CBSE Class 09

Science

Sample Paper 10 (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. Name the three sub-atomic particles of an atom.
2. Find the ratio by mass of the elements present in the molecule of hydrogen sulphide (H_2S). Given that, atomic mass S = 32, H = 1.
3. The practice of keeping or rearing, caring and management of honey bee on a large scale for obtaining honey and wax is called apiculture. The place where bees are raised is called apiary. Besides honey, other products of bee-keeping are bee wax, bee venom, propolis and royal jelly. Bee-keeping requires low investment and generates additional income, hence it is done by farmers along with agriculture. Following are the Honey bee varieties that are used for bee-keeping as follows:

Indigenous varieties	**Exotic varieties**
Apis cerana indica (Indian bee)	*Apis mellifera* (Italian bee)
Apis dorsata (Rock bee), Apis florae (Little bee)	*Apis adamsoni* (South African bee)

Answer the following questions:

i. What is apiculture?
ii. Does honey bee help in pollination? Which type of flowers attracts the honey bee?
iii. Mention the products obtained from the honey bee.
iv. What is the best season to start beehive?

4. Phylum Porifera belongs to the kingdom Animalia. This phylum includes about 5000 species. Poriferans are pore-bearing first multicellular animals. The pores are known as ostia.

   The poriferans have a spongy appearance and are therefore called sponges. They are attached to the substratum and do not move. They have the ability to absorb and withhold fluids.

   They were initially regarded as plants due to the green colour and their symbiotic relationship with algae. Later, their life cycle and feeding system were discovered and they were included in the animal kingdom.

Answer the following questions:

i. Name the animal associated with Ostia.
ii. What is the common term for phylum porifera.?
iii. Why the position of phylum Porifera is controversial?
iv. What is the rough estimate of the phylum Porifera species?

5. State, whether the following statement is true or false “force, can be measured using first law of motion”
   a. partially false
   b. partially true
   c. false
   d. true

OR

Which has more inertia?
   a. 1Rs coin
   b. All have same inertia.
   c. 5Rs note
   d. 5Rs coin

6. Water stored in a dam possess
   a. potential energy
   b. no energy
   c. electrical energy
   d. kinetic energy

7. An object is falling from a height h, when it has fallen a height $\frac{h}{2}$, it will possess
   A Half kinetic energy
   B Half potential energy
   C Only kinetic energy
   D Only potential energy
   a. (b) and (c) are correct
   b. (a), (b) and (c) are correct
   c. (a) and (b) are correct
   d. (a), (b) , (c) and (d) are correct

8. _____ have frequencies more than 20,000 hertz.
   a. Different

b. Ultrasonics
c. Sound
d. Infrasonics

OR

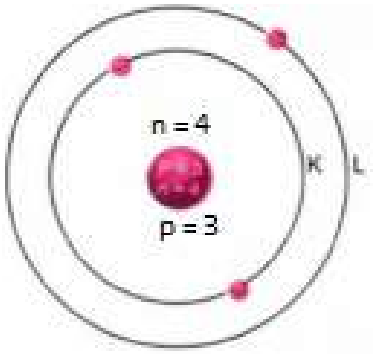
Which force causes things to fall towards the earth?

9. Find the incorrect statement.
   a. The painted bug is a pest of mustard plant
   b. Pesticides are toxic chemicals
   c. Blast is a viral disease of Paddy
   d. Puccinia causes rust disease in wheat.
10. Which of the following methods would you use to separate cream from milk?
   a. centrifugation
   b. filtration
   c. distillation

   d. fractional distillation

11. AIDS can be transmitted by:
   A. Sexual contact
   B. Handshake
   C. Hugs
   D. Breast-feeding
   a. A and D
   b. B and C
   c. A and C
   d. All of these

12. What is the mass number of the following figure? (given n = 4, p =3)



a. 3

b. 7

c. 4

d. 1

OR

If the humidity in the air increases then the rate of evaporation:-

a. decreases

b. increase

c. remain same

d. both (b) and (a) depending upon the temperature

13. **Assertion:** Gases are compressible but liquids are not.

Reason: Structure of gas and liquid are different.

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:** Displacement of a body may be zero when the distance travelled by it is not zero.

    Reason: The displacement is the longest distance between the initial and final position.

    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) reason (R) both are false.

15. Give difference between Rabi and Kharif crop?

16. An old man and a scientist were talking about a deserted house. The old man was sure that it was haunted by ghosts, but the scientist discarded the view saying no one had ever seen a ghost. The old man was annoyed and challenged the scientist about existence of atoms, sub-atomic particles which also could not be seen.

    i. Name the three sub-atomic particles and their discoverers.
    ii. Whose viewpoint do you support and why?

    OR

    Helium atom has an atomic mass of 4 u and two protons in its nucleus. How many neutrons does it have?

17. How is the power related to the speed at which a body can be lifted? How many kilograms will a man working with the power of 100 W, be able to lift at constant speed of 1 ms^{-1} vertically? (g = 10 ms^{-2})

18. The Resident Welfare Association of an area refused the proposal of installation of a mobile tower in their complex.

    i. Co-relate the refusal with the environment and extinction of house sparrow.

ii. Comment upon the values shown by RWA.

OR

A laundry engaged in washing clothes has been pouring waste water directly into the river. Over a period of time, it was found that large numbers of fish were dying in the river. Answer the following questions based on the above information:

1. Mention the reasons for the dying of fish.
2. Is there any way it can be avoided?
3. Mention values associated with above situation.

19. If you are provided with some vegetables to cook, we generally add salt to the vegetables during cooking process. After adding salt, vegetables releases water. What mechanism is responsible for this?

20. Differentiate amongst parenchyma, collenchyma and sclerenchyma on the basis of the cell wall.

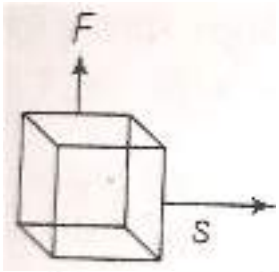
21. Sodium chloride contains two elements, but it is still a pure substance. Give reason.

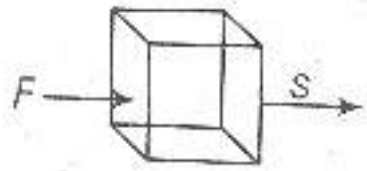
22. An object is thrown vertically upwards and rises to a height of 13.07 m. Calculate

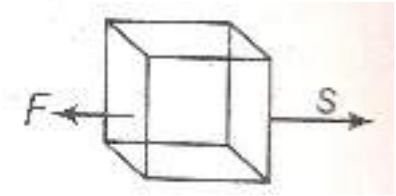
    i. the velocity with which the object was thrown upwards.
    ii. the time taken by the object to reach the highest point.

23. Two objects of masses 100 g and 200 g are moving along the same line and direction with velocities of 2 $ms^{-1}$and 1 ms^{-1} respectively. They collide and after the collision, the first object moves at a velocity of 1.67 ms^{-1}. Determine the velocity of the second object.

24. In each of the following, a force F is acting on an object of mass m. The direction of displacement is from West to east shown by the longer arrow. Observe the figure carefully and state whether the work done by the force is negative, positive or zero.

i. 

ii. 

iii. 

OR

For the symbol H, D and T, tabulate three sub-atomic particles found in each of them.

25. i. Draw a neat and labelled diagram of the apparatus used to separate components of blue-black ink. Name the process and state the principle involved.
    ii. Identify, the physical and chemical changes from the following.
        a. Burning of magnesium in air.
        b. Tarnishing of silver spoon.
        c. Sublimation of iodine.
        d. Electrolysis of water.

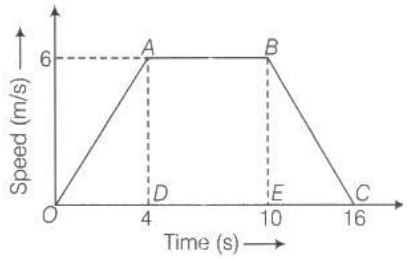
OR

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.

26. Study the speed-time graph of a body given here and answer the following questions:



i. What type of motion is represented by OA?
ii. What type of motion is represented by AB?
iii. What type of motion is represented by BC?
iv. Find out the acceleration of the body.
v. Calculate the retardation of the body.
vi. Find out the distance travelled by the body from A to B.

27. We can control some of the actions of our body, but some are not in our control. Comment on this statement.

28. i. It was diagnosed that a patient has lost the power of fighting against any infection.
    a. Name the disease from which the patient is suffering from.
    b. Name the pathogen responsible for the disease.
    ii. A person suffering from HIV-AIDS cannot fight even minor infections. Why?
    iii. A lady suffering from AIDS is pregnant. What is the most likely route for the child to get the disease?

OR

Refer to the figures given below and answer the questions that follow:

(a)  (b)  (c)  (d) 

i. Identify figures A-D.
ii. Write the phylum to which each of them belongs?
iii. Which one of them has
   a. scolex and sucker?
   b. a notochord?
iv. Which of the given animals is diploblastic?

29. The volume of a 500 g sealed tin is 350 cm^{-3}.

i. What is the density of the packed tin?
ii. Will the packet float or sink in water if it has a density 1 g cm^{-3}?
iii. What will be the mass of water displaced by this tin?
iv. What will be the relative density of the packed tin?

30. i. Write two differences between isotopes and isobars.
ii. Write uses of Co-60 and U-235.

OR

Fill in the blanks.

i. In a chemical reaction, the sum of the masses of the reactants and products remains unchanged. This is called ____.
ii. A group of atoms carrying a fixed charge on them is called ____.
iii. The formula unit mass of $Ca_3(P0_4)2$ is _____.
iv. The Formula of sodium carbonate is ____ and that of ammonium sulphate is _____.

CBSE Class 09

Science

Sample Paper 10 (2019-20)

Solution

Section A

1. The three sub-atomic particles of an atom are as follows:-

   (a) **Proton** (positively-charged particle)

   (b) **Neutron** (neutral particle)

   (c) **Electron** (negatively-charged particle)

2. atomic mass of sulphur S = 32 u

   atomic mass of hydrogen H = 1u

   the ratio by mass of the elements present in the molecule of hydrogen sulphide (H_2S) = mass of hydrogen atom present in the compound: the mass of the sulphur atom present compound

   $= 2 \times 1 : 32 = 2 : 32 = 1 : 16$

3. I. The practice of keeping or rearing, caring and management of honey bee on a large scale for obtaining honey and wax is called apiculture.
   II. Yes, honey bee helps in the pollination. The bright coloured flowers attract the honey bee.
   III. Besides honey, other products of bee-keeping are bee wax, bee venom, propolis and royal jelly.
   IV. Spring season is best to start a beehive.

4. i. The animals associated with Ostia are sponges.
   ii. The common term for phylum Porifera is pore bearing.
   iii. Phylum Porifera were initially regarded as plants due to the green colour and their relationship with algae. Later their life cycle and feeding system support placing them in the animal kingdom.
   iv. Around 5000 species roughly estimated to be in Phylum Porifera.

5. (c) false **Explanation:** The force can be measured by newton's second law of motion. First law of motion states that object in rest or uniform motion tends to remain in its state.

OR

(d) 5Rs coin **Explanation:** Inertia of the body is proportional to the mass of the body. 5Rs coin is heavier than 5Rs note and 1Rs coins. So, inertia of 5Rs coin more than others.

6. (a) potential energy **Explanation:** Water stored in a dam possesses potential energy. And once the water is falling it has kinetic energy.
7. (c) (a) and (b) are correct Explanation:

   At a height $\frac{h}{2}$ PE = mg ($\frac{h}{2}$) = $\frac{1}{2}$ mgh
   The rest ($\frac{1}{2}$ mgh) of the PE is converted into K.E.
   Thus, at a height ($\frac{h}{2}$), PE = KE = $\frac{1}{2}$ mgh

8. (b) Ultrasonics **Explanation:** The sound of frequency more than 20,000Hz are called ultrasonics. ultrasonic sounds have a frequency above the upper limit of human hearing.

OR

Gravitational force.

9. (c) Blast is a viral disease of Paddy
   Explanation: Puccinia causes rust disease in wheat. The painted bug is a pest of mustard plant. Blast is a bacterial disease of paddy. Pesticides are toxic chemicals.
10. (a) centrifugation
    Explanation: In centrifugation by churning the milk at a high speed, the cream collects at the centre and being lighter than milk floats at the top of the mixture. As cream is lighter than milk.
11. (a) A and D
    Explanation: AIDS can be transmitted through sexual contact from one partner to another. It can also be transmitted through blood to blood contact with infected

people or from an infected mother to her baby during pregnancy or through breast-feeding. It is not transmitted through casual physical contacts like handshake or hugs

12. (b) 7

    Explanation: Mass number = number of proton + number of electron

    = 3 + 4

    = 7

OR

    (a) decreases

    Explanation: Because the water evaporates very slowly due to muggy (damp) weather.

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

    Explanation: The molecules of a gas are separated very far and there is a lot of empty space between them. Hence gases can be compressed easily. In liquids molecules are closer to each other and can be brought further closer only under very high pressure.

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

    Explanation: The displacement is the shortest distance between initial and final position. When final position of a body coincides with its initial position, displacement is zero, but the distance travelled is not zero.

15. **Kharif Crops**

    i. The term ‘Kharif’ comes from Arabic language means autumn
    ii. The crops which are grown in the rainy season are called Kharif crops
    iii. Seeds are sown in the month of June/July
    iv. Harvested during the months of October/November
    v. These crops are also known as monsoon crops
    vi. These crops depends on the quantity of rain water as well its timing
    vii. These crops can grow in hot and wet conditions
    viii. Examples of Kharif crops are paddy, maize, soya bean, groundnut, cotton etc.,

    Rabi Crops

i. The term ‘Rabi’ comes from Arabic language means spring.
ii. The crops which are grown in the winter season are called Rabi crops
iii. Seeds are sown in the month of November/December
iv. Harvested during the months of March/April
v. These crops are also known as winter crops
vi. These crops mainly depends on the water that has percolated in the ground during rainy season
vii. These crops grow in cold and dry conditions
viii. Examples of Rabi crops are wheat, gram, pea, mustard, linseed etc.,

16. (i)

Particles	Discoverer
Electrons	J.J. Thomson
Protons	Rutherford
Neutrons	Chadwick

(ii) View point in support of scientist as he discourages superstition.

OR

Since the atomic number is equal to the number of protons and the atomic mass is the sum of the number of protons and neutrons, the number of **neutrons** present in a helium atom = Atomic mass (A) – Number of protons (Z) = 4 - 2 = 2

Thus, a helium atom has **2 neutrons**.

17. We know that, Power = $\frac{Work\ done\ or\ energy}{time}$ = $\frac{mgh}{t}$ = m.g.($\frac{h}{t}$)

Since, speed = $\frac{Distance}{time}$ = $\frac{h}{t}$

Therefore, mass, m= $\frac{Power}{g \times Speed}$

Hence, mass of a body that can be lifted = $\frac{Power}{g \times Speed}$ = $\frac{100}{10 \times 1}$ = 10 kg

18. i. The proposal was refused by the RWA as the radiations from the mobile tower causes cancer, fatigue, cataracts, reduced mental concentration, etc. It has also

been noticed that by the heat radiation of mobile tower, the house sparrows are getting extinct in nature day by day.

ii. Protecting nature, concern towards the society.

OR

i. The chemical detergents in the waste water accumulate in the body of fish. The process is called biological magnification. These accumulated chemicals interrupt the metabolic processes and ultimately results in death.

ii. The situation can be avoided by preventing discharge of waste water directly into the river or by treating the waste water before its discharge.

iii. Environmental conservation.

19. After adding salt, the concentration of solvent decreases, hence water form vegetable move out from higher concentration to lower concentration.

20.

Parenchyma	Collenchyma	Sclerenchyma
1. The cell wall is thin.	It is thickened	It is thickened
2. It is smooth.	It is unevenly thickened.	The wall is uniformly thickened.
3. Wall is formed of cellulose.	The thickening is pecto-cellulosic	The thickening is generally of lignin.

21. The two elements sodium and chlorine have combined with each other by chemical reaction to form sodium chloride (NaCl) which is a chemical compound. Since these elements cannot be separated from each other by any physical process, sodium chloride is a pure substance.

22. Distance travelled, h = 13.07 m

Final velocity v = 0

Acceleration due to gravity g = - 9.8 m/s^2 (upward motion)

i. $v^2 = u^2 + 2gh \Rightarrow 0 = u^2 + 2 \times (-9.8) \times 13.07$

$u^2 = 256 \Rightarrow u = 16$ m/s

ii. $v = u + at \Rightarrow 0 = 16 - 9.8 \times t \Rightarrow t = 1.63$ s.

23. Given,

m_1= 100g = 0.1 kg

m_2= 200g = 0.2 kg Before collision Initial velocity of the first object,u_1= 2 ms^{-1} Initial velocity of the second object,u_2= 1 ms^{-1} After collision Final velocity of the first object,v_1= 1.67 ms^{-1} Final velocity of the second object,v_2= ? (to be calculated)

According to the law of conservation of momentum, Total momentum of the system before collision = Total momentum of the system after collison

$\implies m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$

$\implies 0.1\,kg \times 2\ ms^{-1} + 0.2\,kg \times 1\ ms^{-1} = 0.1\,kg \times 1.67\ ms^{-1} + 0.2\,kg \times v_2$

$\implies 0.4\,kg ms^{-1} = 0.167\,kg ms^{-1} + 0.2\,kg \times v_2$

$\implies 0.4\,kg ms^{-1} - 0.167\,kg ms^{-1} = 0.2\,kg \times v_2$

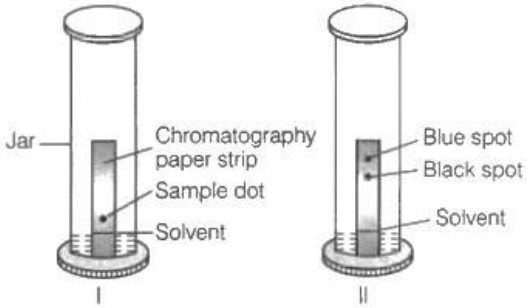
$\implies 0.233\,kg ms^{-1} = 0.2\,kg \times v_2 \implies v_2 = 1.165\ ms^{-1}$ So,the velocity of the second object after collision is 1.165 ms^{-1}

24. In Fig. (i), the angle between F and S is 90°, so work done is zero.
In Fig. (ii), the angle between F and S is 0°, so work done is positive.
In Fig. (iii), the angle between F and S is 180°, so work done is negative.

OR

Symbol	**Proton**	**Neutron**	**Electron**
$_1H^1$	1	0	1
$_1D^2$	1	1	1
$_1T^3$	1	2	1

25. i.



The labelled diagram of the apparatus used to separate components of blue-black

ink is shown above.

Name of the process: Paper chromatography.

Principle of paper chromatography: Different components of a mixture move with different speeds in a solvent, so they separate at different heights. Here blue ink and black ink rise with the help of solvent at different speeds to form two spots at different heights.

ii. The physical and chemical changes are as follows:
- Burning of magnesium in the air: Chemical change
- Tarnishing of silver spoon: Chemical change
- Sublimation of iodine: Physical change
- Electrolysis of water: Chemical change

OR

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

26. i. OA is a straight line graph between speed and time and it is sloping upward from O to A. Here, OA represents uniform acceleration.
ii. AB is a straight line graph between speed and time which is parallel to the time axis (X-axis). So, AB represents uniform speed. There is no acceleration from A to B.
iii. BC is a straight line graph between speed and time which is sloping downwards from B to C. Therefore, BC represents uniform retardation or negative acceleration.
iv. Acceleration of the body as we see from graph line OA represents it. So, the slope

of velocity-time graph OA will give the acceleration of the body.

Thus, acceleration = slope of line OA = $\frac{AD}{OD}$

We have, AD = 6 m/s and OD = 4s

So, acceleration = $\frac{6\ m/s}{4/s}$ = 1.5 m/s^2

v. The slope of line graph BC represents the retardation of the body.

So, retardation = slope of line BC = -$\frac{BE}{EC}$

We have, BE = 6 m/s, EC = 16 - 10 = 6s

Retardation = -$\frac{6\text{m/s}}{6\text{s}}$ = -1 m/s^2

vi. The distance travelled by the body is equal to the area enclosed between the speed-time graph and time axis.

Distance travelled from A to B = area under the line AB and the time axis = area of rectangle DABE = DA $\times$ DE.

Here, DA = 6 m/s and DE = 10 - 4 = 6 s

Distance travelled from A to B = 6 $\times$ 6 = 36 m

27. Yes, we can control some of the actions of our body, but some are not under our control. The actions which we can control are known as voluntary actions like the movement of hand and limbs. We can move these parts of our body whenever we want to, but some actions of our body like contraction and relaxation of heart, blinking of an eye, etc., are not under our will, i.e. we cannot stop functioning of heart if we want to do so. The actions, which can be manipulated by our wishes are known as voluntary actions. The muscles, which can perform voluntary actions are voluntary muscles.

These muscles are also called skeletal muscles or striated muscles. These muscles are mostly attached to bones and help in body movement. Their cells are long, cylindrical, unbranched and multinucleate (having many nuclei).

The actions, which are not under our control are known as involuntary actions. These actions are performed by smooth muscles or involuntary muscles. Their cells are long with pointed ends (spindle-shaped) and uninucleate (single nucleus).

28. i. a. AIDS

b. AIDS virus or HIV.

ii. In the case of AIDS, the virus affects the body's immune system and damages it. So, a person cannot fight even very small infections due to a weakened immune system.

iii. AIDS spreads through the exchange of body fluids. So, the virus from infected mother to child occurs through the placenta.

OR

i. The organisms are:
   a. Balanoglossus
   b. Tapeworm
   c. Leech
   d. Scolopendra

ii.
   a. Phylum-Protochordata
   b. Phylum—Platyhelminthes
   c. Phylum—Annelida
   d. Phylum—Arthropoda

iii.
   a. Tapeworm has scolex and sucker.
   b. Balanoglossus has notochord

iv. None of them is diploblastic. All of them are bilaterally symmetrical triploblastic animals.

29. Given: Mass of packed tin (m) = 500 g

Volume of tin (V) = 350 cm^{-3}

i) Therefore density of the tin

$$density = \frac{mass}{volume} = \frac{500}{350} = 1.429\ gcm^{-3}$$

ii) As the density of the tin is more than the density of water therefore it will sink in water.

iii) Volume of water displaced by packed tin = volume of packed tin = 350 cm^{-3}

Therefore mass of water displaced by tin

M = V × d = 350 × 1 = 350 g

iv) Relative density of packed tin,

$$R\,D = \frac{density\ of\ tin}{density\ of\ water} = \frac{1.429}{1} = 1.429$$

30. i. Difference between isobars and isotopes:

Isotopes	Isobars

These are the atoms of the same element having the same atomic number but different mass numbers	These are the atoms of the different elements having the same mass number but different atomic numbers
They have identical chemical properties and different physical properties. e.g. ${}_{1}^{1}\mathrm{H}$, ${}_{1}^{2}\mathrm{H}$, ${}_{1}^{3}\mathrm{H}$	They have different chemical properties and different physical properties because these are the atoms of different elements. e.g. ${}_{18}^{40}\mathrm{Ar}$ and ${}_{20}^{40}\mathrm{Ca}$

ii. An isotope of cobalt (Co-60) is used in the treatment of cancer.
An isotope of uranium (U-235) is used as fuel in a nuclear reactor.

OR

i. Law of conservation of mass
ii. polyatomic ion
iii. 310 u
$[\mathrm{Ca_3(PO_4)_2} = 3 \times 40 + 2 \times 31 + 8 \times 16 = 310\mathrm{ul}$
iv. Na_2CO_3 : $(NH_4)_2SO_4$