KENDRIYA VIDYALAYA SANGATHAN
[AGRA REGION]
SESSION ENDING EXAMINATION 2018
SUBJECT : SCIENCE
CLASS–IX
(SOLVED PAPER)

**Time : 3 Hours**   **Max. Marks : 80**

General Instructions :

1. *The question paper comprises **two sections** : Section **A** and **B**. You need to attempt both the sections.*
2. *All questions are compulsory. However, some internal choices are provided.*
3. *All questions of **Section-A** and **Section-B** are to be attempted separately.*
4. *Question number **1 to 2** in **Section-A** are **one mark** question. These are to be answered in **one word** or in **one sentence**.*
5. *Question numbers **3 to 5** in Section A are two marks question. These are to be answered in **30 words** each.*
6. *Question numbers **6 to 15** are three marks question. These are to be answered in about **50 words** each.*
7. *Question **number 16 to 21** are five marks question. These are to be answered in about **70 words** each.*
8. *Question numbers **22 to 27 in Section B** are questions based on practical skills and are **two marks** questions.*

SECTION- A

1. Name any two indigenous breeds of cattle.
2. Name the carbon compound responsible for the depletion of ozone layer in atmosphere.
3. Write differences between acute and chronic diseases with one example each.
4. Mr. Kumar, while going to his office first goes 5 km towards south to drop his mother at a temple, then he turns and goes 12 km towards east. Calculate (i) total distance covered and (ii) Net displacement of Mr. Kumar.
5. When a carpet is beaten with a stick, dust comes out of it, Explain.
6. The velocity-time graph of a object moving in a definite direction is shown in the following figure. Answer the questions based on this figure.
   (a) What is the velocity of the particle at point 'A' ?
   (b) What does the slope of a graph represent ?
   (c) Calculate the distance travelled in 4 seconds.
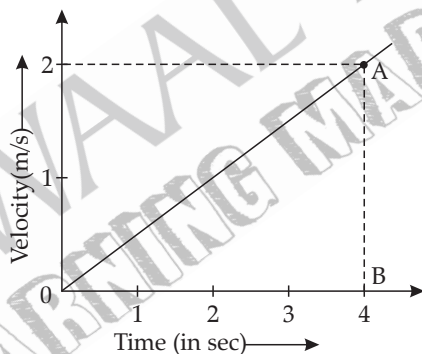
7. (a) How will you differentiate between boiling and evaporation.
   (b) Define melting point

   OR

   (a) Convert the following temperatures to the Kelvin scale :
   (i) 25 °C   (ii) 373 °C
   (b) Define latent heat of fusion.
   (c) Given reason why naphthalene balls disappear with time without leaving any residue.
8. Compare the solid, liquid and gas on the basis of following properties :
   (a) Inter-particle spaces (b) Force of attraction (c) Compressibility.

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9. (a) Name the separation technique used for the separation of different pigments from the flower petals.
　　(b) Classify each of the following as element, compound and mixture :
　　　　gold, air sodium, calcium carbonate
10. (i) With the help of diagram show location of meristematic tissue.
　　(ii) Name the following :
　　　　(a) Tissue that transport water and minerals in plants.
　　　　(b) Tissue that connects bone to bone in humans.
　　　　(c) Connective tissue that has a fluid matrix.
11. (a) What are the differences between organisms belonging to class pisces and amphibia ?
　　(b) Name any two egg laying mammals.
OR
　　　What are the major divisions in the Plantae ? What is the basis of these divisions ?
12. The number of dengue cases had increased in Anita's village in last one year. She read in her text book that diseases like dengue spread through mosquitoes which breed in stagnant water. She immediately discussed with her friends and decided to kill the mosquitoes and their larvae in water bodies in her locality. They also took help of nearest municipal office.
　　Answer the following questions based on above information :
　　(a) Which preventive measure do you suggest for the prevention of such diseases caused by mosquitoes ? Mention any two measures.
　　(b) Which values are displayed by Anita in taking initiative ?
　　(c) Suggest one school activity to promote such value in school students.
13. A bullet of mass 10g travelling horizontally with a velocity of $150 \, ms^{-1}$ 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.
14. (a) What does acronym SONAR stand for ?
　　(b) Write any two applications of sonar.
OR
　　(a) Why are sound waves called as mechanical waves ?
　　(b) What is the audible range of human ear ?
　　(c) How are the wavelength and frequency of a sound wave related to its speed ?
15. Define crop rotation. While choosing plants for crop rotation, what should be kept in mind ?
16. (a) What are polyatomic ions ? Give two examples.
　　(b) Write the chemical formula of sodium oxide.
　　(c) Calculate the formula unit mass of $CaCO_3$ (Given Ca = 40 u, O = 16u)
17. (a) How many electrons, protons and neutrons will be there in 19_{X_9} element ? What will be the valency of the given element ?
　　(b) What are isotopes ? Name isotopes of hydrogen.
　　(c) Give any two uses of isotopes.
OR
　　(a) Which popular experiment is shown in the following figure ?
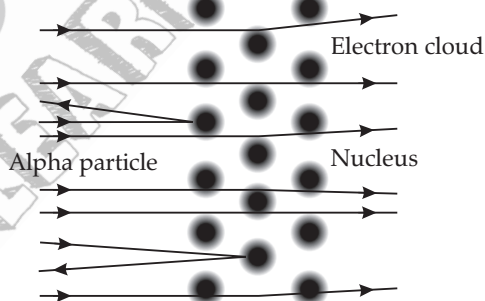
　　(b) List three observations of this experiment.
　　(c) State the model of atom suggested on the basis of the above experiment.
18. (a) How is prokaryotic cell different from eukaryotic cell ? (Any 3 differences)
　　(b) Draw a well labeled diagram of prokaryotic cell.
OR
　　(a) Where do the lipids and proteins constituting the cell membrane get synthesized ?
　　(b) Name the kind of plastid which is important for photosynthesis in the leaves of the plants.
　　(c) Draw a well labeled diagram of plant cell.
19. (a) State Archimedes' principle. Write its two applications.
　　(b) Find the relative density of a copper block of mass 216g having a volume of $80 \, cm^3$. (Density of water = 1 g/cm^3).

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20. (a) Define the term 'kinetic energy'.
(b) Derive an expression for kinetic energy for an object of mass 'm' moving with a velocity 'v'.
(c) Certain force acting on 40 kg mass changes its velocity from 5m/s to 2m/s Calculate the work done by the force.
(d) What is the commercial unit of electrical energy ?

21. (a) Name two biologically important compounds that contain both oxygen and nitrogen.
(b) Give a diagrammatic representation of Nitrogen cycle.
(c) Name two organisms which help in fixation of nitrogen in soil.

SECTION- B

22. A student prepared three solutions- salt solution, soil and milk in water. Distinguish between the three on the basis of transparency and stability.

23. What happens when iron nails are dipped in copper sulphate solution ? Give chemical equation also for the reaction.

24. Given below is the diagram of neuron. Label the parts 1, 2, 3 and 4.
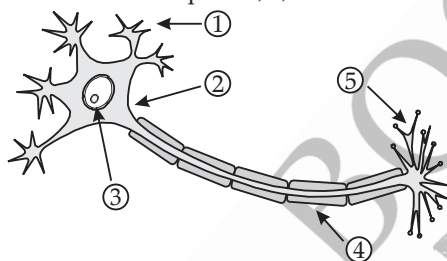
25. During an experiment to verify the laws of reflection of sound, a student drew the figure. In the figure, ∠AOB is 76°. What is the angle of incidence ?
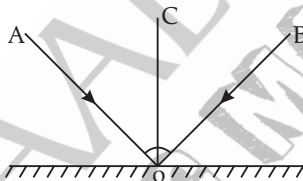
26. Write any two external features of a monocot plant.

OR

Name the kingdom and the phylum to which cockroach belongs. Write any one specific feature of cockroach.

27. The volume of a stone is 25 cm^3 and its density is 5g/cm^3. Calculate the mass of the stone.

●●

ANSWERS
(Issued by CBSE)

SECTION- A

1. **Indigenous breeds of Cattle** :   ½ + ½
(i) Sahiwal   (ii) Red Sindhi

2. Chlorofluorocarbons.   **1**

3. Differences between acute disease and chronic disease :

		Acute Disease	Chronic Disease
	(i)	They are short duration diseases.	They are long lasting diseases.
	(ii)	The patient recovers completely after the cure.	The patient does not recover completely.
	(iii)	Example — Common Cold	Example — Chickerpox, typhoid, Cholera

1 + 1

4.   Distance covered $= s =$ AB + BC
$$= 5 \text{ km} + 12 \text{ km}$$
$$= 17 \text{ km}.$$

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N

W————A————E

5 km

B 12 km C

S
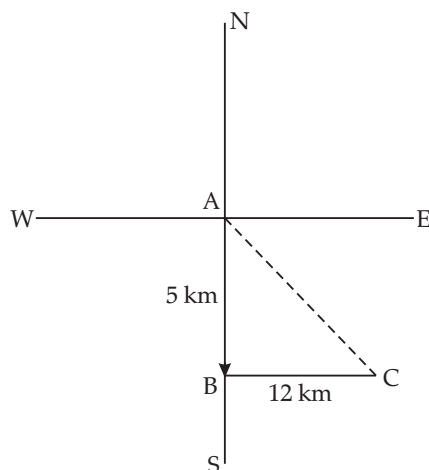
Displacement = Shortest distance between initial position and final position.

$$AC = \sqrt{(AB)^2 + (BC)^2} \quad \text{(Pythagoras theorem)}$$

$$= \sqrt{5^2 + 12^2} = \sqrt{25 + 144}$$

$$= \sqrt{169} = 13 \text{ km.} \qquad \mathbf{1 + 1}$$

5. Initially, both carpet and dust are at rest. When the carpet is beaten with a stick, the carpet is set into motion. Due to inertia of rest, the dust particles tend to remain at rest. As a result, the dust particles fall off. **2**

6. (a) Velocity = 2m/s
   (d) The uniform velocity of the moving object is equal to the slope of the straight line.
   (c) Distance covered in 4 sec

$$s = u \times t$$
$$= 2 \times 4$$
$$= 8 \text{ sec.} \qquad \mathbf{1 + 1 + 1}$$

7. (a) **Differences between Boiling and Evaporation :**

	Boiling	Evaporation
(i)	It occurs at a particular temperature.	It takes place when liquid is placed in open container at any temperature below its boiling point.
(ii)	It is the bulk phenomenon.	It is the surface phenomenon.
(iii)	Heating takes place during boiling.	Cooling takes place during evaporation.
(iv)	For boiling generally heat from an external source is required.	For evaporation, liquid takes the heat from the surroundings.

(b) **Melting Point :** The definite temperature at which a solid starts melting is called the melting point of that solid. eg melting point of ice is 0°C or 273.16 K. **2 + 1**

OR

(a) (i) 25°C — = 25 + 273
         = 298k
    (ii) 373°C — = 373 + 273
          = 646 K

(b) **Latent Heat of Fusion :** The amount of heat energy required to change 1 kg of a solid into liquid at atmospheric pressure at its melting point is known as the latent heat of fusion.

(c) Naphthalene being volatile converts from solid to gas directly by the process called sublimation. Therefore, no solid residue is left after sometime as it takes the heat from the surroundings and sublimes. **1 + 1 + 1**

8.

		SOLID	LIQUID	GAS
(i)	Inter-particle spaces	Interparticle space is small.	Interparticle space is more.	Interparticle space is maximum.

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(ii)	Force of attraction	Force of attraction between the molecules is maximum.	Force of attraction is less than in solid.	Force of attraction between the molecules is minimum.
(iii)	Compressibility	They are rigid and incompressible	They are not rigid but are less-compressible	They are highly compressible.

1 + 1 + 1

9. (a) Chromatography
   (b) Element — Sodium, Gold
       Compound — Calcium carbonate
       Mixture — Air   **½ × 6**

10. (i)

Apical meristem

Intercalary meristem

Lateral meristem
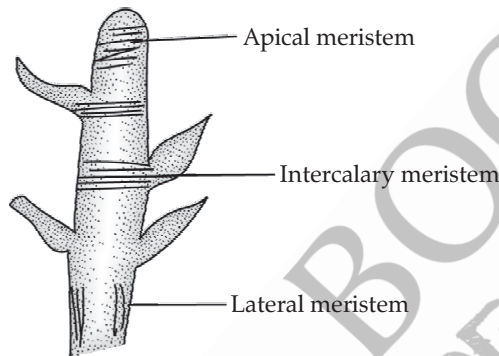
   (ii) (a) Xylem   (b) Ligament   (c) Blood   **½ × 6**

11. (a) **Class Pisces :**
    ● These are fishes and exclusively water living animals.
    ● The body is covered with scales / plates.
    ● Respiration is through gills.
    ● Heart is two-chambered
    Class Amphibia : They are the first land vertebrates, but they are found both in water and land.
    ● They have mucus glands in the skin without scales.
    ● Respiration is either through gills or lungs.
    ● Heart is three chambered.
    (b) Two egg laying mammals are — Platypus and Echidna   **2 + 1**
    OR
    The important divisions of plantae are Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms.
    ➢ **Classification of plants is done at three levels on the basis of :**
    (i) presence or absence of well-differentiated distinct body.
    (ii) presence or absence of special tissues for the transportation of water and other substances.
    (iii) ability to bear seeds, that could be naked or enclosed in fruits.   **2 + 1**

12. (a) (i) Stagnant water should be flown out.
        (ii) Mosquitoes repellant should be used.
    (b) Awareness, carefulness, social-well being nature and intelligent.
    (c) Knowledge about after effects of mosquitoes bite should be imparted to students. Students should be aware of preventive measures to keep away mosquitoes.
    School should organise a workshop for students health and hygiene.   **1 + 1 + 1**

13. Mass of bullet $m = 10\text{g} = \dfrac{10}{1000} = 0.01 \text{ Kg}$

    Initial Velocity $u = -150 \text{ ms}^{-1}$
    Final Velocity $v = 0$
    Time $t = 0.03s$
    From equation of motion
    $$v = u + at$$
    $$0 = 150 + a \times 0.03$$

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$$a = \frac{-150}{0.03}$$
$$= -5000 \; ms^{-2}$$

Distance covered by the bullet before coming to rest is given by :

$$v^2 = u^2 + 2as$$
$$o = (150)^2 + 2\,(-5000)\,s$$
$$s = \frac{150 \times 150}{10000} = 2.25 \; m.$$

Magnitude of the force applied by the bullet on the block

$$F = ma$$
$$= 0.01 \times -5000 = -50 \; N \qquad\qquad\qquad\qquad \textbf{1 + 1 + 1}$$

14. (a) **SONAR :** Sound Navigation And Ranging

(b) **Applications of Sonar :**

(i) It is a technique that uses sound propagation to navigate, communicate with or detect objects on or under the surface of the water.

(ii) Most military vessels carry sonar systems which are used to detect and track every vessels, torpedoes etc. **1 + 2**

OR

(a) Mechanical waves are waves that require a medium in order to transport their energy from one location to another.

(b) Audible range of Human ear is 20 Hz – 20 KHz.

(c) Wavelength is the distance between two consecutive compressions or rarefaction of wave.

The number of sound wave produced in one second is called frequency.

The product of the wavelength of a sound wave and its frequency give us its speed.

Speed = Wavelength × Frequency **1 + 1 + 1**

15. Crop rotation is a practice in which different crops are grown on a piece of land in a pre-planned succession. This practice depends upon the duration of crops. The crops to be chosen depends upon the availability of moisture and irrigation facility. One crop is grown in a field. After its harvest, a second crop is grown in the same field. **3**

16. (a) A Polyatomic ion is a group of atoms carrying positive or negative charge.

Example — Ammonium ion NH_4^+

Carbonate ion CO_3^{2-}

(b) Chemical formula of sodium Oxide is : Na_2O

(c) Mass of $CaCO_3$:

$(40 \times 1) + (12 \times 1) + (16 \times 3)$

$40 + 12 + 48$

$= 100$ amu. **2 + 1 + 2**

17. (a) Element $^{19}_9X$

No. of Electrons = 9

No. of Protons = 9

No. of Neutrons = 19 – 9

= 10

Electronic Configuration = 2, 7

Valency will be = 8 – 7

= 1.

(b) Isotopes are elements which have the same number of protons but different number of neutrons.

Isotopes of Hydrogen are :

^1_1H, ^2_1H, ^3_1H

Pretium   Deuterium   Tritium

(c) **Uses of Isotopes :**

(i) An isotope of Uranium is used as a fuel in nuclear reactors.

(ii) An isotope of cobalt is used in the treatment of cancer. **2 + 2 + 1**

OR

(a) **Rutherford's Experiment :** He bombarded thin sheets of gold foil with α-rays.

(b) **Observations of Rutherford Experiment :**

(i) Most of the fast moving α-particles passed straight through the gold foil.

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    (ii) Some of the α-particles were deflected by the foil by small angles, indicating that the centre of an atom is positively charged.

    (iii) Very few particles appeared to rebound or reflected back, indicating that they had direct collision with the entire mass of material and the whole mass of the atom is concentrated in the nucleus.

 (c) **Rutherford's Model of atom :**

    (i) There is positively charged centre in an atom called the nucleus which contains the whole mass of the atom.

    (ii) The electrons revolve around the nucleus.

    (iii) The size of the nucleus is very small as compared to the size of the atom.   **1 + 2 + 2**

18. (a) Differences between Prokaryotic Cell and Eukaryotic Cell :

| S.No.	Prokaryotic cell	Eurkaryotic cell
(i)	**Size :** generally small $(1 - 10 \ \mu m)$ $1 \ \mu m = 10^{-6} \ m$.	Size : generally large $(5 - 100 \ \mu m)$
(ii)	**Nuclear region :** contain only nucleic acid and is undefined due to the absence of nuclear membrane and is known as nucleoid.	Nuclear region : well defined and surrounded by a nuclear membrane.
(iii)	**Chromosome :** single.	**Chromosome :** more than one chromosome
(iv)	**Membrane bound** cell-organelles absent.	Membrane bound cell organelles like chloroplasts, golgi bodies etc.) are present.

(Any three) 1 × 3

  (b) **Diagram of Prokaryotic Cell :**
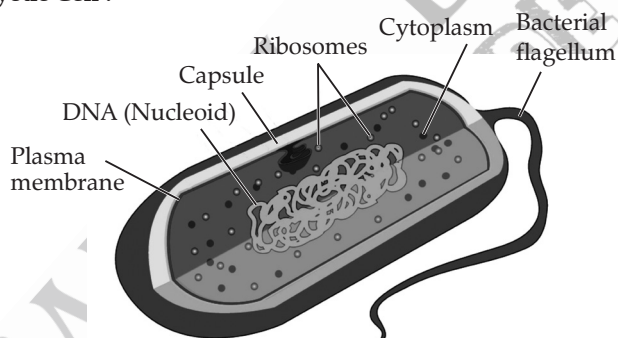
3 + 2

OR

  (a) Lipids are synthesized in smooth endoplasmic reticulum (SER) and the proteins are synthesized in rough endoplasmic reticulum (RER).

  (b) Chloroplast

  (c) **Diagram of Plant Cell :**
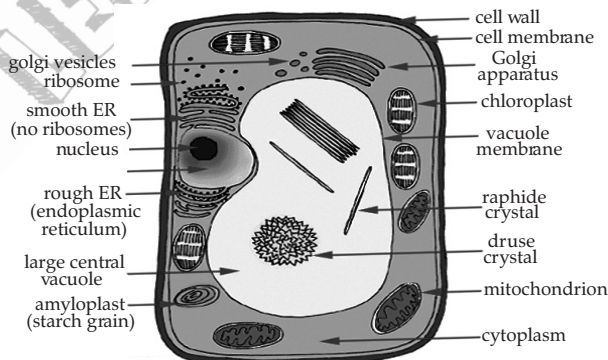
2 + 1 + 2

19. (a) **Archimedes Principle :** Archimedes' principle states that the upward buoyant force that is exerted on a body immersed in a fluid, whether fully or partially submerged is equal to the weight of the fluid that the body displaces and acts in the upward direction at the centre of mass of the displaced fluid.

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Application of Archimedes Principle :
(i) Construction of ships, steamers and boats.
(ii) A hydrometer uses Archimedes principle to determine the density of any liquid.

(b)
$$m = 216 \text{ g}$$
$$\text{Volume} = 80 \text{ cm}^3$$

$$\Delta = \frac{m}{v} = \frac{216}{80} = 2.7 \text{ g/cm}^3$$

$$= \frac{\text{Density of substance}}{\text{Density of water}}$$

$$\frac{2.7}{1} = 2.7 \qquad \qquad \textbf{1 + 2 + 2}$$

20. (a) **Kinetic Energy :** Energy possessed by a body by virtue of its motion is called kinetic energy.

(b) Consider a mass m moving with a speed u and a force F applied on it. Due to the force, the velocity will change as it continues to move. Let v be the velocity on displacing by s. Then the work done to increase the speed.

$$W = Fs$$
$$F = ma$$
$$= mas$$

As we know $\qquad v^2 - u^2 = 2as$
when $u = 0 \qquad v^2 = 2as$

$$as = \frac{v^2}{2}$$

$$= \frac{mv^2}{2}$$

$$W = \frac{1}{2} mv^2$$

Work done is equal to kinetic energy of the body,

$$\text{Or} \qquad \text{K.E} = \frac{1}{2} mv^2$$

(c) $m = 40$ kg, Initial velocity $= 5$ m/s, Final Velocity $v = 2m/s$, time $= 1$ sec
From the first equation of motion

$$v = u + at$$
$$a = \frac{v - u}{t} = \frac{2m/s - 5m/s}{1s} = -3\text{m/s}^2$$

From third equation of motion,

$$v^2 - v^2 = 2as$$
$$(2m/s)^2 - (5m/s)^2 = 2 \times -3 \ m/s \times s$$
$$= -6 \ m/s \times s$$
$$4m/s - 25 \ m/s = -6 \ m/s \times s$$

$$\frac{21}{-6} = s$$

$$\frac{7}{-2} = s$$

$$\text{Work done} = F \times S$$
$$F = ma$$
$$W = mas$$

$$= 40 \times (-3m/s^2) \times \frac{7}{2} \ m$$

$$= 20 \times (-3) \times 7$$
$$= -420 \text{ J}.$$

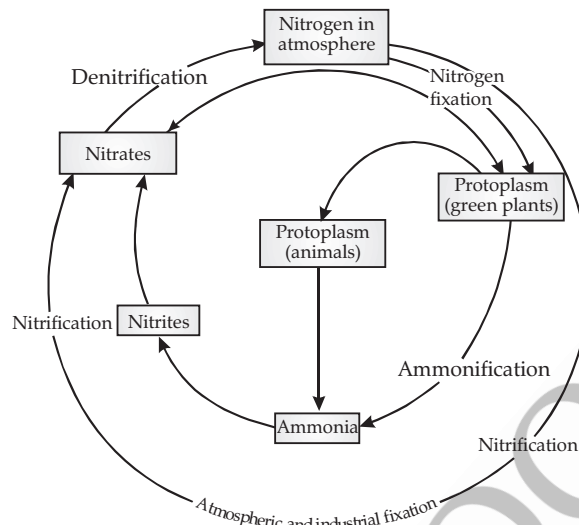(d) Kilowatt-hour is the commercial unit of electrical energy. $\qquad \textbf{1 + 1 + 2 + 1}$

21. (a) Proteins and Nucleic acids are the two biologically important compounds that contain both oxygen and nitrogen.

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(b) **Nitrogen Cycle :**

(c) **Two organisms which help in fixation of nitrogen in soil :**
    (i)   Nitrogen fixing Bacteria : *Rhizobium*
    (ii) Algae : *Nostoc* and *Anaebena*.   **1 + 2 + 2**

SECTION- B

22. **Based on transparency :**
When a salt is mixed in water, a true solution is formed, which is totally transparent and clear.
When soil is mixed in water, a suspension is formed which is not clear and is dirty.
When milk is mixed in water, a colloidal solution is formed which is either trans lucent or opaque.
Based on Stability :
Salt and water solution is stable, as true solutions are stable.
Soil and water solution is unstable, as suspensions are not stable. Milk and water solution is unstable, as particles settle down if kept undisturbed for a very longtime.   **2**

23. Iron is more active metal than copper, so it displaces copper from copper sulphate solution.
$Fe + CuSO_4 \longrightarrow FeSO_4 + Cu$ **1 + 1**

24. (1) Dendrite
    (2) Cell body
    (3) Nucleus
    (4) Axon   **½ + ½ + ½ + ½**

25.   Angle of incidence = Angle of reflection
                          $38° = 38°$ **1 + 1**

26. **Two external features of Monocot Plants are :**
    (i)   Monocot plant possess seeds with single cotyledons
    (ii) Monocots show fibrous root system, parallel venation of leaves.   **1 + 1**

OR

Cockroach belongs to kingdom Animalia and the phylum Arthropoda. Cockroaches are uricotelic, *i.e.* they get rid of their waste in the form of Uric acid.   **1 + 1**

27.   Volume = 25 cm^3
                          Density = 5g/cm^3
                          Mass = ?

$$Density = \frac{Mass}{Volume}$$

                          Mass = Density × Volume
                               = 5 × 25
                               = 125 g   **2**

●●

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KENDRIYA VIDYALAYA SANGATHAN
[JAMMU REGION]
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CLASS–IX
(SOLVED PAPER)

Time : 3 Hours **Max. Marks : 80**

General Instructions :

1. The question paper comprises two sections A and B. You are to attempt both the sections.
2. All questions are compulsory.
3. All questions of section-A and section-B are to be attempted separately.
4. There is an internal choice in two questions of three marks and one question of five marks.
*5. Question number **1 and 2 in section-A are of one mark question.** They are to be answered in one word or in one sentence.*
*6. Question numbers **3 to 5 in section A are two marks question.** These are to be answered in 30 Words each.*
*7. Question numbers **6 to 15 are three marks question.** These are to be answered in about 50 words each.*
*8. Question **number 16 to 21 are five marks question.** These are to be answered in about 70 words each.*
*9. Question numbers **22 to 27 in section B are based on practical skills.** Each question is a two marks question. These are to be answered in brief.*

SECTION- A

1. Name two factors responsible for losses of grains during storage.
2. What are the two forms of oxygen found in the atmosphere ?
3. List the points of differences between a Eukaryotic cell and Prokaryotic cell (Any two).
4. A train starting from a railway station and moving with uniform acceleration attains a speed of 40 km/h in 10 min. Find its acceleration in S.I. units.
5. Why is it advised to tie any luggage kept on the roof of a bus with a rope ?
6. (i) Why are we able to sip hot tea or milk faster from a saucer rather than a cup ?
   (ii) Suggest a method to liquefy atmospheric gases.
7. Give the points of differences between three types of muscle fibres ? Also draw the diagrams.
8. Give any three characteristic features of chordates.
   OR
   On what basis are plants and animals put into different categories (Any three).
9. Ramesh was a poor jobless rural youth. His land was water logged and was not suitable for raising crops. One day, his friend Rohan came to village and both went for a walk in fields. His friend suggested Ramesh to start fish farming to earn his livelihood.
   (i) What is fish farming ?
   (ii) What are the advantages of fish farming ?
   (iii) What values are displayed by Rohan ?
10. Under which of the following conditions is a person most likely to fall sick ?
    (a) When she is recovering from malaria.
    (b) When she has recovering from malaria and is taking care of someone suffering from chickenpox.
    (c) When she is on a four day fast after recovering from malaria and is taking care or someone suffering from chicken-pox. Why ?
11. What happens to the force between two objects, if.
    (i) the mass of one object is doubled ?
    (ii) the distance between objects is doubled and tripled ?
    (iii) the masses of both objects are doubled ?
12. State which of the following situations are possible and give an example for each of these :
    (i) a body with a constant acceleration but with zero velocity.
    (ii) an object moving in a certain direction with an acceleration in the perpendicular direction.

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OR

Derive an equation for position time relation by graphical method.

13. State newton's second law of motion. Mathematically derive Newton's second law of motion. Also give one application of second law of motion.

14. Give an example each of the mixtures having following characteristics. Also suggest a suitable method to separate the components of these mixtures :
    (i) A volatile and a non-volatile components.
    (ii) Two volatile components with appreciable difference in boiling points.
    (iii) Two immiscible liquids.

15. (i) What are polyatomic ions ? Give one example.
    (ii) Write the formulae of Calcium hydroxide and Aluminium Chloride.

16. What are the major divisions in the kingdom plantae ? What is the basis for these divisions.

17. (i) Draw Nitrogen cycle.
    (ii) Write a note one how forests influence the quality of our (a) air and water resources.

18. (i) What is kinetic energy ? Give its S.I. unit. Derive an expression for kinetic energy of an object.
    (ii) An object of mass 15 kg is moving with a uniform velocity of 4m/s. What is the K.E. possessed by the object.

19. (i) What are the audible range of the average human ear ?
    (ii) What is the range of frequencies associated with infra sound and ultrasound.
    (iii) Give three applications of ultrasound.

20. Compare all the proposed models of an atom.

OR

(i) Summarize the rules for writing of distribution of electrons in various shells for first eighteen elements.
(ii) Explain with examples.
   (a) Isotopes.   (b) Isobars.

21. (A) Calculate the mass of
    (i) 0.5 mole of N_2 gas. (ii) 3.011×10^{23} number of N atoms
    (B) What is atomicity ? Give atomicity of Sulphur and Chlorine.

SECTION- B

22. Why it is easier to lift a heavy stone under the water than on the surface of earth.

23. Name two sources of sound that may be preferred while performing the experiment on the reflection of sound.

24. Explain, why glycerine is used for temporary mounting ?

25. What are the characteristics of reptiles.

26. What will be your observation when a beam of light is passed through a true solution and through a suspension respectively.

27. Can you separate a mixture of common salt and sugar by sublimation ? Explain.

●●

SOLUTIONS
(Issued by CBSE)

SECTION- A

1. Two factors responsibility for losses of grains during storage are :
   (a) **Biotic Factors :** These are rodents, fungi, insects, mites and bacteria.
   (b) **Abiotic Factors :** These are inappropriate moisture and temperature.   ½ + ½

2. The two forms of oxygen found in the atmosphere are :
   (i) Elemental Oxygen (O_2)   (ii) Ozone (O_3).

3. Difference between Prokaryotic and Eukaryoic cell :

	PROKARYOTIC CELL	EUKARYOTIC CELL
(i)	Nuclear region in Prokaryotes is not well de-fined due to absence of nuclear membrane.	Nuclear region is will defined and surround-ed by a nuclear membrane.
(ii)	Membrane bound organelles are absent.	Membrane bound organelles are present.

1 + 1

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4. Initial Velocity of train, $u = 0$

Final Velocity of train, $v = 40$ km/h

$$= 40 \times \frac{5}{18} = 11.11 \text{m/}s.$$

$$\text{Time taken} = 10 \text{ min} = 10 \times 60 = 600s$$

$$\text{Acceleration } a = \frac{v-u}{t} = \frac{11.11-0}{600}$$

$$= 0.0185 \text{ m/s}^2$$

$$= 1.85 \times 10^{-2} \text{ m/s}^2$$

Hence, acceleration of the train is 1.85×10^{-2} m/s^2 **2**

5. When the bus stops suddenly, the luggage on the roof top will fall forward due to motion. Similarly when the bus starts, the luggage will fall backwards due to inertia of rest. To avoid this, any luggage kept on the roof of a bus is tied with a rope.   **2**

6. (i) The surface area of a saucer is greater than that of a cup. The rate of evaporation increases with an increase of surface area. As saucer has a greater surface area, the cooling is more due to increase in evaporation.

(ii) Applying high pressure and reducing its temperature, helps to liquefy atmospheric gases. Because, under these conditions, the particles comes closer, kinetic energy decreases and the gas is liquefied.   **1½ + 1½**

7.

S.No.	Striated muscles	Unstriated (Smooth) muscles	Cardiac muscles
(i)	They are found in limbs, tongue, pharynx etc.	They are present in the wall of visceral organs.	They form the heart.
(ii)	Long, cylindrical with blunt ends.	Short, spindle shaped with pointed ends.	Short, branched and cylindrical with flat ends.
(iii)	Multinucleate, nuclei peripheral.	Uninucleate, nucleus in the centre.	One of two nuclei in the centre.
(iv)	They are voluntary in action.	They are involuntary in action.	They are involuntary in action.
(v)	Dark and light bands are present.	No bands present.	Bands present.

(any three)

(a) Striated muscle   **(b) Smooth muscle**   **Cardiac muscles**
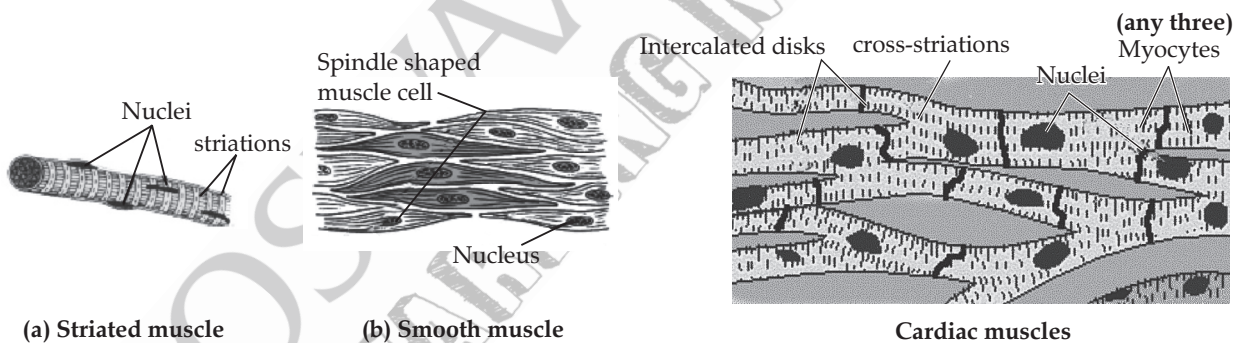
1 + 1 + 1

8. **Three Characteristic features of Chordates are :**

(i) Presence of a notochord and backbone (vertebral column)

(ii) Closed type blood vascular system present.

(iii) Body is bilateral symmetrical.   **1 + 1 + 1**

OR

Plants and animals are put into different categories :

(i) On the basis of their ability to obtain food. Plants can make their own food by the process of photosynthesis while animals obtain their food from other organisms.

(ii) Cell wall is present in plant cell while its is absent in animal cell.

(iii) Locomotion is absent is plants while animals need to move in search of food.   **1 + 1 + 1**

9. (i) Fish farming or pisciculture involves raising fish commercially in tanks or enclosures such as fish ponds, usually for food.

(ii) **Advantages of Fish Farming :**

● Fish provides high quality animal protein for human consumption.

● A farmer can often integrate fish farming into the existing farm to create additional income and improve its water management.

(iii) Rohan displayed, awareness, utility, intelligence and careness for friends.   **1 + 1 + 1**

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10. A person is most likely to fall sick in (c) condition because malaria attack has caused large scale destruction of her blood cells so she is weak and anaemic. Then she is on a four–day fast so is not getting proper and sufficient food which further decreases the functioning of her immune system and lastly chickenpox is a communicable and contagious disease. **3**

11. According to law of gravitation, the force between two objects (m_1 and m_2) is proportional to their masses and inversely proportional to the square of the distance (R) between them.

$$F = \frac{Gm_1m_2}{R_2} \quad (G = \text{gravitational constant})$$

(i) If the mass of one object is doubled.

Then,
$$F = \frac{G \times 2m_1 \times m_2}{R_2}$$

$F = 2F$, hence force will be doubled.

(ii) If the distance between the objects is doubled and tripled

Then,
$$F = \frac{G \times m_1 \times m_2}{(2R)^2} = F = \frac{1}{4} F, \text{ hence force become one-fourth of its initial force.}$$

and
$$F = \frac{G \times m_1 \times m_2}{(3R)^2}$$

$$F = \frac{1}{9} F, \text{ hence force become one-ninth of its initial force}$$

(iii) If the masses of both objects are doubled.

Then,
$$F = \frac{G \times 2m_1 \times 2m_2}{R^2}$$

$F = 4F$, hence force will be four times more than its actual value **1 + 1 + 1**

12. (a) **Possible :** When a ball is thrown up at maximum height, it has zero velocity, although it will have constant acceleration due to gravity, which is equal to 9.8 m/s^2.

(b) **Possible :** When a car is moving in a circular track, its acceleration is perpendicular to its direction. **1½ + 1½**
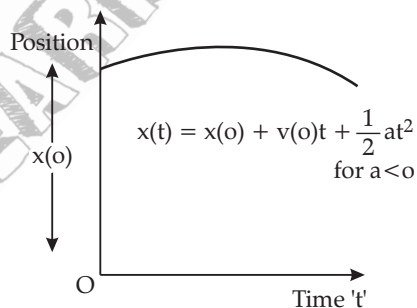
OR

(ii) Derivation of second equation of motion or
Equation for position-time relation :
Distance travelled,

s = area of the trapezium OABC

or, s = (area of the triangle ABD) + area of the rectangle OADC

or, $s = (\frac{1}{2} \times \text{base} \times \text{height}) + (\text{length} \times \text{breadth})$

$$s = (\frac{1}{2} \times AD \times BD) + (OC \times OA) \quad ...(1)$$

Position

$x(t) = x(o) + v(o)t + \frac{1}{2}at^2$
for $a < o$

$x(o)$

O

Time 't'

From the figure,

$$AD = OC = t$$
$$BD = (BC - DC) = (v - u)$$
$$= (u + at - u) = at$$
$$OA = u$$

Putting these above values in equation (1), we get

$$s = (\frac{1}{2} \times t \times at) + (t \times u)$$

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

This is the second equation of motion.

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13. The force acting on a body is directly proportional to the rate of charge of momentum of the body. This is Newton's second law of motion.

Let pi and pf be the initial and final momentum respectively.

According to newton's second law,

$$\frac{p_f - p_i}{t} \propto F$$

We known that Momentous (P) $= mv$

Let v be the final and U be the initial velocity.

Now, $\dfrac{m(v - u)}{t} \propto F$

$$\frac{F \propto m(v - u)}{t}$$

$F \propto ma$

$F = Kma$

Here, K is the proportionality constant. It's value is 1. Units of Force are given by the units of mass and acceleration. Units of force is Kgm/s^2

In accordance to honour the contributions of Newton, 1 Kgm/s^2 is termed as 1 Newton.

Newton's second law of motion, establishes the ground rules for how every thing moves. For example, if you use the same force to push a truck and push a car, the car will have more acceleration than the truck, because the car has less mass.   **3**

14. (i) Example of a volatile and a non-volatile component is a mixture of acetone and water.

Simple distillation can be used to separate a mixture of volatile and non-volatile components.

(ii) Mixture of kerosene and Petrol. Simple distillation can be used to separate two volatile components with appreciable difference in boiling points.

(iii) Example : Mixture of mustard oil and water.

Separating funnel can be used to separate a mixture of immiscible liquids.   **1 + 1 + 1**

15. (i) Poly atomic ions are a group of atoms carrying charge. They are also called molecular ions.

Example : Carbonate or phosphate or nitrate ion.

(ii) Formula of Calcium hydroxide $= Ca(OH)_2$

Formula of Aluminium Chloride $= AlCl_3$ **1 + 2**

16. ● **The major divisions in the Kingdom Plantar are :**

Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms.

● The basis of these divisions are :

(i) Presence or absence of distinct organelles.

(ii) Presence or absence of distinct and differentiated tissues.

(iii) Presence or absence of seeds.

(iv) Whether the seeds are enclosed within fruits or not.

17. (i) **Nitrogen Cycle :**

2

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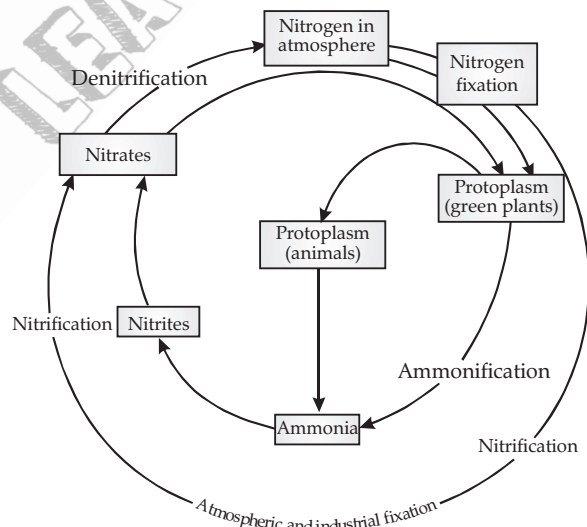
(ii) Forests influence the quality of air and water resources in the following ways :

(a) **Influence of forest on air :** Both plants and animals release carbon dioxide in the atmosphere as a product of respiration. Forests take up this carbon dioxide for the manufacture of their food and release oxygen to the atmosphere after photosynthesis. In this way they are helpful in cleaning the air.

(b) **Influence of forest on water :** Forest lose water to the atmosphere through transpiration which is then converted into clouds, water vapours etc. which are responsible for causing rain. Thus, forests help in increasing the water resources of the earth. **2 + 1½ + 1½**

18. (i) Energy processed a body by virtue of its motion is referred to as kinetic energy. S.I. unit of Kinetic energy is Joule.

Consider a mass in moving with a speed u and a force F is applied on it.

Due to the force, the velocity will change as it continues to move.

Let v be the velocity on displacing by s.

The work done to increase the speed = $\quad$ W $= Fs$.

$$F = ma$$
$$W = mas.$$
$$v^2 - u^2 = 2as \qquad \qquad ...(1)$$

Using equation of motion, $\qquad v^2 = 2as$ when u (initial velocity is Zero)

$$as = \frac{v^2}{2} \qquad \qquad ...(ii)$$

From (i) and (ii) we have $\qquad W = \frac{1}{2} mv^2$

Work done is equal to Kinetic energy of the body

$$K.E = \frac{1}{2} mv^2$$

(ii) $\qquad\qquad\qquad\qquad m = 15\,Kg \qquad\qquad v = 4m/s$

$$K.E = \frac{1}{2} mv^2 = \frac{1}{2} \times 15 \times 4 \times 4$$
$$= 30 \times 4$$
$$= 120\,Joule \qquad\qquad \mathbf{3 + 2}$$

19. (i) Audible range of average human ear : Between 20 Hz to 20,000 Hz.

(ii) Frequency less than 20 Hz is infrasonic while greater than 20 KHz is ultrasonic.

(iii) Three applications of Ultrasound are :

(a) To clean parts located in hard to reach places like spiral tube, odd shaped parts etc.

(b) Detect cracks and flaws in metal blocks.

(c) To investigate the internal organs of the human body such as Liver, gall bladder, kidney etc.

(d) SONAR. **1 + 1 + 3**

20. **Thomson's Model of an Atom :**

(i) An atom consists of a sphere of positively charge with negatively charged electrons embedded in it.

(ii) The positive and the negative charges in an atom are equal in magnitude due to which an atom is electrically neutral.

Rutherford's Model of an Atom :

(i) There is a positively charged, highly dense centre in an atom called the nucleus. Nearly the whole mass of an atom resides in the nucleus.

(ii) The electrons revolve around the nucleus in circular path.

(iii) The size of the nucleus is very small compared to the size of an atom.

Bohr's Model of an Atom :

(i) An atom consists of a positively charged centre called the nucleus where the whole mass of the atom is concentrated.

(ii) Electrons revolve in orbits with well defined energy levels.

(iii) Under normal conditions, the energy of the I^{st} energy level will be lowest, say, E_1. Other orbits, 2nd, 3rd ...., will have energies E_2, E_3 ....

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(iv) As long as an electron revolves in the same orbit, it does not radiate energy levels.

(v) When we supply energy to an electron, it can go to higher energy levels.

(vi) When an electron falls from a higher energy level to a lower energy level, the difference in energy between the two energy levels is radiated.

(vii)Since each atom has its specific energy levels, it can emit radiations of specific wavelengths or energy which leads to characteristic spectra of different atoms.
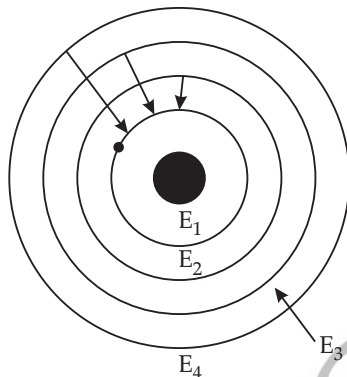
OR

(a) Bohr and Bury Scheme for Distribution of Electrons in Different Energy Levels :

    (i) The maximum number of electrons in an energy level is equal to $2n^2$ where 'n' is the energy level.

       1st energy level can have $2n^2 = 2 \times 1^2 = 2$ electrons.

       2nd energy level can have $2 \times 2^2 = 8$ electrons.

       3rd energy level can have $2 \times 3^2 = 18$ electrons.

    (ii) The last energy level (outermost energy level) cannot have more than 8 electrons.

    (iii) The last but one shell (penultimate shell) cannot have more than 18 electrons.

    (iv) the last but second shell (anti-penultimate shell) cannot have more than 32 electrons.

(b) **Isotopes :** Elements having same atomic number but different atomic masses are called isotopes.

Example : ^1H, ^2H, ^3H, or $^{12}_6C$ and $^{14}_6C$

Isobars : Elements having different atomic number but same atomic mass are called isobars.

Example : Calcium $\begin{pmatrix} 40 \\ Ca \\ 20 \end{pmatrix}$ and $\begin{pmatrix} 40 \\ Ar \\ 18 \end{pmatrix}$ Argon.   **3 + 2**

21. (a) (i) 0.5 mole of N_2 gas

$$1 \text{ mole of } N_2 \text{ gas} = 28g$$

$$0.5 \text{ mole of } N_2 \text{ gas} = \frac{28 \times 0.5}{1}$$

$$= 14.0g$$

    (ii) 3.011×10^{23} number of N atoms

$$\text{Number of moles} = \frac{\text{Given number of particles}}{\text{Avagadro's number}}$$

$$= \frac{3.011 \times 10^{23}}{6.022 \times 10^{23}} = \frac{1}{2} = 0.5 \text{ mole}$$

$$1 \text{ mole of } N = 14g$$

$$0.5 \text{ mole of } N = \frac{14 \times 0.5}{1}$$

$$= 7.0g$$

(b) The number of atoms constituting a molecule is known as atomicity.

Atomicity of Sulphur $S_8 = 8$ (Poly atomic)

Atomicity of Chlorine $Cl_2 = 2$ (Diatomic)   **1 + 2 + 2**

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SECTION- B

22. According to Archimedes principle, a body when immersed in a fluid shows an apparent loss of weight which is equal to the weight of the fluid displaced by the body. So a heavy stone when under water, is acted upon by upthrust due to water, which ultimately reduces the true weight of the stone.   **2**

23. Clock or watch with a quiet tick.   **1 + 1**

24. Glycerin is used for temporary mounting because it is a good dehydrating agent. It avoids drying of specimen. It Glycerine tends of reflect light due to its refractive nature. As a result, image appears clearer under the microscope.   **2**

25. (i)   Reptiles lay egg on land.

    (ii) All reptiles have scales or scutes.

    (iii) Reptiles are ectothermic or cold blooded. They are able to regulate their inner body temperature to the temperature of the environment.   **(Any two) 1 + 1**

26. A beam of light when passed through a true solution passes straight through it, whereas light gets scattered when passed through a suspension.   **2**

27. No, because common salt and sugar are not sublimates. Sublimates are substances which on heating directly changes into vapours changing into liquid. You can separate sublimating substances (like Naphthalene / Camphor / ammonium chloride) from the mixture through the process of sublimation.   **2**

●●

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