomic mass of chlorine is equal to 35.5 u.

OR

(a) (B) and (D) are correct

Explanation: Because in both the cases no new substance with new chemical properties is formed.

13. (a) Both assertion(A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Explanation: The rubber band can not change its shape by itself. When force is applied it changes its shape (due to elasticity) and regain its shape when force is removed.

14. (c) Assertion (A) is true but reason (R) is false.

Explanation: Weight of an object is the force with which a body is attracted towards the earth. Its direction is vertically downwards.

15. i. Cultivation of marine fishes like mullets, peral spots, etc., in coastal waters of India on a commercial scale is known as mariculture.

   ii. Fish culture is done with a combination of rice so that fishes get ample food in the paddy field and the latter can get water.

   iii. Manures are bulky source of organic matter which supply nutrients in small quantities to crops. They do not help in draining out of excess water from clayey soil.

16. (a) Atomic mass of nitrogen is 14 u.

therefore 1 mol of N = 14 g

(b) Atomic mass of aluminium = 27 u
therefore 1 mol of Al = 27 g

so 4 mol of Al = 27×4 = 108 g

(c)molecular mass of Na_2SO_3 = $23 \times 2 + 32 + 16 \times 3$= 46 + 32 + 48 = 126 u
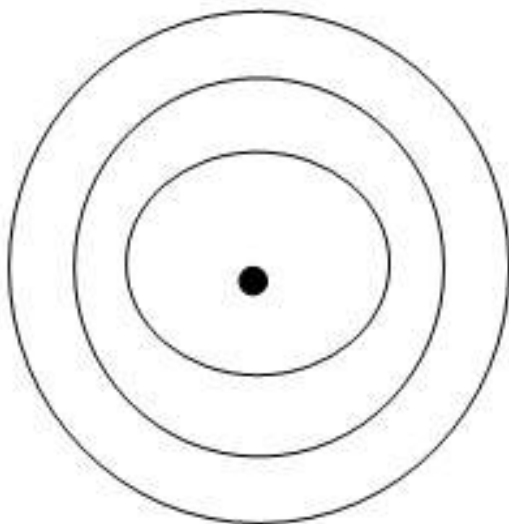therefore 1 mol of Na_2SO_3 has weight/mass 126 g.
hence, 10 mol of Na_2SO_3 = 10×126 1260g

OR

Bohr's model of an atom with three shells:
The three stationary orbits are designated as K-shell (nearest to the nucleus), M-shell and N-shell.
The atom with three shells can accommodate a maximum of 2, 8 and 18 electrons respectively.

17. No work is done, Since work done on the object by gravitational force depends upon change in the vertical height of the object. Vertical height of the object is not changing as the joining A and B is horizontal at the same height hence the work done is zero.

18. i. Environmental concern, responsibility towards humanity.
   ii. a. Government should make laws limiting the pollutants amount.

b. It should take immediate actions to ban the factories which do not comply the rules of discharging wastes in water bodies.

iii. Yes I identify with the cause of Rahul's fight. He fought to prevent the spread of disease-causing organisms like the bacteria which cause cholera.

OR

i. HForests play an important role in the hydrological cycle by directly affecting the rate of transpiration and by influencing how water is routed and stored in a watershed and water table.

ii. Plants are unable to take atmospheric nitrogen directly. Symbiotic bacteria convert the atmospheric nitrogen into water-soluble nitrates, which are easily utilised by plants.

iii. The organisms, which play vital roles in nitrogen-fixation are:
   a. Rhizobium and blue-green algae help in fixation of free atmospheric nitrogen.
   b. Nitrosomonas and Nitrobacter are nitrifying bacteria that convert ammonia to nitrite and then to nitrates.

19. Ribosomes synthesize proteins. Golgi body helps in storage, packaging and dispatch of various substance inside and outside the cell.

20.

Part of neurin.
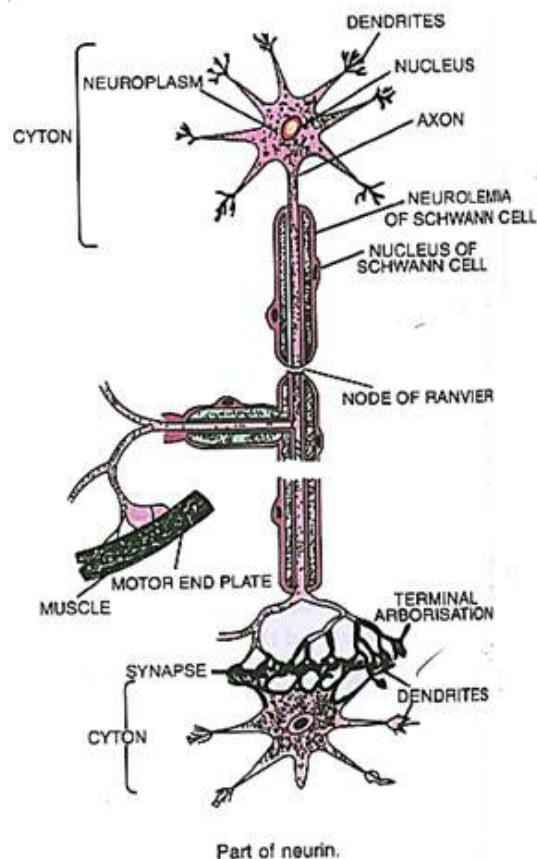
21. The component which is present in larger amount will be the solvent and the other which is present in lesser quantity will be the solute.

22. As we know,

$F = \frac{Gm_1 m_2}{r^2}$ [symbols have their usual meanings]

 i. $r' = 3r \Rightarrow F' = \frac{Gm_1 m_2}{9r^2} = \frac{F}{9}$ [force decreases by 9 times]

 ii. $m_1' = 2m_1$ and $m_2' = 2m_2 \Rightarrow \quad F' = \frac{4Gm_1 m_2}{r^2} = 4F$ [force increases by 4 times]

 iii. $m_1' = 2m_1$ and $m_2' = 2m_2$ r' $\Rightarrow F' = \frac{4Gm_1 m_2}{4r^2} = F$ [force remains unchanged]

23.   i. Here, initial velocity, u = 0

   Using Newton's second law of motion, s = ut + $\frac{1}{2}at^2 = \frac{1}{2}at^2$ [∵ u = 0]

   We get, $a = \frac{2s}{t^2}$

Time (in second)	Distance (in metre)	a = 2 s/t^2
0	0	0
1	1	2

2	8	4
3	27	6
4	64	8
5	125	10
6	216	12
7	343	14

Thus, acceleration is increasing.

ii. Since acceleration is increasing, so the net unbalanced force is acting on the object.

24. Given, mass of A (m_A) = 60 kg

mass of B (m_B) = 40 kg

mass of luggage (m_L) = 20 kg

Height of staircase (h) = 0.5 × 10 = 5 m

So, work done by boy A to climb staircase = mgh = (60 + 20) × 9.8 × 5 = 3920 J

So, power of A = $\frac{work}{time} = \frac{3920}{20} = 196\ W$

Similarly, power of Bf = $\frac{work}{time} = \frac{mgh}{t}$

$\frac{[(40+20)\times 9.8\times 5]}{10} = \frac{2940}{10} = 294\ W$

i. B possesses greater power than A.

ii. So, the ratio is given by $\frac{power\ of\ A}{power\ of\ B} = \frac{196}{294}$ = 2:3

So, power, P = $\frac{W}{t} = \frac{3000}{3}$ = 1000 W

OR

Atomic number (Z) of Na is 11; so its electronic configuration is 2, 8, 1 (2 + 8 + 1 = 11). When Na gives away the single electron from its outermost shell, it acquires a net positive charge and changes to Na^+ ion with electronic configuration 2, 8.

The maximum number of electrons in the first orbit or K-shell can be 2 ($2n^2$; n = 1) and the maximum number of electrons in the second orbit or L-shell can be 8 ($2n^2$; n = 2). The above configuration (2, 8) in Na^+ indicates completely filled K and L shells. K shell is completely filled with 2 electrons and the L shell is completely filled with

8 electrons.

25. i.   Evaporation and crystallization
    ii.   Sublimation
    iii. Filteration
    iv.   Chromatography
    v.   Centrifugation
    vi.   By using separating funnel
    vii. Filteration
    viii. Magnetic separation
    ix.   Winnowing
    x.   Loading and decantation

<div align="center">

OR

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  i.   It is a physical change because moisture in the shirt is converted from its liquid state to gaseous state because of the heat of the Sun.
  ii. It is a physical change because water in the radiator is converted from a liquid state to gaseous state.
  iii. It is a chemical change because combustion of kerosene occurs and new products are formed.
  iv. It is a chemical change because there is a reaction between citric acid present in lemon and the compounds of the tea resulting in the formation of new products.
  v.   It is a physical change because the cream suspended in milk is separated by churning (centrifugation).

26. The speed-time graph for both cars is shown below.
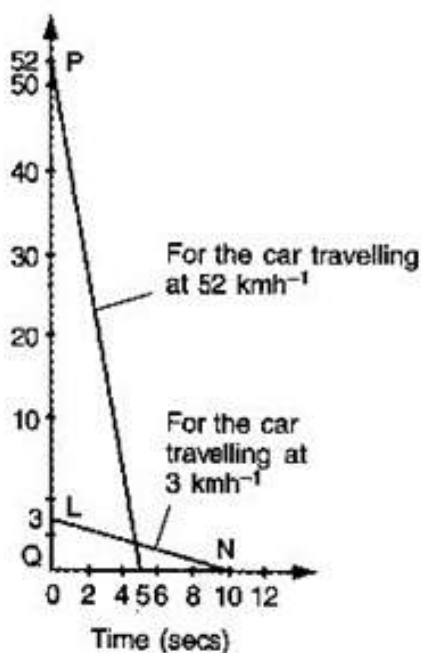
i. Distance covered by car moving at 52 kmh⁻¹

Or $52 \times \frac{5}{18}$ = 14.4 ms⁻¹

= area of ΔPQR = $\frac{1}{2}$ × PQ × QR = $\frac{1}{2}$ × 14.4 × 5 = 36 m

ii. Distance covered by car moving at 3 kmh⁻¹

or $3 \times \frac{5}{18}$ = 0.83 ms⁻¹

= area of ΔLNQ = $\frac{1}{2}$ × LQ × QN = $\frac{1}{2}$ × 0.83 × 10 = 4.15 m

The car moving at 52 kmh⁻¹ travels more distance on the application of brakes.

27.

Types	Striated Muscles	Unstriated Muscles	Cardiac Muscles
Structure	These are made up of long, cylindrical, unbranched and multinucleate cells. These show alternate light and dark striations.	These muscles are made up of long uninucleate cells with pointed ends.	These are made up of cells, which are cylindrical, branched and uninucleate.
Striations	They show alternate light and dark bands or striations.	These do not show striations.	These muscles show faint striations.

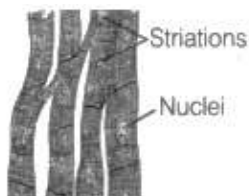| **Site/Location**	These are located in limbs and are mostly attached to bones to help in body movement.	These are mostly present in the walls of the alimentary canal. blood vessels, ureters, bronchi of the lungs and in the iris of eyes.	These are present only in the walls of the heart.

i. Striated muscle
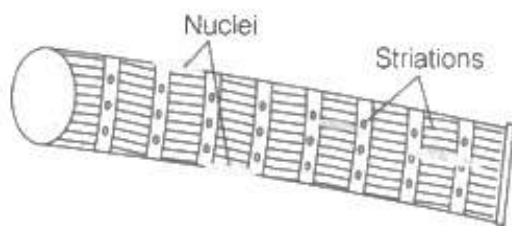
ii. Smooth muscle
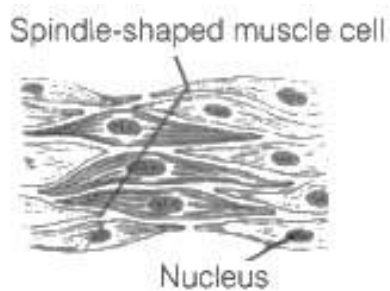
iii. Cardiac muscle

28. i. Cold is commonly caused by a virus while soar throat can be due to bacterial infection or allergy.

  ii. Antibiotics act on bacteria and kill them by inhibiting their metabolic reactions (e.g. cell wall formation, ribosome functioning, etc.).
  Yes, the doctor can continue the antibiotics for 3-4 days more because bacterial sore throat takes about 10 days to heal.

OR

  i. Crocodile is a reptile with a four-chambered heart.
  ii. Echidna is an egg-laying mammal.

iii. Scoliodon is a fish with a cartilaginous skeleton.

iv. Lichen is the mutually dependent relationship of blue-green algae and fungi.

v. Marchantia is a bryophyte (i.e. amphibian of the plant kingdom)

29. A stone is dropped from the edge of a roof.

Given, initial velocity $u = 0$

Acceleration $g = 9.8 \text{ m/s}^2$

i. Displacement $= s = 4.9$ m

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

4.9 = 0 × t + $\frac{1}{2}$ × 9.8 × t^2

t^2 = $\frac{9.8}{9.8}$ = 1

$\Rightarrow t = 1$ s

The stone takes 1 s to fall 4.9 m

ii. We have, $v^2 - u^2 = 2as$

$v^2 - 0^2$ = 2 × 9.8 × 4.9

$v^2 = 96.04$

$\Rightarrow$ v = $\sqrt{96.04} = 9.8$ m/s

At the end of 4.9 m, stone will be moving at a speed of 9.8 m/s

iii. We have, $v^2 - u^2 = 2as$

$v^2 - 0^2 = 2 \times 9.8 \times 7.9$

v^2 = 154.84

$\Rightarrow v = 12.44$ m/s

The stone will be moving with a speed of 12.44 m/s at the end of 7.9 m.

iv. During the free fall the acceleration produced in a body remains constant.

So, acceleration after 1 s = 9.8 m/s^2

Acceleration after 2 s = 9.8 m/s^2

30. i. Mass number of A = 3 + 4 = 7

Mass number of B = 9 + 8 = 17

ii. The atomic number of B = Number of protons = 9

iii. C and D are isotopes as they have the same atomic number but different mass numbers.

iv. Electronic configuration of C : $\begin{array}{cc} K & L \\ 2, & 6 \end{array}$

It needs two electrons to complete its octet.

Hence, its valency is 2.

OR

Chemical formulae of

(a) Magnesium chloride

Symbols; Mg   Cl

Valencies: 2   1

cross-over valencies

Mg_1Cl_2 or $MgCl_2$

Thus, the formula of magnesium chloride is MgCl$_2$.

(b) Calcium oxide

Symbols;   Ca   O

Valencies: 2   2
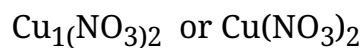
cross-over valencies

Ca_2O_2 or CaO

Thus, the formula of calcium oxide is CaO.

(c) Copper(II) nitrate

Symbols;   Cu NO_3
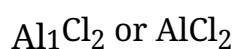
Valencies: 2   1

cross-over valencies

$Cu_{1}(NO_3)_2$ or $Cu(NO_3)_2$

Thus, the formula of copper nitrate is $Cu(NO_3)_2$.

(d) Aluminium chloride

Symbols; Al   Cl
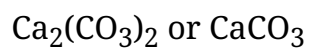
Valencies: 3   1

cross-over valencies

Al_1Cl_2 or $AlCl_2$

Thus, the formula of Aluminium chloride is $AlCl_2$.

(e) Calcium carbonate.

Symbols; Ca CO_3

Valencies: 2   2

cross-over valencies

$Ca_2(CO_3)_2$ or $CaCO_3$

Thus, the formula of Calcium carbonate is $CaCO_3$.