

SCIENCE OLYMPIAD

PRACTICE BOOK



GRADE
9

The Science Olympiad series is an initiative of International Society for Olympiad (ISFO)
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Preface



Our education system effectively provides an introduction to the concepts of Math and Science and helps us understand the underlying concepts. But in its overly generalised approach, which aims to enlighten and test all students of varying caliber and interests, it leaves the exploration of application of all these concepts completely on the students.

This workbook is designed to enable students to explore Science effectively. Designed in accordance with the requirements of the Science Olympiads, the workbook is an efficient tool to achieve comprehensive success at the **ISFO – Science Olympiad**.

The main aim of this workbook is to assist students in developing and improving their ability to solve problems.

Each chapter of the book consists of 3 sets of questions.

- **Section A** (Scientific Reasoning) : This section is created to test the knowledge of scientific concepts and topics pertaining to the respective grades.
- **Section B** (Everyday Science) : This section deals with the application of the concept learnt.
- **Section C** (BrainBox) : Questions to prepare students with HOTS (Higher Order Thinking Skills), based on the syllabus provided.

Logical Reasoning section is provided to equip students with verbal and non-verbal analysis and reasoning skills.

Sample Test Papers and Answer keys have been provided to accelerate the learning process.



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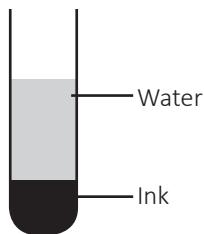
Matter in Our Surroundings

- ▶ Matter is used to cover all the substances and the materials from which the universe is made.
- Particles are very tiny things present in the matter. Every matter is made up of certain particles, which differs in shape, size and nature from other types of matter. Particles are of two types: atoms and molecules.
- The mixing and spreading out of a particular substance with the another substance due to the movement or motion of its particles, is called diffusion.
- The rate of diffusion in liquids is much faster than those in solids, because the particles of liquids move much more freely, and have more space between them as compared to the particles of solids.
- The kinetic energy of particles (or the amount of movement) is maximum in gases, more in liquid and minimum in solids.
- The force of attraction between particles (or inter-particle forces) is strongest in solids, weaker in liquids and weakest (negligible) in gases.

SECTION - A : SCIENTIFIC REASONING

1. Wet clothes are kept for drying. Which of the following does not help them in drying?
 - a. Spreading them out.
 - b. Blowing wind over them.
 - c. Making the room a little warmer.
 - d. Cooling the room.
2. When a mixture is boiled for separating into its constituents, the constituent which is separated at last has:
 - a. lower boiling point.
 - b. higher boiling point.
 - c. can have lower or higher boiling point.
 - d. medium boiling point.
3. Latent heat of vaporisation is used to:
 - a. overcome the forces of attraction between the liquid particles at the boiling point.
 - b. overcome the forces of attraction among solid particles at the freezing point.
 - c. increase the kinetic energy of particles in the liquid state.
 - d. increase the kinetic energy of the particles in the vapour phase.
4. When an incense stick is lit in one corner of the room, the aroma is felt equally in all parts of the room. This is due to:
 - a. evaporation
 - b. combustion
 - c. sublimation
 - d. diffusion
5. The term “fluid” may describe more than one state of matter. Which one of the following may describe a fluid?
 - a. Solid and gas
 - b. Gas and liquid
 - c. Solid and liquid and gas
 - d. Liquid and solid
6. When a bottle of soda water is opened, carbon dioxide escapes, producing a fizz. This is due to:
 - a. decrease in the solubility on decreasing the temperature.
 - b. decrease in the solubility on increasing the temperature.
 - c. decrease in the solubility on decreasing the pressure.
 - d. Both b. and c.
7. When liquid starts boiling, the further heat energy which is supplied:
 - a. is lost to the surrounding as such.
 - b. increases the temperature of the liquid.
 - c. increases the kinetic energy of the particles in the liquid.
 - d. is absorbed as the latent heat of vaporisation by the liquid.
8. Ammonia and hydrogen chloride gases are both pungent smelling in nature. These are released from the two opposite corners in a room. Which gas will reach first a person sitting at the center of the room?
 - a. Ammonia
 - b. Hydrogen
 - c. Both a. and b.
 - d. None of these
9. Rohit puts some petrol in a saucer and left it open in the garage. Next day, when he went to garage, he found that there was no petrol left in it. What happened to the petrol?
 - a. Stolen
 - b. Evaporated
 - c. Leaked away
 - d. Both a and b

10. A small amount of blue ink was carefully placed at the bottom of a test-tube containing some water as shown in the diagram. After several hours, the ink would have:



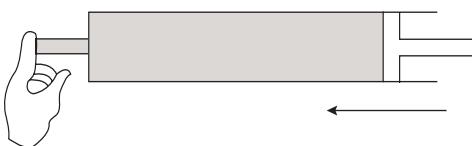
test tube containing separate ink and water level

- a. diffused throughout the water producing a uniform blue solution.
- b. ink particles settle down.
- c. only few ink particles get mixed with the water.
- d. Cannot say.

11. The Bose - Einstein phase of matter occurs closest at what temperature?

- a. Boiling point of the water
- b. Freezing point of the water
- c. Absolute zero temperature
- d. 1000°F

12. The diagram shows a coloured gas being compressed in a gas syringe, until the plunger can not be pushed any further. The experiment is repeated using the same volume of a coloured liquid. It is found that the final volume of the gas is :



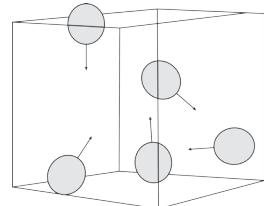
- a. much less than that of the liquid.
- b. much more than that of the liquid.
- c. same as that of the liquid.
- d. none of these

13. Rita heated some water on a gas flame and placed a thermometer to record the temperature change in this process. She

observed that the temperature kept on increasing till the water starts boiling, but after that, it was found constant. What might be the temperature at which this has happened?

- a. 200°C
- b. 4°C
- c. 10°C
- d. 100°C

14. Study the diagram carefully. It shows the way that the particles of a gas occupy space.



The particles of gas have lots of space, they move randomly at high speeds in three dimensions and collide with each other and also with the container in which they are packed. The arrows represent the velocities of the gas particles. Select the property of a gas from the list below which can describe the given diagram.

- a. Gases have maximum fluidity.
- b. Gases have indefinite volume and shapes.
- c. Gases can be compressed easily.
- d. All of these

15. There are 5 states of matter in all. They differ in their physical and chemical features. Study the given table and match the columns.

State of matter	Property
w – Liquid	i) Highly compressible
x – Gas	ii) Definite Volume
y – Plasma	iii) Super Low Density
z – BEC	iv) Highly energetic

Choose the correct option.

- a. w – (iv), x – (iii), y – (ii), z – (i)
- b. w – (ii), x – (iii), y – (i), z – (iv)
- c. w – (iii), x – (ii), y – (iv), z – (i)
- d. w – (ii), x – (i), y – (iv), z – (iii)

SECTION - B : EVERYDAY SCIENCE

16. Rahul's younger brother is learning how to read a thermometer. He asks, "Why does the red stuff in the thermometer goes up when it gets heat from the outside?" What is a correct explanation that Rahul can give to his brother?
- When the red stuff gets warmer, it increases in volume. Since it is confined in the tube, it must go up.
 - The red stuff in that little tube rises up because it is really sensitive to heat.
 - The red stuff goes up because the pressure of coldness is not there and the red stuff is free to move.
 - The heat hits the bottom of the thermometer and boosts up the temperature.
17. Rohit visited a Natural Gas Compressing Unit and found that gases can be liquefied under specific conditions of temperature and pressure. While sharing his experience with friends he got confused. Help him to identify the correct set of conditions.
- Low temperature, high pressure
 - High temperature, low pressure
 - Low temperature, low pressure
 - None of these
18. A team of students were going to visit a desert area where temperature is too high, more than 48°C . They were carrying some inflammable substances along with them. Then, the students collected information about these substances and tabulated data as given here:

Substance	Ignition Temperature
W	38°C
X	42°C
Y	53°C
Z	66°C

Which of these substances, they should carry to the desert area?

- W and X
- X and Y
- Y and Z
- X and Z

19. Anushka was making tea in a kettle. Suddenly, she felt intense heat from the steam gushing out of the spout of the kettle.

Which of the following is not a possible observation by Anushka?

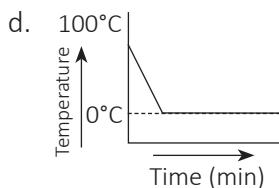
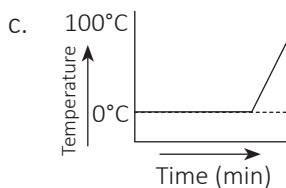
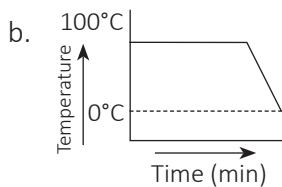
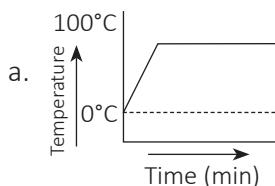
- The temperature of the steam was higher than that of the boiling water.
- Steam is more dangerous than boiling water.
- The temperature of both the boiling water and the steam was same.
- Steam gives out more heat than boiling water due to latent heat.

20. In summers, water is kept in earthen pots to keep it cool. Which of the following could be possible reason for cooling of water in an earthen pot?

- It happens because of evaporation of water.
- Water molecules seep through the pores of the earthen pot.
- The water evaporates continuously and takes latent heat required for vaporisation.
- All of these

SECTION - C : BRAINBOX

21. Geeta heated a beaker containing ice and water. She measured the temperature of the content of the beaker as a function of time. Which of the following graph can correctly represent her result?



22. The diagrammatic representation of interconversion of the states of water is given below.

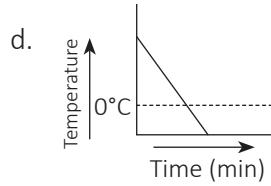
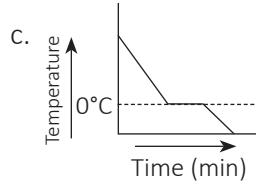
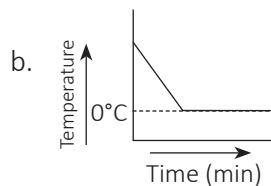
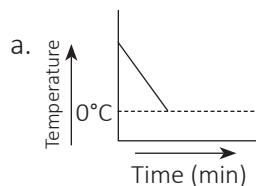


Which of the following is incorrect about the phenomena P, Q, R and S?

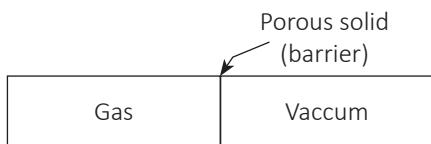
- a. P and Q are endothermic, while R and S are exothermic.

- b. P and Q are exothermic, while R and S are endothermic.
- c. Water vapours formed during the process "Q", when comes in contact with skin, give out 22.5×10^5 J/kg more heat than the boiling water.
- d. Latent heat for the process 'P' is 3.3×10^5 J/kg.

23. A glass tumbler containing hot water is kept in the freezer compartment of a refrigerator. If you could measure the temperature of the content of the glass tumbler, which of the following graph would correctly represent the change in its temperature as a function of time?



24. Rate of diffusion of different gases at same temperature and pressure can be studied by using given apparatus.



Which of the following pairs of gases would diffuse into vacuum at same speed?

- a. $\text{NH}_3 + \text{N}_2$
- b. $\text{CO}_4 + \text{SO}_2$
- c. $\text{NH}_3 + \text{H}_2$
- d. $\text{CO} + \text{N}_2$

25. Choose the incorrect statement about the plasma state of the matter.

- a. The particles of plasma state are in the forms of ionised gases.
- b. Colour and taste of plasma depends on the temperature of the gas only.
- c. Plasma is created on the stars.
- d. Plasma state consists of highly energetic and highly excited particles.

Darken your choice with HB pencil –

1.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
2.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
3.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
4.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
5.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
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7.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

8.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
9.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
10.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
11.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
12.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
13.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
14.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

15.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
16.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
17.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
18.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
19.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
20.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
21.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

22.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
23.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
24.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
25.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

Is Matter Around Us Pure?

→ Matter is made of one or more components known as substances.

- Pure substances have been classified into two types : elements and compounds.
- An element is the simplest or the basic form of a pure substance, which cannot be broken into anything further by physical or chemical methods.
- Elements are further classified into metals, non-metals and metalloids.
- **Metals** are strong and tough. They have high tensile strength. Metals are lustrous (shiny) and can be polished.
- **Non-metals** are not strong. They have low tensile strength. Non-metals are non-lustrous (dull) and cannot be polished (except iodine which is a lustrous non-metal).
- **Compounds** are the pure substances containing two or more elements, which combines together in a fixed proportion by mass". Example: H_2O (water), Carbon dioxide, Ammonia, etc.

SECTION - A : SCIENTIFIC REASONING

1. The principle of chromatography is:
 - a. liquids with lower boiling points boil off first.
 - b. salts with lower solubility crystallise out from saturated solution when cooled.
 - c. the rate of diffusion of the liquids vary.
 - d. all liquids are not miscible in water.
2. Inter-conversion of the states of matter is considered as a physical change because:
 - a. state changes from one form to another.
 - b. a change in the temperature is required.
 - c. the chemical composition of the substance remains unchanged.
 - d. they have the same physical properties.
3. Which of the following substance, when mixed with sand cannot be separated by sublimation?
 - a. NaCl
 - b. NH₄Cl
 - c. Camphor
 - d. Iodine
4. A solution is prepared by mixing a white powder in distilled water. As soon as the powder was added to make solution, it turns blue. It can be the powder of:
 - a. Sulphur
 - b. Copper
 - c. Bromine
 - d. Potassium
5. Which of the following statement is correct?
 - a. In a colloidal solution, the size of a colloidal particle lies roughly between 0.1 nm to 1 nm.
 - b. In a colloidal solution, the particles have a tendency to settle down when the solution is left undisturbed.
 - c. In a colloidal solution, the particles pass through ultra filter papers and animal and vegetable membranes.
 - d. In a colloidal solution, the dispersed phase is uniformly distributed in the dispersion medium.
6. A solution contains 5 ml of alcohol mixed with 75 ml of water. What is the concentration of the solution in terms of volume percent?
 - a. 6.25
 - b. 3.5
 - c. 4.5
 - d. 8.50

Direction (Q. No. 7 and 8)

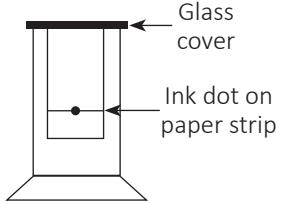
A homogeneous mixture is a true solution, in which the solute particle size is very small – 10 Å. Due to this, solute particles cannot be seen with naked eyes and they cannot be separated by filtration. Homogeneous mixtures are clear and transparent. Heterogeneous mixtures can be classified into either colloids or suspensions depending on the particle size. Colloids are solutions in which the solute particle size is between 10 Å and 1000 Å. Suspensions are solutions in which the particle size is greater than 1000 Å. Human beings can see the particles whose particle size is greater than 10 Å.

7. The order of a solute particle size is:

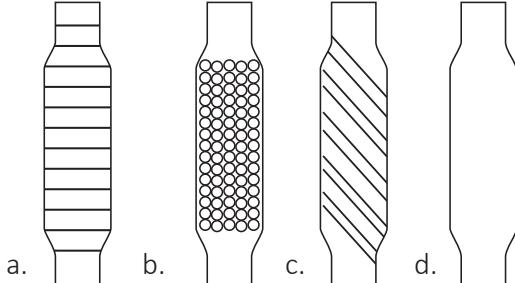
- a. true solution < suspension < colloid.
- b. true solution > suspension > colloid.
- c. true-solution > colloid > suspension.
- d. true solution < colloid < suspension.

8. Filtration can be used, if the solute particle size is
 a. greater than 10^{-7} Å.
 b. equal to 10^{-9} Å.
 c. smaller than 1.0 Å.
 d. smaller than 10^{-8} Å.
9. A mixture of sulphur dioxide (boiling point is 10°C) and oxygen (boiling point is -183°C) can be separated economically by:
 a. cooling to boiling point of oxygen.
 b. absorbing the gases.
 c. cooling to BP of SO_2 .
 d. reacting one of the gases.
10. A salt solution is obtained by dissolving 20 g of salt in 80 g of water. To make this salt solution 60%,
 a. add 100 g of water to the solution.
 b. add 100 g of the salt to the solution.
 c. add 50 g of water and 50 g of salt to the solution.
 d. both a and b
11. Match the following.
- | Column – I | Column – II |
|--|--------------------|
| 1. Salt in water | p. Solid in solid |
| 2. Soda water | q. Gas in gas |
| 3. Air | r. Solid in liquid |
| 4. Bronze | s. Gas in liquid |
| a. $(1 \rightarrow s), (2 \rightarrow r) (3 \rightarrow q), (4 \rightarrow p)$ | |
| b. $(1 \rightarrow r), (2 \rightarrow s) (3 \rightarrow p), (4 \rightarrow q)$ | |
| c. $(1 \rightarrow p), (2 \rightarrow r) (3 \rightarrow q), (4 \rightarrow s)$ | |
| d. $(1 \rightarrow r), (2 \rightarrow s) (3 \rightarrow q), (4 \rightarrow p)$ | |
12. Which of the following are homogeneous in nature?
 i. ice ii. wood iii. soil iv. air
- a. (i) and (iii)
 b. (ii) and (iv)
 c. (i) and (iv)
 d. (iii) and (iv)
13. A solution contains 40 g of sugar dissolved in 360 g of water. What is the concentration of this solution?
 a. 20 %
 b. 30 %
 c. 10 %
 d. 40 %
14. Read the following statements and mark the correct option.
- Statement – I : Evaporation causes cooling.
 Statement – II : Particles of liquid absorb energy from the surrounding to regain the energy lost during evaporation.
- a. Only the statement I is correct
 b. Only the statement II is correct
 c. Both the statements, I and II are correct
 d. Both the statements I and II are incorrect
15. The boiling points of a few substances given below:
- | Substance | Kr | Ne | N_2 | O_2 |
|-------------------|------|------|--------------|--------------|
| Boiling point (x) | -152 | -246 | -196 | -183 |
- If the mixture of these substances undergoes fractional distillation, what will be the order of distillation of substances?
- a. Kr, Ne, N_2 , O_2
 b. Ne, N_2 , O_2 , Kr
 c. O_2 , Ne, N_2 , Kr
 d. N_2 , Ne, O_2 , Kr

SECTION - B : EVERYDAY SCIENCE

16. Tincture of Iodine has antiseptic properties. This solution is made by dissolving :
- I_2 in KI .
 - I_2 in Vaseline.
 - I_2 in water.
 - I_2 in alcohol.
17. Anil is given two samples of water labelled as 'X' and 'Y'. Sample 'X' boils at $100^{\circ}C$ and sample 'Y' boils at $102^{\circ}C$. Which of the given statement is incorrect about these samples?
- Sample 'Y' will not freeze at $0^{\circ}C$.
 - Sample 'X' will not freeze at $0^{\circ}C$.
 - Sample 'Y' contains impurities.
 - Insufficient information is provided.
18. Gold is alloyed with Cu or Ag for the purpose of making ornaments. Why is alloying done?
- To make gold harder and stronger.
 - To make gold more brittle.
 - To make gold less brittle.
 - Both a. and c.
19. A student wanted to separate the components of a dye. For this purpose, he took a sample of ink. He set up the experiment as shown here. Which of the following statement is correct about it?
- 
- Three different coloured spots would be obtained on the strip at different heights.
 - This method of separation is called chromatography.
 - This method is also used to separate drugs from the blood.
 - All are correct.
20. Iron is used in different forms, like cast iron, steel and alloys. The iron-carbon bond structure, considered as basis for the branch of science is :
- Organic chemistry
 - Carbon metallurgy
 - Ferrous metallurgy
 - Stereo chemistry

SECTION - C : BRAINBOX

21. Two chemical species, A and B combine together to form a product C. The molecular formula of C contain A and B.
 $A + B \rightarrow C$
- A and B cannot be broken down into simpler substances by simple chemical reactions. Which of the following concerning the species, A, B and C is correct ?
- C is a compound
 - A and B are compounds
 - A and B are elements
 - Both a. and c.
22. Which of the following tubes will be more effective as a condenser in the distillation apparatus?
- 

23. There are various techniques to separate the components of a mixture.

Match the technique suitable for the mixture to be separated.

Separation Technique	Mixture to be separated
p – Sublimation	i) Separation of water and CCl_4
q – Distillation	ii) Separation of NaCl from MNO_3
r – Magnetic Separation	iii) Separation of benzene & aniline
s – Separating funnel	iv) Separation of metal and sand
t – Fractional Crystallisation	v) Separation of NH_4Cl & sand

Choose the correct option –

- a. p – (v), q – (iii), r – (iv), s – (i), t – (ii)
- b. p – (iv), q – (iii), r – (v), s – (i), t – (ii)
- c. p – (v), q – (iv), r – (iii), s – (ii), t – (i)
- d. p – (iii), q – (iv), r – (v), s – (i), t – (ii)

24. Iron fillings and sulphur powder are mixed together and divided into two parts – 'X' and 'Y'. Part 'X' was heated. Dilute HCl is added to both parts, 'X' and 'Y', and a gas is evolved in both the cases. Which of the following reaction can be used to identify the gas evolved?

Action	Result
a. Pass this gas to $\text{Ca}(\text{OH})_2$	Black precipitate
b. Pass this gas to lead acetate	Black precipitate
c. Bring burning match stick near the mouth of the test tube	Burns with blue - red flame
d. Bring dry blue litmus near the mouth of the test tube	Turns red

25. Match the following.

	Column – I		Column – II
1. CO_2 gas \rightarrow CO_2 solid	p.	Chemical change	
2. H_2 molecules \rightarrow Helium atoms	q.	Nuclear fission	
3. $\text{C} \rightarrow \text{CO}_2$	r.	Nuclear fusion	
4. Uranium \rightarrow Lead	s.	Physical change	

- a. (1 \rightarrow s), (2 \rightarrow r) (3 \rightarrow p), (4 \rightarrow q)
- b. (1 \rightarrow q), (2 \rightarrow r) (3 \rightarrow p), (4 \rightarrow s)
- c. (1 \rightarrow p), (2 \rightarrow q) (3 \rightarrow s), (4 \rightarrow r)
- d. (1 \rightarrow r), (2 \rightarrow p) (3 \rightarrow s), (4 \rightarrow q)

Darken your choice with HB pencil –

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4. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	11. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	18. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	25. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d
5. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	12. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	19. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	
6. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	13. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	20. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	
7. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	14. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	21. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	

Atoms and Molecules

- ▶ The symbol of an element is the “first letter” or the “first letter and another letter” of the English name or Latin name of the element.
- During a chemical reaction, the sum of the masses of the reactants and the products remains unchanged. This is known as the law of conservation of mass.
- A chemical compound always contains the same elements which combines together in same proportion by mass, independent of the method by which it is prepared or the source from which it is obtained.
- Molecule is an electrically neutral group of two or more atoms chemically bonded together.
- Atoms are electrically neutral. On gaining or loosing electron, they get converted into charged species, called ions.
- Valency of ions is equal to the charge on the ions.

SECTION - A : SCIENTIFIC REASONING

1. The formula of the chloride of a metal is MCl_3 . The formula of its sulphate is:
 - a. MSO_4
 - b. $\text{M}_2(\text{SO}_4)_3$
 - c. $\text{M}_3(\text{SO}_4)_2$
 - d. $\text{M}_4(\text{SO}_4)_3$
2. What happens to the number of electron, proton and neutron when the calcium metal (Ca) changes to calcium ion (Ca^{+2})?
 - a. They remain same.
 - b. The number of neutrons remain same, while the number of both protons and electrons changes.
 - c. The number of neutrons and protons remain same, while the number of electrons decrease by 2.
 - d. The number of neutrons and electrons remain the same, while the number of protons increase by 2.
3. 4.9 g of KClO_3 , when heated, produced 1.94 g of Oxygen and the residue (KCl), left behind weighs 2.96 g. This chemical reaction follows _____.
 - a. the law of multiple proportion
 - b. the law of conservation of mass
 - c. the law of constant proportion
 - d. the law of reciprocal proportion
4. Find molality of a solution when 50 g urea (H_2NCONH_2) is dissolved in 1 kg of water.
 - a. 0.83
 - b. 0.79
 - c. 0.85
 - d. 1.83
5. Which of the following statement is true?
 - a. Mass of 0.5 mole of N_2 gas > Mass of 0.5 mole of N atoms
 - b. Mass of 0.5 mole of N_2 gas = Mass of 0.5 mole of N atoms
 - c. Mass of 0.5 mole of N_2 gas < Mass of 0.5 mole of N atoms
 - d. Mass of 0.5 mole of N_2 gas = Mass of 0.5 mole of O_2 gas
6. The reducing agent in the given reactions is:
$$\text{Fe(s)} + \text{Cu}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \downarrow \text{Fe}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) + \text{Cu(s)}$$
 - a. Cu^{2+}
 - b. Fe
 - c. Fe^{2+}
 - d. SO_4^{2-}
7. 'X' is the product formed in the reaction given below. What will be the colour of the 'X' as per this reaction?
$$\text{Fe(s)} + \text{H}_2\text{SO}_4(\text{aq}) \xrightarrow{\text{heat}} \text{X(aq)} + \text{H}_2(\text{g})$$
 - a. Green colour
 - b. Yellow colour
 - c. Blue colour
 - d. Black colour
8. Which of the following is correct about the mole of a substance?
 - I. A mole represents a definite number of atoms or molecules of a substance.
 - II. It represents 6.022×10^{23} atoms or molecules of a substance.
 - III. A mole also represents a definite amount of the substance.
 - IV. It represents the amount of a substance equal to its gram atomic mass or gram molecular mass.
 - a. I and II
 - b. II and III
 - c. I, II, III and IV
 - d. III and IV

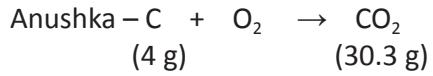
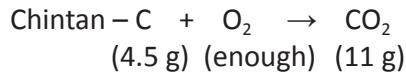
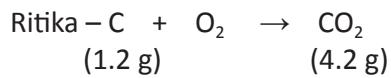
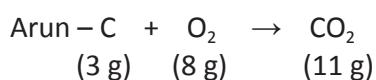
9. Arrange the following in the decreasing order of their masses and choose the correct option for it.
- 2.5 moles of water
 - 3.012×10^{24} molecules of water
 - 25 g of water
- III > I > II
 - III > II > I
 - II > I > III
 - II > III > I
10. Calculate the weight of carbon monoxide having the same number of oxygen atoms as are present in 22 g of carbon dioxide.
- 12 gram
 - 16 gram
 - 28 gram
 - None of these
11. How many grams of oxygen gas contain the same number of molecules as 16 grams of sulphur dioxide gas?
(O = 16 u, S = 32 u)
- 12 grams
 - 18 grams
 - 8 grams
 - 10 grams
12. The valencies of two elements A and B are given. What is the formula of nitrate of B?
- | Element | Valency |
|---------|---------|
| A | 1+ |
| B | 2+ |
- a. $\text{B}(\text{NO}_2)_2$ b. $\text{B}(\text{NO}_3)_2$
c. $\text{B}(\text{NO}_3)_3$ d. $\text{B}(\text{NO})_2$
13. A sample of pure water irrespective of its source contains 88.89% oxygen and 11.11% hydrogen by mass. The data supports:
- the law of conservation of mass.
 - the law of constant composition.
 - Dalton's Atomic theory.
 - Avogadro's law.
14. If 2 g of water contains Z molecules, what will be number of molecules in 4 g of carbon dioxide?
- $9Z/10$ molecules
 - $9Z/15$ molecules
 - $7Z/11$ molecules
 - $9Z/11$ molecules
15. If 90 g of pure water is obtained through 80 g of oxygen and X g of hydrogen. Then the value of X will be _____
- 10 g
 - 15 g
 - 18 g
 - 20 g

SECTION - B : EVERYDAY SCIENCE

16. Match column I with the column II.
- | Common Names | Chemical Formulas |
|-----------------------------|------------------------------|
| p – Vinegar | i) NaHCO_3 |
| q – Baking Soda | ii) CH_3COOH |
| r – Bleaching Powder | iii) CaO |
| s – White washing Substance | iv) CaOCl_2 |
- Choose the correct option:
- p – (iv), q – (ii), r – (i), s – (iii)
 - p – (ii), q – (i), r – (iv), s – (iii)
 - p – (iii), q – (ii), r – (iv), s – (i)
 - p – (i), q – (ii), r – (iv), s – (iii)
17. Riya's mother had a very beautiful gold necklace. But the jeweller told her that the necklace is made of 90% gold and 10% copper. Calculate the number of atoms of gold present in 1 g of this sample of gold necklace.
- 6.022×10^{23}
 - 1.67×10^{-23}
 - 2.75×10^{21}
 - 2.75×10^{-21}

18. The visible universe is estimated to contain 10^{25} stars. How many moles of stars are present in the visible universe?
- 1.67×10^{-2} mol
 - 1.67×10^2 mol
 - 0.167×10^2 mol
 - 0.67×10^{-2} mol
19. Atomic clocks can measure time very accurately. They are not affected by rotation or revolution. This measurement is based on the:
- size of the atoms.
 - chemical reaction of the atoms.
 - movement of the atoms.
 - vibration of the atoms.

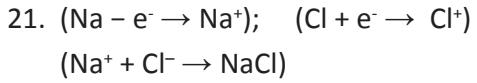
20. A group of students conducted different experiments in the following ways :



Which of the given experiments satisfies the law of constant proportions?

- Arun's and Ritika's
- Ritika's
- Anushka's and Chintan's
- Arun's

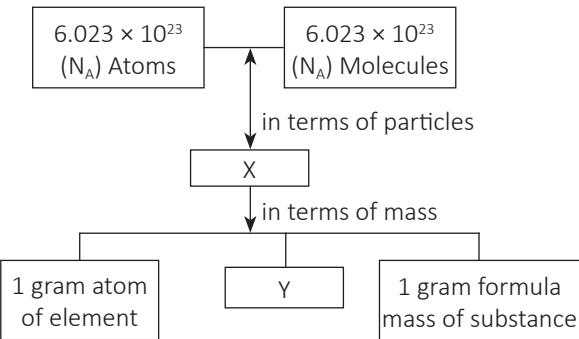
SECTION - C : BRAINBOX



Which of the following statements justify the above chemical reactions?

- An ionic compound is made up of two ions, one positively charged cation and another negatively charged anion.
 - Cations are usually formed by the metals, which donate their electrons to the nonmetals, which accept the electrons to form anions.
 - An ionic compound is made up of a metal and a nonmetal.
 - A cation is formed by the loss of electrons.
- I and II
 - I, II, III and IV
 - II and III
 - III and IV

22. Following table shows the summary of different relationships in terms of mole Concept. Choose suitable option for X and Y.



- X- 1 Mole, Y- 1 gram mole of substance
- X- 3 Mole, Y- 2 gram mole of substance
- X- 1 Mole, Y- 1.5 gram mole of substance
- None of the above

23. The atomic mass of an element represents the actual mass of its atom. Which of the statement shown below correctly justify this line about atomic mass?
- I. Atoms of different elements are very small in size and their actual masses are extremely small
 - II. To solve this problem, we consider the relative atomic masses of the elements
 - III. If we divide the atomic mass of an element by the actual mass of its atom, the value is 6.022×10^2
- a. I is correct and II is the correct explanation of I
 - b. II is incorrect and I is correct
 - c. All the three statements I, II and III are correct
 - d. I is correct and II is correct explanation of I, but III is not related to this statement
24. When atoms like those of chlorine or oxygen pick up an electron, they release energy and assume a more stable form. This energy released is said to be a measure of the
- a. electron affinity.
 - b. electrochemical potential.
 - c. explosive power of the atom.
 - d. nuclear stability.
25. Atoms of inert gas elements are monoatomic, while of the other elements are not. This is because
- I. the atoms of inert gas elements have stable electronic configuration, thus, they can exist independently and are monoatomic in nature.
 - II. the atoms of all other elements are yet to have stable configuration and to achieve it, they combine with the atoms of the other elements
- a. Both I and II
 - b. Only I
 - c. Only II
 - d. None of the above

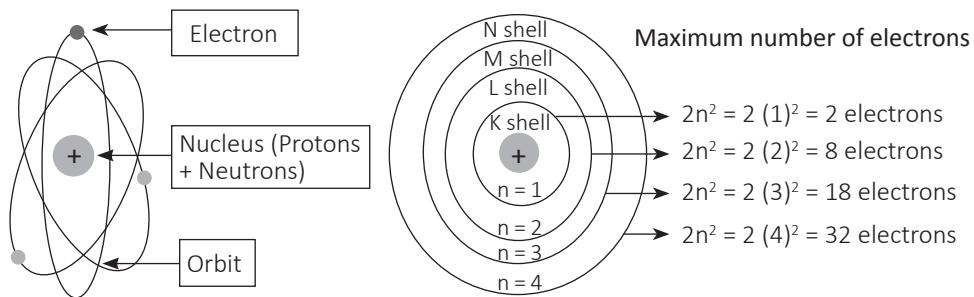
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4. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	11. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	18. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	25. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d
5. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	12. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	19. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	
6. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	13. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	20. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	
7. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	14. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	21. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	

Structure of Atom

→ To describe the arrangement of subatomic particles within an atom, many models of atom are proposed like- Thomson's model, Rutherford's model and Bohr's model.

- Electron, proton and neutron are subatomic particles. Electron carries one unit of negative charge and it has negligible mass. Proton carries one unit of positive charge; it is 2000 times heavier than the electron. Neutron is the chargeless atomic particle.

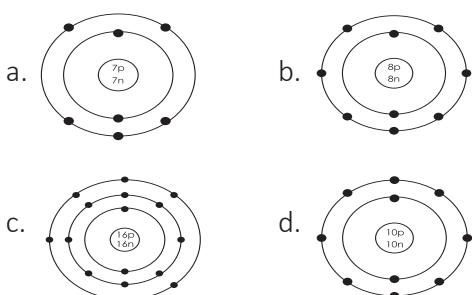


- Atomic number represents the total number of protons present in the nucleus of an atom.
- Mass number represents the total number of protons and neutrons present in the nucleus of an atom.
- Valency is the number of electrons gained, lost or shared by an atom, so as to make the octet of the electrons in the outermost shell.

SECTION - A : SCIENTIFIC REASONING

1. The isotopes of carbon ${}_6\text{C}^{12}$, ${}_6\text{C}^{13}$, ${}_6\text{C}^{14}$ have different mass numbers, but are electrically neutral. This happens because
 - a. the number of electrons and protons are same and the number of neutrons vary, which produces no net charge.
 - b. The number of electrons and protons are same.
 - c. The number of neutrons vary, which produces no net charge and the mass numbers are different.
 - d. The atomic numbers are same.
2. An element Y has 15 electrons, 16 neutrons, and 15 protons. Its atomic number, mass number and symbol respectively are:
 - a. 15, 31, ${}_{31}\text{Y}^{15}$
 - b. 15, 15, ${}_{15}\text{Y}^{15}$
 - c. 15, 31, ${}_{15}\text{Y}^{31}$
 - d. 31, 16, ${}_{31}\text{Y}^{16}$
3. An element 'X', that has an atomic number 16 is required to form ion by achieving its nearest inert gas configuration. The inert gas is –
 - a. Helium
 - b. Neon
 - c. Argon
 - d. Krypton
4. In an atom, constituent electrons _____.
 - a. move in all directions
 - b. do not move at all
 - c. move around the nucleus in fixed every levels
 - d. move around the nucleus randomly
5. Which of the following statement is correct about the molecules in the vapour of aluminum chloride?
 - a. They are round.
 - b. Each of them are shaped like a plane triangle.
 - c. They have no shape.
 - d. They appear like a collection of randomly broken bricks.
6. The atoms in a molecule do not remain stationary. They vibrate around their mean position, by stretching or bending out of the plane. We gain useful knowledge about these vibrations and the energy they carry by studying:
 - a. X-ray spectra
 - b. Infrared spectra
 - c. Ultraviolet spectra
 - d. Visible spectra
7. Which of the following statement is incorrect?
 - a. An isotope of iodine is used in the treatment of Goitre.
 - b. An isotope of uranium is used as a fuel in a nuclear reactor.
 - c. An isotope of cobalt is used in the treatment of cancer.
 - d. An isotope of carbon is used in the preparation of dye.
8. Which of the following statement(s) is/are correct about the canal rays?
 - I. They are positively charged radiations which were discovered by E. Goldstein in 1886.
 - II. They travel in the direction opposite to that of cathode rays.
 - III. They are also called as anode rays or positive rays.

- IV. They led to discovery of protons.**
- I and II
 - II and IV
 - I, II and IV
 - I, II, III and IV
- 9. When beryllium is bombarded with alpha particles (Chadwick's experiment), extremely penetrating radiations, which cannot be deflected by electrical or magnetic field, are given out.**
- These are :
- a beam of protons.
 - alpha rays.
 - a beam of neutrons.
 - a beam of neutrons and protons.
- 10. There are two atomic species X and Y, such that –**
- | Atomic species | X | Y |
|----------------|---|----|
| Protons | 7 | 7 |
| Neutrons | 7 | 10 |
- Which of the following statement is correct about X and Y?
- X and Y are isobars.
 - X and Y have different chemical properties.
 - X and Y have different physical properties.
 - All of the above
- 11. Which of the following correctly represents the arrangement of electrons in ${}_{7}N^{14}$?**



- 12. Aluminium has atomic number 13. Its valency and the number of valence electrons are :**

- +3 and 3, respectively.
- 3 and 3, respectively.
- +3 and 13, respectively.
- 13 and 3, respectively.

- 13. Elements X, Y, A, D and E have electrons, neutrons and protons as follows:**

Element	Electrons	Neutrons	Protons
X	4	4	3
Y	8	9	9
A	18	22	18
D	17	20	17
E	17	18	17

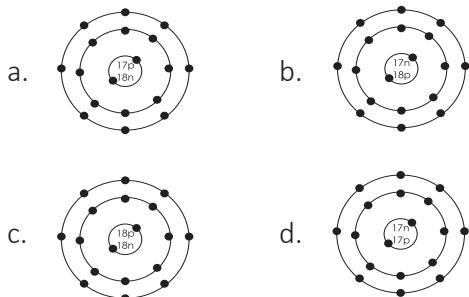
On the basis of the above data, identify an atom of noble gas.

- Only A
- X and Y
- A and D
- Only E

- 14. If the average atomic mass of a sample of an element X is 35.5u, calculate the percentage of the isotopes ${}_{17}X^{37}$ in this sample.**

- 20%
- 40%
- 25%
- 35%

- 15. Which of the following is a correct representation of Cl^{-} ion?**



SECTION - B : EVERYDAY SCIENCE

16. Which of the following statement is correct about the isotope of the element which is used for the treatment of cancer?

 - I. Isotope of cobalt, Co-60 is used in the treatment of cancer.
 - II. It is a radioactive metal used in radiotherapy.
 - III. It produces two gamma rays.

a. I and II b. II and III
c. I, II and III d. None of these

17. In nature, Boron element occurs 19.9% as B¹⁰ and 80.1% as B¹¹. If the isotopic mass of B¹⁰ is 10.013 amu and that of B¹¹ is 11.009. What is the atomic mass of Boron?

a. 11 b. 11.8
c. 10 d. 10.8

18. Aditya studied about an element which exists in its two isotopic forms. This element is used in purification of water and in the swimming pools. which of the following element Aditya studied about?

a. X → 2, 8, 8
b. X → 2, 8, 7

c. X → 2, 8, 8, 7
d. X → 2, 8, 2

19. In Rutherford's α - scattering experiment, a gold foil was used. Which of the following properties of gold made it – suitable for this experiment?

 - Gold is a heavy metal with high atomic mass.
 - Gold is the best malleable metal.
 - Only gold can be beaten into 100 atoms thick foil.
 - All of these

20. Lithium is a soft and reactive metal. Its atoms have an electronic configuration of 2, 1.

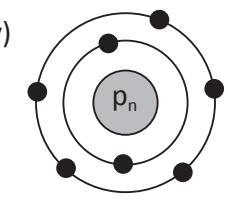
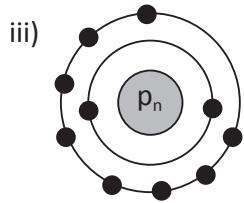
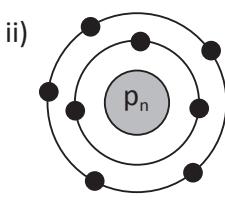
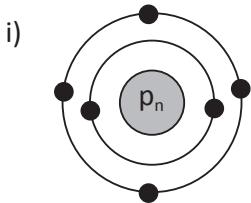
Which of the following statements are correct about lithium?

 - The lithium atom has 1 valence electron.
 - The lithium ion has an electronic configuration of 2, 2.
 - All the electrons of lithium take part in the bonding with other atoms.

a. Both I and II b. Only II
c. Only III d. Only I

SECTION - C : BRAINBOX

21. Which of the following do not represent Bohr's model of atom?



- a. i, ii
 - b. ii, iii
 - c. iii and iv
 - d. i, iv

22. In a sample ethylethanoate ($\text{CH}_3\text{CooC}_2\text{H}_3$), the two oxygen atoms have the same number of electrons but different number of neutrons. Which of the following is the correct reason for it?

- One of the oxygen has gained.
- One of the oxygen has 2 neutrons.
- The two oxygen atoms are isotops.
- The two oxygen atoms are isobars.

23. Composition of nuclei of two atomic species X and Y are as follows –

- Protons and neutrons of X = 6
- Protons and neutrons of Y = 6
- Electrons of X = 8 , Electrons of Y = 6

How are X and Y related to each other?

- X and Y are isotopes because they have the same atomic numbers but different mass numbers.
- X and Y are an atom and an ion of the same element.
- Y is an atom, while X is an ion of the same element.
- They are oppositely charged ions of different elements.

24. Which of the following isotopes incorrectly represent the natural isotopes of the element shown in column?

Column	Isotopes
Cl	Cl-35 and Cl-37
O	O-11, O-12 and O-13
C	C-12, C-13 and C-14
H	H-1, D-2 and T-3

25. In Rutherford's experiment, generally the thin foil of heavy atoms, like gold, platinum, etc. have been used to be bombarded by the particle. If the thin foil of light atoms like aluminium, etc. is used, what difference would be observed from the above results?

- I. The number of α -particles undergoing deflection will be very small.
 - II. The number of α -particles undergoing deflection will be very large.
 - III. The light atom will not be able enough to deflect heavy fast moving helium nuclei in α -particles.
 - IV. The light atom will be able enough to deflect heavy fast moving helium nuclei in α -particles.
- I and III
 - I and IV
 - I and II
 - Only I

Darken your choice with HB pencil :-

1.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
2.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
3.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
4.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
5.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
6.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
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Cell – The Fundamental Unit of Life

- ▶ Heredity refers to the passing on of the characteristics from parents to their offspring. Example- eye colour, dimples, hair colour, etc.
- A cell is a mass of protoplasm containing a nucleus and is bounded by a cell membrane. Shape of the cell mainly depends upon the function it performs. Other factors which determine the cell shape are: surface tension, viscosity of the protoplasm, etc.
- Viruses are exceptions to the cell theory.
- In leaf epidermis, stomata consisting of two kidney-shaped guard cells enclose a pore in between and this structure helps in the exchange of gases and the loss of water from the leaf surface.
- Plasma membrane is a living, dynamic and an extremely delicate elastic membrane which covers the cell that separates its contents from the external environment.
- Cytoplasmic organelles are endoplasmic reticulum, mitochondria, golgi complex, ribosome, centrosome, centriole, lysosome, plastid, cilia and flagella.
- Nucleus is the largest cell structure. Prokaryotes have an incipient nucleus called nucleoid.
- Diploids ($2N$) have two sets of chromosomes, while haploids (N) have only one set of chromosomes.

SECTION - A : SCIENTIFIC REASONING

1. What is the function of the part of the cell shown in the given diagram?



- a. It packages and dispatches the material synthesised in the cell.
- b. It produces vacuoles or secretory vesicles that contain cellular secretion.
- c. It allows the entry and exit of selective materials while preventing the movement of some other materials.
- d. Both a and b

2. X is the organelle found in all eukaryotic cells; it is an interconnected network of tubules, vesicles and cisternae, that is responsible for several specialized functions.

Here, X is:

- a. Mitochondria
- b. Plastids
- c. Nucleus
- d. Endoplasmic reticulum

3. Which of the following statement is correct?
- a. Mitochondria are sometimes described as "Cellular power plants".
 - b. They generate most of the cell's supply of ATP.
 - c. The ATP generated by the mitochondria is used as a source of chemical energy.
 - d. All of the above

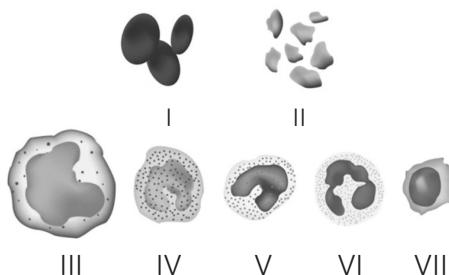
4. Identify the organelles that contain their own genetic material.

- i. Mitochondria ii. Vacuoles
- iii. Plastids iv. Golgi complex
- v. Ribosomes vi. Nucleolus
- a. i and ii b. iii and iv
- c. i and iii d. v and vi

5. Which of the following statement(s) is/are correct about the black reaction?

- I. The black reaction contributes in fixing silver chromate particles to the neurilemma by reacting silver nitrate with potassium dichromate.
- II. This result in a stark black deposit on the soma as well as on the axon and all the dendrites.
- a. I and II
- b. Only I
- c. Only II
- d. None of these

6. Examine the different types of cells shown in the given diagram and identify which of them is a neutrophil.

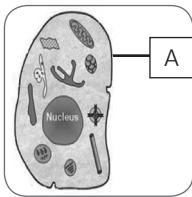


- a. RBCs
- b. Plastids
- c. WBCs
- d. All of these

7. X is involved in the synthesis of protein as it has ribosomes attached to it. Y is involved in synthesis of lipids for making a cell membrane. Here, X and Y are:

- a. X- RER Y- SER
- b. X- SER Y- ER
- c. X- Ribosomes Y- Ribosomes
- d. X- Ribosomes Y- Golgi apparatus

8. What is the chemical composition of the part labeled as A in the given figure?

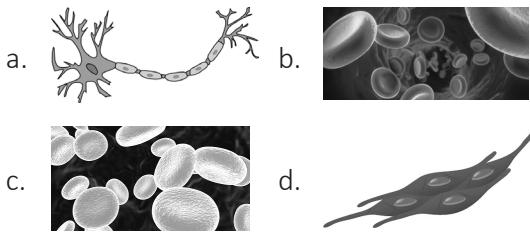


- I. Protein II. Lipid
- III. Starch IV. Glucose
- a. I and II b. II and III
- c. III and IV d. Only I

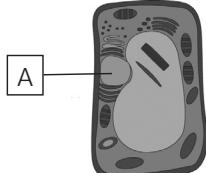
9. Which of the following represents a correct match?

- a. RER – Synthesis of proteins as it has ribosomes attached to it.
- b. SER – Synthesis of lipids required for making cell membranes.
- c. Golgi Apparatus-Storage and packaging of various products.
- d. All of these

10. Identify the cell which can change its shape continuously.



11. Which of the following are able to pass through structure A in the diagram?



- I. Nitrates II. Bacteria
- III. Water IV. Phosphates
- a. I, II and III
- b. I, III and IV
- c. II, III and IV
- d. II and III

12. Organelle 'A' comprises an envelope that houses deoxyribonucleic acid. Organelle

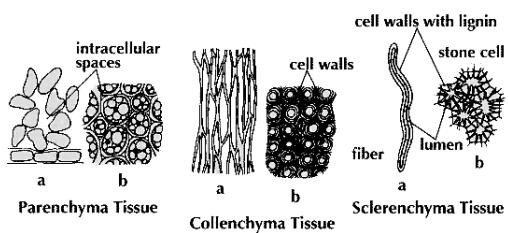
'B' is membrane bound and is involved in the synthesis of protein molecules. Which option correctly defines 'A' and 'B' respectively?

- a. Nucleus and endoplasmic reticulum
- b. Ribosomes and nucleus
- c. Mitochondrion and ribosomes
- d. Endoplasmic reticulum and golgi apparatus

13. A dead cell differs from a living cell with respect to its:

- a. vital processes.
- b. specific organization.
- c. surrounding atmosphere.
- d. separation from other cells.

14. The principal supporting cells in plant tissues that have ceased elongation is:



- a. Sclerenchyma cell
- b. Parenchymal cell
- c. Mesophyl cell
- d. Collenchyma cell

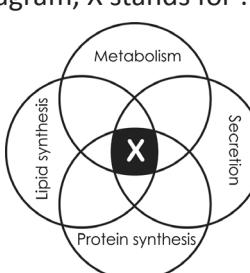
15. Which of the following statements is/are correct about the cell wall?

- I. It is a rigid layer of poly-saccharides.
- II. It lies outside the plasma membrane of the cells.
- III. It is found in the cells of plants, fungi and bacteria.
- a. I and II
- b. I, II and III
- c. II and III
- d. Only III

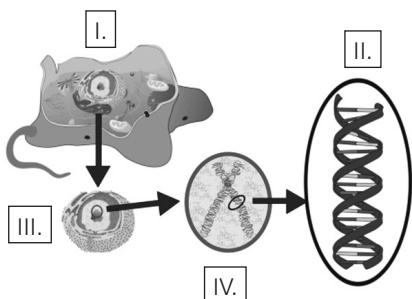
SECTION - B : EVERYDAY SCIENCE

16. What will happen if the organisation of a cell is damaged due to certain physical or chemical reasons?
- Lysosomes will burst and their enzymes will eat up their own cell organelles.
 - Lysosomes will expand in size and their enzymes will eat up their own cell organelles.
 - Ribosomes will expand in size and their enzymes will eat up their own cell organelles.
 - Lysosomes and other cell organelles will remain affected.
17. Rohan dropped few raisins in a solution and he observed that in few minutes, the raisins get swell up. Which kind of solution is this?
- Hypertonic
 - Hypotonic
 - Isotonic
 - Mesotonic
18. Jiya has made following statements on the cell. Which of the statement is incorrect?
- The smaller the cell, the more it will be active metabolically.
 - The rate of metabolism depends on the surface area to volume ratio of a cell.
- III. The smaller the cell, the smaller will be size of its nucleus.
- Only I
 - Only II
 - Only III
 - None of these
19. Radhika was washing clothes for 2-3 hours. She observed that the skin of her fingers had shrink. Why did it happen?
- Soap/detergent solution is a hypertonic solution compared to our skin cells.
 - Exosmosis takes place in the skin cells.
 - Endosmosis takes place in the skin cells.
 - Only a and b
20. A person took concentrated solution of salt. After sometime, he started vomiting. Which of the following phenomenon is responsible for this situation?
- The outward movement of water from the cell, results in irritation and excessive dehydration.
 - The inward movement of water from the cell, results in irritation and excessive dehydration.
 - Endosmosis takes place that causes vomiting.
 - None of these

SECTION - C : BRAINBOX

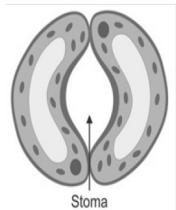
21. Identify the correct statement(s) among the following.
- All viruses have genetic material- either DNA or RNA, which are long molecules, that carry genetic information.
 - All viruses have a protein coat that protects these genes.
 - Some viruses have an envelope of fat that surrounds them when they are outside a cell.
- a. I and II
- b. II and III
- c. Only II
- d. I, II and III
22. In the given Venn diagram, X stands for :
- Nucleus
 - Cytoplasm
 - Mitochondria
 - Endoplasmic Reticulum
- 

23. The eye colour of Aman and his mother is same. Which of the part labelled in the given diagram is responsible for this characteristic?



- a. I b. II c. III d. IV

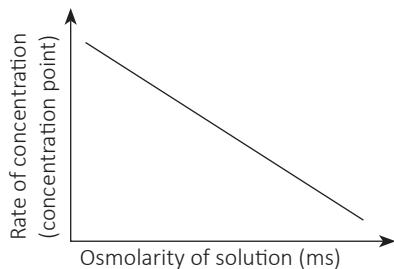
24. The cell shown in the figure performs its intended function by a particular specialized feature. Which of the following correctly identifies that feature?



- a. Lignified cell wall
b. Cell wall with non-uniform thickness
c. A high density of chloroplast
d. Fully permeable cell wall enveloping a selectively permeable cell membrane

25. A unicellular protist 'P', which was contractile vacuole to remove excess intracellular water, was placed in salt solution of increasing as molarity.

A graph is drawn to show the rate of contraction of vacuole to pump out excess water against as molarity of solution. Study the given graph and choose the correct option regarding this data/graph.



- a. In an isotonic solution, there is no diffusion of water in or out of the 'P', so the concentration rate is zero.
b. The rate of contraction increases as osmolarity decreases, because amount of water entering 'P' by osmosis increases.
c. At higher osmolarity, more salt diffuses into P, therefore lower rates of contractions are repaired.
d. None of these

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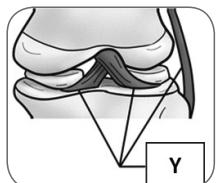
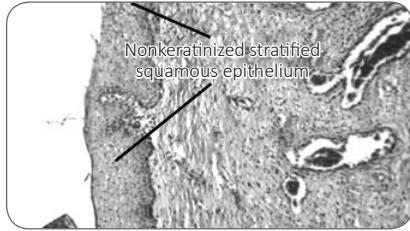
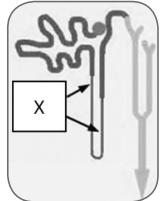
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- ▶ Tissues are a group of similar or dissimilar cells (performing similar functions), which are held together by an intercellular substance secreted by them. The study of the tissues is known as Histology.
 - In an unicellular organism, all the life processes, such as digestion, respiration, excretion, reproduction, etc., are performed by the single cell, but in a multicellular organism, different groups of cells perform different functions. A group of cells having similar origin, structure and function is called a tissue.
 - Simple epithelial tissue—A group of cells similar in form, structure and embryonic origin, which coordinate to perform a specific function along with their intercellular material is called a simple tissue
 - Compound tissue—A group of cells, different in their structure and function is called a compound tissue.
 - Based on the capacity to divide, tissues of higher plants have been classified into two fundamental types, meristematic tissues and permanent tissues.
 - In animals, tissues have been classified into—epithelial tissues, connective tissues, muscular tissues and nervous tissues.

SECTION - A : SCIENTIFIC REASONING

1. Name the tissue that provides a barrier between the organ it covers and the external environment.
- Connective tissue
 - Epithelial tissue
 - Muscular tissue
 - Nervous tissue
2. X is a short band of tough fibrous connective tissue composed mainly of long, stringy collagen fibres. It connects one bone to another bone to form a joint. Here X is :
- Ligament
 - Calcium
 - Tendon
 - Potassium
3. What do we call the cell lying between the epidermis and the pericycle in a root or shoot and constitutes the cortex, and are used for storage of food?
- Sclerenchyma
 - Collenchyma
 - Xylem
 - Parenchyma
4. Name the substance that makes the surface of the plant (shown in the given figure) waxy and hence, does not allow the water loss due to transpiration.
- Cutin
 - Suberin
 - Lignin
 - Fat
5. Which of the following is correct regarding the function of epithelium?
- Epithelium lines the skin.
 - Epithelium lines the inside cavities.
 - Epithelium lines the lumen of our body.
- I and III
 - I and II
 - II and III
 - I, II and III
6. What is Y in the given figure?
- Ligament
 - Calcium
 - Tendon
 - Potassium
- 
7. Which of the following shows the correct difference between ligaments and tendons?
- Ligaments connect bones to other bones to form a moveable joint.
Tendons join muscle to bones
 - Ligaments are elastic and flexible but tendons are tough and non-flexible.
 - Ligaments are formed of yellow fibrous tissues and fibroblast, but tendons are formed of white fibrous connective tissues and fibroblast.
 - All of these
8. The tissue shown in the given figure is found in :
- 
- buccal cavity and anus.
 - vagina, cervix, buccal cavity and anus.
 - vagina, cervix and buccal cavity.
 - vagina and cervix.
9. In the given diagram of Henle's loop of nephron, the part 'X' is lined by :
- columnar epithelium.
 - squamous epithelium.
 - ciliated epithelium.
 - cuboidal epithelium.
- 

10. An overlap of actin and myosin filaments occurs in the:
- A Band
 - I Band
 - Z Line
 - H Band
 - M Line
- I and II
 - II and III
 - Only I
 - IV and V
11. Which of the following statement regarding aging and the muscular system is true?
- Aging is associated with decreased myoglobin production.
 - Effects of aging can be nearly reversed.
 - The satellite cells will differentiate into motor neurons when an individual is advance in age.
 - Youngsters have more adipocytes in their muscle tissues than the elderly people.
12. Which of the following organelles is responsible for the appearance of Nissl body in the cell bodies of motor neurons?
- Smooth endoplasmic reticulum
 - Rough endoplasmic reticulum
 - Golgi apparatus
 - Mitochondria
13. Observe the given diagram of nerve cell and choose the correct statement about this cell.
-
- The diagram shows a nerve cell (neuron) with a central cell body containing a nucleus. Dendrites branch out from the top left, and a long axon extends to the right, ending in a terminal bouton. Three specific points are labeled: 'W' points to a dendrite; 'X' points to a gap between two nodes on the axon; and 'Y' points to the terminal bouton where vesicles are shown being released.
- 'W' receives impulses.
 - 'X' takes impulses away from the cell body.
 - 'Y' is called Node of Ranvier.
 - All are correct
14. Tissue consisting of dividing cells in rings throughout the length of shoots and roots is
- intercalary meristem
 - lateral meristem
 - apical meristem
 - sclerenchyma
15. Which of the following shows correct functions of mast cell?
- They release histamine.
 - They release heparin, an anticoagulant which prevents the clotting of blood.
- Only I
 - Only II
 - Both I and II
 - None of the above

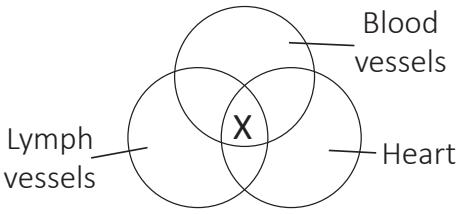
SECTION - B : EVERYDAY SCIENCE

16. Tetanus toxin causes convulsive paralysis by:
- blocking acetylcholine from binding to the muscarinic acetylcholine receptor.
 - inhibiting acetyl cholinesterase.
 - causing motor neurons to release massive amounts of acetylcholine.
 - blocking acetylcholine from being released by motor neurons.
17. What is the effect of exercises such as jogging, swimming and aerobics on the skeletal muscle tissue?
- Increase in the number of mitochondria per muscle fibre
 - Increase in the number of muscle fibres
 - Increase in the number of motor units
 - Increase in the number of skeletal muscles

18. Jaya took a plant with root and removed the root tip by 2 cm by measuring with a centimetre scale. She kept the plant under observation for few days. She observed that the growth of the root stopped. This is because:
- The dividing tissue known as meristematic tissue is located only at the root tip which has been cut off.
 - The dividing tissue known as collenchyma tissue is located only at the root tip which has been cut off.
 - This happened because of some other reason; as the growth of plant is independent of the tissue present in root tip.
 - All of the above
19. The stems of plants are flexible and have good strength. Which of the following tissue is responsible for this?
- Parenchyma
 - Collenchyma
 - Aerenchyma
 - Sclerenchyma
20. Tissue play very important role in maintaining our body structure. Pragya matched different types of tissues with their respective roles. Which one of them is not matched correctly?

Column 'A'	Column 'B'
a. Adipose tissue	Fat storage
b. Areolar tissue	Packaging tissue
c. Squamous epithelium	Kidney tubules
d. Cardiac muscles	Branched and multinucleated

SECTION - C : BRAINBOX

21. If the tip of a sugarcane plant is removed from the field, even then it keeps on growing vertically (in length). Which one of the following is responsible for the growth?
- Cambium
 - Apical meristem
 - intercalary meristem
 - lateral meristem
- 
22. Which of the following statement is incorrect about sclerenchyma?
- Sclerenchyma is a supporting tissue.
 - Their walls consist of cellulose and lignin.
 - Immature sclerenchyma is composed of dead cells with extremely thick cell walls.
23. Identify X in the given Venn diagram.
- 
- Ciliated epithelium
 - Columnar epithelium
 - Squamous epithelium
 - Glandular epithelium

24. The brown adipose tissue is abundant in new born infants because:
- heat production in brown fat provides an infant with an alternative means of heat regulation.
 - it prevents infants from hypothermia.
 - it prevents weigh loss in infants.
- I and III
 - I and II
 - II and III
 - I, II and III
25. In a skeletal muscle, a triad refers to which of the following?
- A T tubule sandwiched between 2 dilated cisternae of the sarcoplasmic reticulum
 - A Z line flanked by 2 A bands
 - An A band flanked by 2 I bands
 - An H zone flanked by 2 A bands
 - A Z line flanked by 2 sarcomeres
- I and II
 - II and III
 - Only I
 - IV and V

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Diversity in Living Organisms

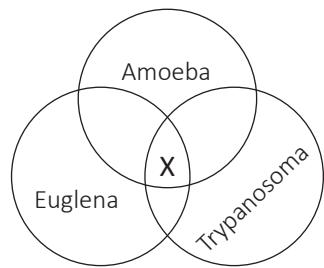
- ▶ Organisms are named according to binomial nomenclature introduced by Carolus Linnaeus.
 - While classifying organisms, organisms are first of all classified into kingdoms. These kingdoms are then further classified as Phylum, Class, Order, Family, Genus, and Species.
 - Protista kingdom involves unicellular eukaryotic organism, kingdom monera includes unicellular prokaryotic organism. The fungi kingdom involves unicellular or multicellular eukaryotic organisms with heterotrophic nutrition.
 - Kingdom Plantae includes multicellular, eukaryotic organisms with cell walls. They are capable of producing their own food themselves by photosynthesis. For example: mango tree.
 - Animals are classified on the basis of presence of notochord as
 - Non-chordates: They do not have a notochord.
 - Chordates: They have a notochord.

SECTION - A : SCIENTIFIC REASONING

1. Which of the following statement(s) is/are correct about amphibians?
 - a. Amphibians are a taxon of animals that include all living tetrapods that are ectothermic.
 - b. They have three chambered heart and generally spend part of their time on land.
 - c. They are able to breathe through their skin.
 - d. All of the above
2. Which of the following carry fertilised eggs in their brood pouch?
 - a. Female hippocampus
 - b. Foetal female hippocampus
 - c. Old aged hippocampus
 - d. Male hippocampus
3. Correct sequence of taxonomic categories can be written as
 - a. Class – Phylum- Order – Family – Genus – Species
 - b. Division – Class – Order – Family – Genus – Species
 - c. Division – Class – Family – Order – Genus – Species
 - d. Phylum – Order – Class – Family – Genus – Species
4. Notochord, dorsal nerve chord and gill-slits are features seen in subphylum
 - a. Vertebrata
 - b. Protozoa
 - c. Mollusca
 - d. Porifera
5. Which of the following statement is correct?
 - a. All echinoderms have a mesodermal endoskeleton made of tiny calcified plates and spines
 - b. The mesodermal endoskeleton forms a rigid support contained within the tissues of the organisms.
 - c. Some groups of Echinoderms have modified spines called pedicellariae that keep the animals free of debris.
 - d. All of the above
6. X is a unicellular prokaryote, which live everywhere and also in extreme conditions like hot springs, deserts, snows and deep oceans. These organisms do not have a defined nucleus or organelles. Organism X belongs to which group?
 - a. Protista
 - b. Monera
 - c. Thallophyta
 - d. Nematoda
7. X organisms are eukaryotic and use either cilia or flagella for moving around. They may be autotrophs or heterotrophs. Here X organism belongs to
 - a. Protista
 - b. Monera
 - c. Fungi
 - d. Plantae
8. Which group of plants among the following has specialised tissues for conduction of water?
 - I. Thallophyta
 - II. Bryophyta
 - III. Gymnosperms
 - IV. PteridophytaThe correct option is :
 - a. I and II
 - b. III and IV
 - c. II and III
 - d. I and IV
9. Which of the following statement(s) is/are correct about plasmodium?
 - I. Aggregation of slime moulds under suitable conditions are called plasmodium.
 - II. Plasmodium may grow and spread over several feet.

- III. During unfavourable condition, they can differentiate and follow fruiting bodies.
- I and II
 - I, II and III
 - II and III
 - I and III

10. Study the Venn diagram and identify X.



- Binary fission
 - Contractile vacuole
 - Holozoic nutrition
 - Multiple fission
11. Which of the following holds true for mycoplasma?
- Mycoplasmas are the smallest living cells known and can survive without oxygen.
 - Many mycoplasmas are pathogenic in plants and animals.
 - These are the organisms that completely lack cell wall.
- I and II
 - II and III
 - I, II and III
 - I and III
12. Which among the following have closed circulatory system?
- | | |
|------------------|-----------------|
| I. Annelids | II. Arthropodes |
| III. Vertebrates | IV. Molluscs |

Choose the correct answer.

- I and II
- II and III
- I and III
- III and IV

13. Which of the following is not a feature of protochordates?

- Presence of the notochord
- Jointed legs
- Bilateral symmetry and coelom
- Presence of the circulatory system

14. Choose the one of the following pairs of important features distinguishing Gnetum from cycas and pinus and showing affinities with angiosperms.

- Perianth and two integuments
- Embryo development and apical meristem
- Absence of resin cut and leaf venation
- Presence of vessel element sand absence of archegonia

15. In a laboratory, an old preserved permanent slide was kept without labelling. It was observed under a microscope and the following features were shown:

- unicellular.
- Biflagellate that is one long flagellum, lying longitudinally and the other short flagellum
- well defined nucleus. On the basis of the above features, name the kingdom it belongs to.
 - Protista
 - Protozoa
 - Monera
 - Fungi

SECTION - B : EVERYDAY SCIENCE

16. X is a disease caused by plasmodium in human beings and Y is a disease caused by puccinia in plants like wheat, barley and rye. Which of the following is correct option for X and Y respectively?

- a. Jaundice and hairy root
- b. Malaria and wheat rust diseases
- c. Malaria and bacterial heart rot
- d. Typhoid and fire blight

17. Food poisoning caused after consuming spoiled canned food is due to:

- a. *Bacillus amyloliquefaciens*.
- b. *Escherichia coli*.
- c. *Clostridium botulinum*.
- d. *Yersinia pestis*.

18. Observe the given diagrams.



Gram seed



Maize seed

One student tabulated the differences between these two. Which one of the following is incorrect?

	Gram Seed	Maize Seed
a.	Reticulated veins	Parallel veins
b.	Stem vascular bundles scattered	Stem vascular bundles in a ring
c.	Secondary growth often present	Secondary growth absent
d.	Pollen with three furrows	Pollen with a single furrow

19. How are the given animals similar?

They :



Bat



Cat

- I) are ureotelic animals.
- II) are uricotelic animals.
- III) are warm blooded.
- IV) are cold blooded.
- V) have notochord and 4 chambered heart.

Choose the correct option :

- a. I, II and V
- b. II, IV and V
- c. III and IV
- d. II and IV

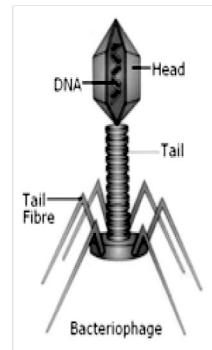
20. Which of the following has skeleton made of hard calcium carbonate?

- a. Earthworm
- b. Sea Urchin
- c. Enoplea
- d. Polychacte

SECTION - C : BRAINBOX

21. Which of the following holds true for the organism shown in the given figure?

- I. It can pass through bacteria proof filter.
They can be crystallised as protein molecules.
 - II. It is an obligatory parasite.
 - III. Its head is made up of protein coat; inside is genetic material; either DNA or RNA.
 - IV. It has single stranded DNA.
- a. I, II, III and IV b. I, II and IV
c. II, III and IV d. I, II and III



22. In laboratory, a specimen of a pigeon was shown to the students. Students note down the characteristics of that specimen. Which of the following statement is incorrect?

- a. Its fore limbs are modified into wings.
- b. It has 4-chambered heart.
- c. It has light weight skeleton.
- d. It does not respire through lungs.

23. Which of the following is/are incorrect about the organism shown in the given figure?



- I. It belongs to the phylum Aschelminthes.
 - II. Its body is slender, cylindrical, unsegmented and covered by cuticle.
 - III. It possess true coelom between body wall and digestive system.
 - IV. It has complete tube like digestive system with mouth and anus at the opposite ends of the body.
 - V. It has setae which act as the locomotory organ.
- a. Both II and IV
b. Only V
c. Both II and V
d. Only III

24. Which of the following shows incorrect difference between a bony and a cartilaginous fish?

Bony fish	Cartilaginous fish
a. Skeleton made up of bones	Skeleton made up of cartilages
b. Body covered with cycloid or catenoid scale	Body covered with placoid scale
c. Gills are covered by operculum	Gills are exposed to the outside
d. None of the above	

25. Given table shows the name of animals. Classify them as acelomates, Pseudocoelomates and coelomates.

I. Sea anemone	II. Human beings	III. Filarial worm	IV. Fish tapeworm
V. Planaria	VI. Scorpion	VII. Spongilla	VIII. Ascaris

- | Acoelomates | Pseudocoelomates | Coelomates |
|----------------------|------------------|------------------|
| a. I, IV, V and VII | III and VIII | II, VI and IX |
| b. II, III and V | I, IV and VI | VII, VIII and IX |
| c. VII, VIII and IX | II, III and V | I, IV and VI |
| d. II, V, VII and IX | I, IV and VI | III and VIII |

Darken your choice with HB pencil -

1. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	8. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	15. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	22. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d
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3. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	10. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	17. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	24. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d
4. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	11. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	18. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	25. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d
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6. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	13. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	20. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	
7. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	14. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	21. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d	

→ A body is said to be in motion when its position changes continuously with respect to an object taken as a reference point.

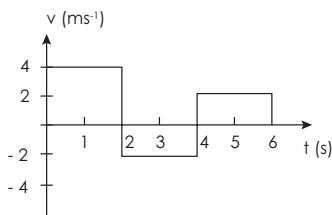
- If the position of an object does not change as time passes, it is said to be at rest. If the position of the object changes as time passes, it is said to be in motion
- When a body moves from one point to other, the actual path length covered by it is **distance** travelled. The shortest distance between two destinations in the motion of a an object is called its **displacement**
- **Uniform Speed:** A body is said to be moving in an uniform speed, if it travels equal distances in equal interval of time.
- **Uniform Velocity:** If the velocity of an object does not change as time passes, it is said to be moving with the uniform velocity.
- **Uniform Acceleration:** If change in velocity is equal in equal intervals of time then the acceleration is said to be uniform.
- There are three **equations of motion :**

$$(i) \ v = u + at \quad (ii) \ s = ut + \frac{1}{2}at^2 \quad (iii) \ v^2 = u^2 + 2 as$$

SECTION - A : SCIENTIFIC REASONING

1. Which of the following statement is true for the motion of the tip of a minute hand of a clock after one hour?
 - a. The displacement is zero.
 - b. The distance covered is zero.
 - c. The average speed is zero.
 - d. The instantaneous velocity is zero.
2. Read the following statements and mark the correct option for a moving body.
 - a. If its speed changes but the direction of the motion does not change, its velocity can remain constant.
 - b. If it is accelerating, then its speed and velocity must change.
 - c. If its speed changes, its velocity must change and it must have some acceleration.
 - d. Both b and c
3. A man moves with a constant acceleration from P to Q along the line joining two stationary objects P and Q. He will observe that the two objects:
 - a. have different velocities.
 - b. have same speed.
 - c. have same acceleration
 - d. Both a and c are correct
4. Two balls are moving with constant speed 'v' such that they are always at a constant distance 'd' apart and their velocities are always equal and opposite.
After what time, they return to their initial position?
 - a. $\frac{d}{v}$
 - b. $p \frac{d}{2v}$
 - c. $\frac{2d}{v}$
 - d. $\frac{\pi d}{v}$
5. Which of the following statement is not correct for uniform motion?
 - a. A ball rolls along a frictionless surface.
 - b. A mass is thrown vertically upwards with a speed of 10 m s^{-1} .
 - c. A lift moves vertically upwards past five floors at zero acceleration.
 - d. A boy runs 70 m along a straight track at a constant speed.
6. A stone is dropped from a height of 125 m. If the stone is acted upon by a uniform acceleration of 10 ms^{-2} , find when and with what velocity it will strike the ground.
 - a. 5 s, 50 m/s
 - b. 10 s, 50 m/s
 - c. 4 s, 16 m/s
 - d. 8 s, 32 m/s
7. Read the following statements and mark the correct option.
 - I. An object can have acceleration even if its velocity is zero at a given instant of time.
 - II. An object is momentarily at rest when it reverses its direction of motion.
 - a. Only statement I is correct
 - b. Only statement II is correct
 - c. Both the statements are correct
 - d. Both the statements are incorrect
8. A ball is dropped from a certain height and at the same time, another ball is thrown horizontally from the same height. Which one will reach the ground earlier?
 - a. Simultaneously
 - b. First ball
 - c. Second ball
 - d. Can not say

9. The velocity-time graph of an object moving in a straight line is shown in the figure. The displacement travelled by the object in 6 s is



- a. 6 m b. 10 m
c. 8 m d. 16 m
10. An artificial satellite is moving in a circular orbit of diameter 21125 km. If it takes 24 hours to revolve around the earth, what would its speed?

- a. 3.069 km/s b. 30.69 km/s
c. 63.09 km/s d. 63 km/s
11. A motor-car starting from rest, moves with uniform acceleration and attains a velocity of 8 ms^{-1} in 8s. It then moves with uniform velocity and is finally brought to rest in 32 m under uniform retardation. The total distance covered by the car is 464 m. Find the value of acceleration.

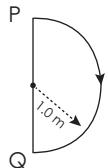
- a. 2 m/s^2 b. 1 m/s^2
c. 4 m/s^2 d. 6 m/s^2
12. A body covers a certain distance X in equal thirds; the first third of the distance with a speed v_1 , the second third with a speed of v_2 and the last third with a speed of v_3 . What is the average speed of the body over time?

- a. $\frac{3v_1v_2}{v_2v_3 + v_1v_3}$
b. $\frac{v_1v_2v_3}{v_2v_3 + v_1v_3 + v_1v_2}$
c. $\frac{v_1v_2v_3}{3(v_2v_3 + v_1v_3 + v_1v_2)}$
d. $\frac{3v_1v_2v_3}{v_2v_3 + v_1v_3 + v_1v_2}$

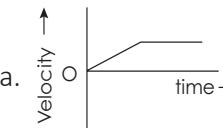
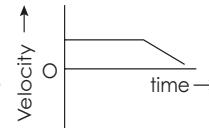
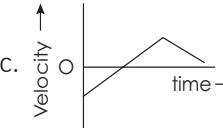
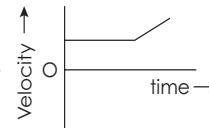
13. A canoe moves upstream at a speed of 2 m/s and returns downstream at a speed of 8 m/s. Assuming that the rate of paddling and the flow of the stream are constant, what is the flow rate of the stream?
- a. 3 m/s b. 4 m/s
c. 5 m/s d. 6 m/s

14. An object goes from point P to Q, moving in a semicircle of radius 1.0 m in 1.0 s. The magnitude of the average velocity is:

- a. 3.14 m/s
b. 2.0 m/s
c. 1.9 m/s
d. Zero



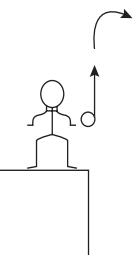
15. Velocity-time graphs are given for an object which first moves with a constant speed in the +ve direction, and then moves with a negative acceleration. Which of the following graph is correct?

- a.  b. 
- c.  d. 

SECTION - B : EVERYDAY SCIENCE

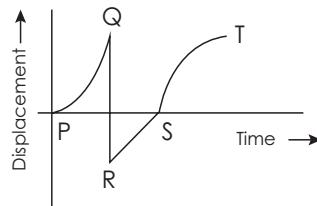
16. A girl had designed a clap switch for science exhibition that enables her to switch on or off an alarm just with clapping of her hands. While testing her device in a hall, she noticed that once the alarm has sounded, it followed another one due to the echo of the clap, that is, the sound reflected by the walls. She recorded the two soundings of the alarm with her tape recorder and found out that time difference in between them of 0.1 s. If the distance of the wall is 15 m, calculate the speed of sound.
- 150 m/s
 - 300 m/s
 - 400 m/s
 - 100 m/s
17. A body is formed to move on a rectilinear path. It returns to the starting point after 10 seconds. The total distance covered by the body during this time is 20 m. Which of the following statements is/are true regarding the motion of the body?
- The average velocity of the body is zero.
 - The displacement of the body is zero.
 - The average speed of the body is 2.0 ms^{-1} .
 - All of these
18. A thin sheet of paper and an iron nail released simultaneously from the same height do not touch the ground at the same time because of which one of the following factor?
- Size difference
 - Mass difference
 - Gravity
 - Resistance of the air
19. A juggler maintains four balls in motion, making each of them to rise to a height of 20 m from his hand. What time interval should he maintain, for the proper distance between them? ($g = 10 \text{ m/s}^2$)
- 1s
 - 2s
 - 3s
 - 4s
20. A boy has to go 500 m to north, 400 to east and 200 m to south to reach his field. If he takes 20 minutes to reach the field. The distance he has to walk to reach the field is
- 550 m
 - 1100 m
 - 2200 m
 - 350 m

SECTION - C : BRAINBOX

21. A robot standing on a cliff shoots a ball upwards with an initial speed of 30 ms^{-1} . What is the height of the cliff, given that the ball reaches the bottom of the cliff 8 s after the shoot?
- 
- (Take $g = 10 \text{ ms}^{-2}$ and the height of the robot is negligible.)

- 25 m
- 45 m
- 80 m
- 145 m

22. The displacement-time graph of a accelerated body is shown in following graph. Which part of the graph is showing motion along a straight line?



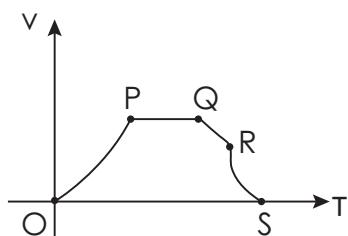
- PQ only
- RS only
- ST only
- Both PQ and ST

23. Two identical metal coins are dropped separately into two identical tubes. One of the tubes is filled with air and the other one has its air pumped out with a vacuum pump. Which of the following observation(s) is/are true?
- Both the metal coins will drop with same speed.
 - Both the metal coins will accelerate at a different rate.
 - Both metal coins will reach the bottom of the tube at the same time.
- a. II only b. I and II only
c. II and III only d. None of the above

24. A stone rolls off the edge of a vertical cliff. Neglecting air resistance, which of the following best describes its subsequent motion?

	Vertical	Horizontal
a.	Increasing velocity	Decreasing velocity
b.	Constant velocity	Constant acceleration
c.	Constant acceleration	Constant velocity
d.	Increasing velocity	Decreasing acceleration

25. Consider the graph shown and decide which of the following is correct ?



	Region OP	Region PQ	Region QR	Region RS
a.	Increasing	Zero	Constant	Decreasing
b.	Constant	Variable	Zero	Decreasing
c.	Decreasing	Constant	Zero	Increasing
d.	Constant	Zero	Constant	Increasing

Darken your choice with HB pencil -

1. (a) (b) (c) (d)
2. (a) (b) (c) (d)
3. (a) (b) (c) (d)
4. (a) (b) (c) (d)
5. (a) (b) (c) (d)
6. (a) (b) (c) (d)
7. (a) (b) (c) (d)

8. (a) (b) (c) (d)
9. (a) (b) (c) (d)
10. (a) (b) (c) (d)
11. (a) (b) (c) (d)
12. (a) (b) (c) (d)
13. (a) (b) (c) (d)
14. (a) (b) (c) (d)

15. (a) (b) (c) (d)
16. (a) (b) (c) (d)
17. (a) (b) (c) (d)
18. (a) (b) (c) (d)
19. (a) (b) (c) (d)
20. (a) (b) (c) (d)
21. (a) (b) (c) (d)

22. (a) (b) (c) (d)
23. (a) (b) (c) (d)
24. (a) (b) (c) (d)
25. (a) (b) (c) (d)

Force and Laws of Motion

- ▶ A force is a push or pull on an object which results from the object's interaction with another object. Whenever there is an interaction between two objects, there is a force acting on each of the objects when the interaction ceases, the two objects no longer experience a force. Forces only exist as a result of an interaction
 - A body at rest will remain at rest, and a body in motion will continue in motion in a straight line, unless it is compelled by an external force to change its state of rest or of uniform motion.
 - All objects have mass; so if an object is moving, then it has momentum - it has its mass in motion. The amount of momentum which an object has, is dependent of two variables: how much stuff is moving and how fast the stuff is moving. Momentum depends on the variables mass and velocity.
 - Newton's first law states that, the total momentum of a system (or an object) remains constant, if no net external force acts on the system.
 - Newton's second law of motion states that "the rate of change of momentum of a body is directly proportional to the applied force, and takes place in the direction in which the force acts".
 - Newton's third law states "When a body exerts a force on another body, the other body also exerts the same force on the first. We say that the two bodies interact with each other or an interaction takes place between the bodies".

SECTION - A : SCIENTIFIC REASONING

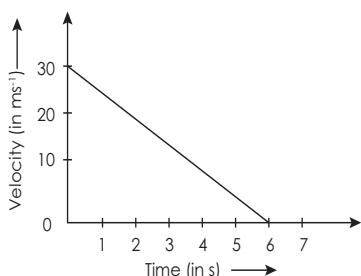
1. An object is acted upon by a force of constant magnitude which is always perpendicular to the velocity of the object. The motion of the particle takes place in a plane. Which of the following is correct?
 - a. Velocity of the object is constant.
 - b. The object moves in circular path.
 - c. Kinetic energy of the object is constant.
 - d. Both b and c are correct
2. A father has mass 60 kg and the mass of his son is 30 kg. The ratio of the inertia of the father to the inertia of his child is
 - a. 1 : 1
 - b. 1 : 2
 - c. 2 : 1
 - d. 1 : 3
3. A force of 100 N applied on an object accelerate it with an acceleration of 2 ms^{-2} . How much force is required to produce the same acceleration when identical object of same mass is tied with the first object?
 - a. 50 N
 - b. 100 N
 - c. 200 N
 - d. 300 N
4. The earth attracts a stone towards itself with a force of 10 N. Then the force with which, the stone attracts the earth is
 - a. Zero
 - b. 20 N
 - c. 10 N
 - d. None of these
5. The sparks produced during the sharpening of a knife against a grinding wheel leaves the rim of the wheel tangentially. This is due to _____.
 - a. the inertia of rest
 - b. the inertia of motion
 - c. the inertia of direction
 - d. the force applied
6. Which of the following statements is correct?
 - a. The inertia of an object does not depend on the mass of the object.
 - b. A balanced force is needed to keep a body in motion.
 - c. Velocity of the body must be changing when the body is accelerating uniformly.
 - d. Uniform velocity is the constant change of displacement.
7. An iron sphere of mass 10 kg is dropped from a height of 20 cm. If the downward acceleration of the ball is 10 ms^{-2} , the momentum transferred to the ground by the ball is –
 - a. 40 kg ms^{-1}
 - b. 20 kg ms^{-1}
 - c. 10 kg ms^{-1}
 - d. 80 kg ms^{-1}
8. A car of mass of 2000 kg is moving over a horizontal road, with an uniform velocity. If this car has to be stopped with a negative acceleration of 1.5 ms^{-2} , then what is the force of friction between the tyres of the car and the road?
 - a. -6000 N
 - b. -3000 N
 - c. -1500 N
 - d. -2000 N
9. Read the following statements and mark the correct option.

Statement 1: In a free fall, the apparent weight of a body is equal to the actual weight of the body.

Statement 2: Nothing prevents the body from falling.

 - a. Statement 1 is true
 - b. Statement 2 is true
 - c. Both the statements are correct
 - d. Both the statements are incorrect

10. The velocity-time graph of a ball moving on the surface of a floor is shown in the figure.



The force acting on the ball, if the mass of the ball is 50 g is

- a. -0.25 N b. -0.5 N
 c. 0.25 N d. 0.5 N
11. A body is moving with a velocity of 72 km/h on a rough horizontal surface of coefficient of the friction 0.5. If the acceleration due to gravity is 10 m/s², find the minimum distance in which it can be stopped.
- a. 10 m b. 20 m
 c. 30 m d. 40 m
12. A body of mass 0.50 kg is moving with a speed of 2.00 ms⁻¹ on a smooth surface. It strikes another mass of 1.00 kg and then they move together as a single body. The energy loss during the collision is –

- a. 0.16 J b. 1.00 J
 c. 0.67 J d. 0.34 J

13. A metal object weighing 2 kg is resting on a frictionless plane. It is struck by a jet, releasing water at a rate of 1 kg/s and at a speed of 5 m/s. The initial acceleration of the block is

- a. 5 m/s² b. 3 m/s²
 c. 2.5 m/s² d. 10 m/s²

14. A skater is pushing a snowmobile across an ice rink. The skater pushes with a horizontal force of 80 N and the snowmobile experiences a force of friction of 30 N. The snowmobile has a mass of 20 kg. What is the acceleration of the snowmobile?

- a. 4.0 m s⁻² b. 1.5 m s⁻²
 c. 2.5 m s⁻² d. 0.25 m s⁻²

15. A small block B is placed on another block, A of mass 7 kg and length 15 cm. Initially, the block B is near the right end of the block A. A constant horizontal force of 10 N is applied to the block A. The time elapsed before the block B separates from A is (all the surfaces are assumed frictionless).

- a. 4 s b. 0.5 s
 c. 2 s d. 1 s

SECTION - B : EVERYDAY SCIENCE

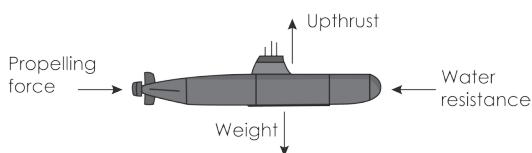
16. A spaceship is travelling in space in a straight line with its engine switched off. Which of the following cases would require the engine to be switched on again?

- I. Keep at a constant speed in a straight line
 II. Change direction
 III. Slow down to a stop
- a. I only b. II only
 c. I and II only d. II and III only

17. Two balls, P and Q of same size are dropped from the same point under gravity. The mass of P is greater than that of Q. If the air resistance acting on each ball is same, then

- a. the ball P reaches earlier.
 b. the ball Q reaches earlier.
 c. both the balls, P and Q reach simultaneously.
 d. None of these

18. A submarine is accelerating through the water at a constant depth. It is being acted by four forces as shown.



Which of the following statement is correct?

- a. The upthrust is balanced by the weight.
 - b. The resultant force of the four forces is zero.
 - c. Gravity has no effect on the submarine.
 - d. The water resistance balanced the propelling force.
19. A rocket, launched vertically, receives a constant thrust throughout its ascent.

However, its acceleration increases steadily as it goes up. Which one of the following reasons does not explain the increase in acceleration?

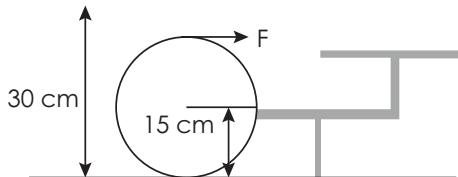
- a. The air resistance becomes lesser.
 - b. The total mass of the rocket is constantly reducing.
 - c. The Earth's gravitational field becomes weaker.
 - d. The atmospheric pressure becomes lesser.
20. A boy is cycling along a road. When he applies the brakes, which one of the following forces occurs between the brake pads and the wheels?
- a. Magnetic
 - b. Friction
 - c. Gravity
 - d. Stretching

SECTION - C : BRAINBOX

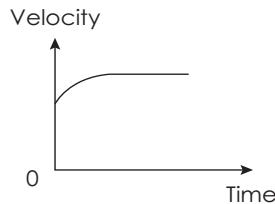
21. Determine the maximum acceleration of a train in which a box lying on its floor will remain stationary, given that the coefficient of static friction between the box and the train floor is 0.15 and $g = 10 \text{ m/s}^2$.

- a. 1.5 ms^{-2}
- b. 1.7 ms^{-2}
- c. 5 ms^{-2}
- d. 8 ms^{-2}

22. The diagram below shows a ball of diameter 30 cm placed against a step of height 15 cm. If the ball has a mass of 15 kg, what is the minimum force F applied at a point as shown is required to move the ball up the step? Assume that the gravitational force acting on a mass of 1.0 kg is 10 N.



- a. 150 N
 - b. 100 N
 - c. 50 N
 - d. 200 N
23. The graph below shows how the velocity varies with time for a given body.



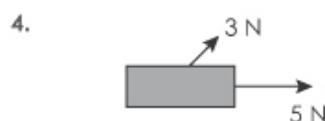
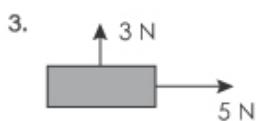
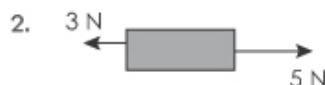
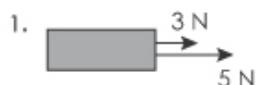
Which of the following statement(s) is/are true?

- I. The resultant force acting on the body is never zero.
 - II. The forces acting on the body are never constant for any period.
 - III. The object is never at rest.
- a. I and II
 - b. I, II and III
 - c. II and III
 - d. III only

24. Two small glass spheres of masses 10 g and 20 g are moving in a straight line in the same direction with velocities of 3 ms^{-1} and 2 ms^{-1} respectively. They collide with each other and after collision, glass sphere of mass 10 g moves with a velocity of 2.5 ms^{-1} .

The velocity of the second ball after collision is

- a. 4.5 ms^{-1} b. 1.25 ms^{-1}
c. 2.25 ms^{-1} d. 8.5 ms^{-1}
25. The figure shows the overhead views of four situations in which two forces accelerate the same block across a frictionless floor. Rank the situations in decreasing order of magnitudes of the acceleration of the block.



- a. 1, 4, 3, 2 b. 1, 3, 4, 2 c. 1, 2, 4, 3 d. 1, 4, 2, 3

Darken your choice with HB pencil -

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Gravitation

- Newton gave the universal law which states the relationship between the forces of attraction between two bodies lying at a certain distance. Every particle in the universe attracts every other particle with a force, which is directly proportional to the product of the two masses and inversely proportional to the square of the distance between them.
 - When object is dropped from a certain height, it falls with a constant acceleration.
 - Kepler's three laws of planetary motion can be described as follows :
 - (I) The path of the planets about the sun are elliptical in shape, with the center of the sun being located at one focus. (The Law of Ellipses)
 - (II) An imaginary line drawn from the center of the sun to the center of the planet will sweep out equal areas in equal intervals of time. (The Law of Equal Areas)
 - (III) The ratio of the squares of the periods of any two planets is equal to the ratio of the cubes of their average distances from the sun. (The Law of Harmonies)
 - The centre of mass is defined as a point in the body where the whole the mass of the body can be assumed to be concentrated. This point is called the centre of mass of the body.
 - The centre of gravity of a body is therefore, a point in a body at which the force of gravity on the whole of the body can be assumed to act.

Sound

- Sound is produced in a wave motion form
 - the particles in one portion transmit their disturbance to the particles in the adjacent portion. Such a wave is called a mechanical wave or an elastic wave. Sound waves are mechanical waves.
 - A wave-motion in which an individual particle of the medium vibrates in a direction at right angles to the direction of the propagation of wave is called a transverse wave motion.
 - A wave-motion in which the individual particles of the medium vibrate back and forth along the direction of the propagation of wave is called a longitudinal wave-motion.

SECTION - A : SCIENTIFIC REASONING

1. The bob of a pendulum is a ball full of water. If a fine hole is made in the bottom of the ball, what will be its effect on the time period of the pendulum?
 - a. Increase
 - b. Decrease
 - c. First increase, reach maximum value and then decrease till initial value
 - d. None of these
2. Which of the following statement is correct?
 - a. The sound waves in the air are longitudinal, while the light waves are transverse.
 - b. Both the light and the sound waves in the air are transverse.
 - c. Both the light and the sound waves can travel in vacuum.
 - d. Both light and sound waves in air are longitudinal.
3. It is possible to distinguish between transverse and longitudinal waves by studying the property of
 - a. Interference
 - b. Diffraction
 - c. Reflection
 - d. Polarisation
4. If the density of air at a point through which a sound wave passing, is maximum at an instant, then the pressure at that point will be –
 - a. minimum.
 - b. same as the density of the air.
 - c. equal to the atmospheric pressure.
 - d. maximum.
5. If the string of a pendulum was cut when the bob is at its central position, then the bob would fall on the earth due to the absence of the:
 - a. force of buoyancy.
 - b. force of deformation.
 - c. force exerted by the string in the downward direction.
 - d. force exerted by the string in the upward direction.
6. Though the forces are balanced at the mean position, even then the bob crosses over to the other extreme position after being released, because of
 - a. inertia of the bob.
 - b. potential energy of the bob.
 - c. velocity of the bob.
 - d. None of these
7. If a planet existed whose mass was twice that of the Earth and whose radius was 3 times greater, 1 kg mass on its surface would weigh
 - a. 2.17 N
 - b. 4.4 N
 - c. 6.7 N
 - d. 13.3 N
8. When a spaceship is at a distance equal to two Earth's radii from the centre of the Earth, the gravitational acceleration is
 - a. 19.6 m s^{-2}
 - b. 9.8 m s^{-2}
 - c. 4.9 m s^{-2}
 - d. 2.45 m s^{-2}

9. If the mass of a body is M on the surface of the Earth, then its mass on the surface of the Moon will be
- $M/6$
 - M
 - $M + 6$
 - $M \times 6$
10. Sound waves from a point source are propagating in all directions. What will be the ratio of amplitude at distance of 9 m and 25 m from the source?
- $5/9$
 - $25/3$
 - $15/9$
 - $25/9$
11. A planet is moving around the Sun in a circular orbit of circumference C . The work done on the planet by the gravitational force F of the Sun is:
- F/C
 - $FC/4$
 - FC
 - Zero
12. A stone is dropped into a well in which water is 78.4 m deep. After how long the sound of splash be heard at the top?
(Taken velocity of sound in air is 332 m s^{-1})
- 8.4 s
 - 6.2 s
 - 4.2 s
 - 2.4 s
13. A man standing on a boat observes that every after 5 seconds, one crest is striking his boat. Two such crests are 1 m away from each other. In how much time, 100 such crests will strike his boat and also find the velocity of the wave.
- 350 seconds 20 cm/s
 - 500 seconds 10 cm/s
 - 545 seconds 10 cm/s
 - 495 seconds 20 cm/s
14. A boy standing at a certain distance from a hill shouts loudly and starts running towards the hill at a speed of 5 m/s. He receives the echo after 5 seconds. What is the distance of the boy from the hill at the initial position?
- 767.7 m
 - 568.5 m
 - 837.5 m
 - 895.5 m
15. Communication satellites move in orbits of radius 44,400 km around the Earth. Find the acceleration of such a satellite assuming that the only force acting on it is due to the Earth. (Mass of the Earth = $6 \times 10^{24} \text{ kg}$.)
- 0.4 m/s^2
 - 0.2 m/s^2
 - 0.6 m/s^2
 - 4 m/s^2

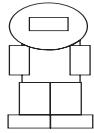
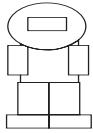
SECTION - B : EVERYDAY SCIENCE

16. An astronaut standing on the Moon's surface has a pen in his hand and releases it. What happens to the pen?
- It falls on the surface of the Moon, but slower than that of the Earth.
 - It falls on the surface of the Moon, but faster than that of the Earth.
 - It doesn't fall, but floats where it is.
 - It doesn't fall, but slowly drifts away.

17. A lead ball and a snow ball of identical radius are released from a certain height in vacuum. The time taken by both of them to reach the ground are
- exactly equal.
 - roughly equal.
 - unequal.
 - in the ratio of the density of lead and snow.
18. Consider a satellite going round the earth in a circular orbit. Which of the following statements is wrong?
- It is a freely falling body.
 - It is moving with a constant speed.
 - It is acted upon by a force directed away from the centre of the earth which counter balances the gravitational pull.
 - Its angular momentum remains constant.
19. A hospital uses an ultrasonic scanner to locate tumours in a tissue. What is the wavelength of sound in a tissue in which the speed of sound is 1.7 kms^{-1} ? (The operating frequency of the scanner is 4.2MHz .)
- 0.405 mm
 - 1 mm
 - 0.703 mm
 - 1.403 mm
20. A wave in slinky travelled to and fro in 5 seconds. The length of slinky is 5 m. What is the velocity of wave?
- 10 m/s
 - 25 m/s
 - 2 m/s
 - 5 m/s

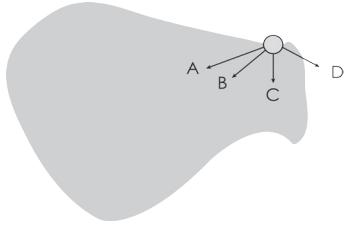
SECTION - C : BRAINBOX

21. In the given figure, two astronauts are floating in space far away from any planets or stars. What is the direction of the gravitational force that they experience, if any?



- Towards each other, because there is a gravitational force between them
- Away from each other because they are pulled by distant planets and stars.
- They experience a gravitational force, but its direction cannot be determined.
- They do not experience any gravitational force because there is no large object nearby.

22. Observe an irregular-shaped asteroid of fixed density shown below. Which arrow best represents the direction of the gravitational force on the ball?



- A, because it points to the centre of the mass of the asteroid.
- B, because it points to the geometric centre of the asteroid.
- C, because it points straight down, directly below the ball.
- D, because it points to the edge, nearest to the ball.

23. Two children are at the opposite ends of an iron pipe. One child strikes at end of the pipe with a stone. Find the ratio of time taken by the sound waves in the air and in iron rod reaching the other child. (Given velocity of sound in air and iron are 332 m s^{-1} and 130 m s^{-1} respectively.)
- $15.40 : 1$
 - $2.55 : 1$
 - $3.45 : 1$
 - $3.15 : 1$
24. On a planet whose size is the and mass 4 times as that of the earth, what is the energy needed to lift a 2 kg mass vertically upwards through 2 m distance in joule? (The value of g on the surface of the Earth is 10 m s^{-2})
- 160 J
 - 155 J
 - 172 J
 - 178 J

25. A geostationary satellite is orbiting the earth at a height of $6 R$ above the surface of the earth, R being the radius of the earth. What will be the time period of another satellite at a height of $2.5 R$ from the surface of the Earth?

- $3\sqrt{2}$ hour
- 8 hour
- $6\sqrt{2}$ hour
- 10 hour

Darken your choice with HB pencil -

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- Work done in moving a body is equal to the product of the force exerted on the body and the distance moved by the body in the direction of the force.

The work done by a force on a body depends on two factors:

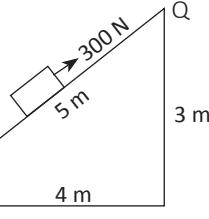
- (1) Magnitude of the force, and
- (2) Distance through which the body moves (in the direction of force)

- Whenever work is done against gravity, the amount of work done is equal to the product of the weight of the body and the vertical distance through which the body is lifted.

Work done in lifting a body = Weight of body × Vertical distance

- Energy is the ability to do work. The amount of energy possessed by a body is equal to the amount of work it can do when its energy is released.
- **Kinetic energy:** The energy of a body due to its motion is called its kinetic energy. Kinetic energy = $1/2 mv^2$
- **Potential energy:** The energy of a body due to its position or change in its shape is known as its potential energy.
- **Power** is defined as the rate of doing work.
- **Conservation of energy:** Whenever energy changes from one form to another, the total amount of energy remains constant. Energy can neither be created nor be destroyed.

SECTION - A : SCIENTIFIC REASONING

1. A body moves through a distance of 3 m in different situations given below. In which of the following case is the work done minimum?
 - a. When pushed over an inclined plane
 - b. When lifted vertically upward
 - c. When pushed over smooth rollers
 - d. When pushed on a plane horizontal surface
2. A horse and a dog are running at the same speed. If the weight of the horse is 10 times that of the dog, what is the ratio of their kinetic energies?
 - a. 1:5
 - b. 10:1
 - c. 5:1
 - d. 1:10
3. No work is done by a force on an object, if
 - a. the object is stationary, but the point of application of the force moves on the object.
 - b. the object moves in such a way that the point of application of the force remains fixed.
 - c. the force is always perpendicular to its velocity.
 - d. Both a and b
4. A boy used a simple machine to lift a 1000 N weight to a height of 2 m in 5 seconds. What will happen if the boy applies a higher force to complete the job?
 - a. The weight will move to a higher distance.
 - b. The work will be completed in a lesser time.
 - c. The energy required to complete the job will increase.
 - d. The average power will reduce.
5. If two unequal masses possess the same momentum, then the kinetic energy of the heavier mass is the kinetic energy of the lighter mass.
 - a. less than
 - b. equal to
 - c. more than
 - d. Can not say
6. The K.E. of a body becomes 4 times its initial value. The new linear momentum of the body will be:
 - a. same as the initial value.
 - b. four times the initial value.
 - c. twice the initial value.
 - d. eight times the initial value.
7. A 300 N force is applied to a box between the points P, Q in order to move it up a ramp of the dimensions given here.

How much work is done to move the box from the point P to the point Q?

 - a. 900 J
 - b. 1200 J
 - c. 1500 J
 - d. 3000 J
8. A box of 'm' kg is lifted vertically onto a shelf of 'h' cm. The gravitational field strength is 'g' N/kg.

What is the work done?

 - a. $mh/100$ Joules
 - b. $mgh \times 100$ Joules
 - c. mgh Joules
 - d. $mgh/100$ Joules

9. A worker, on a building site, lifts a heavy concrete block onto a lorry. He then lifts a lighter block the same distance in the same time. Which of the following is correct?

Work done in lifting the blocks	Power exerted by worker
a. Less for the lighter block	Less for the lighter block
b. Less for the lighter block	The same for both blocks
c. More for the lighter block	More for the lighter block
d. The same for both block	More for the lighter block

10. A boy moves on a straight horizontal road with a block of mass 2 kg in his hand. If he moves a distance of 40 m with an acceleration of 0.5 m/s^2 . The work done by the boy on the block during motion is
- a. 20 J
 - b. 40 J
 - c. 80 J
 - d. Zero

11. A ball is released from a height 20 m above a tower. Assuming the air resistance is negligible and 50% of its kinetic energy is lost at each bounce, what will be the height reached after the second bounce?
- a. 4 m
 - b. 3 m
 - c. 2 m
 - d. 1 m

12. A body is lifted at constant speed through a distance of 15 metres above the ground in 10 s. The potential energy gained by the object is equal to

- a. work done on the object.
- b. work done on the object minus kinetic energy of the object.
- c. force acting on the object.
- d. None these

13. A climber climbs a height of 100 m. Which two other pieces of information must also both be known to calculate the climber's increase in gravitational potential energy?
- a. Mass of climber and average speed
 - b. Weight of climber and average speed
 - c. Mass of climber and gravitational acceleration
 - d. Weight of climber and gravitational acceleration

14. A rocket is moving up with a velocity 'v'. If the velocity of this rocket is suddenly tripled, what will be the ratio of two kinetic energies?
- a. 1 : 3
 - b. 1 : 9
 - c. 8 : 1
 - d. 1 : 6

15. A group of clouds at a height of 500 m above the earth bursts and rainfall cover an area of 10^6 m^2 with a depth of 2 cm. The work done in raising water to the heights of clouds is
- a. $9.8 \times 10^{10} \text{ J}$
 - b. $16.4 \times 10^{10} \text{ J}$
 - c. $5.5 \times 10^{10} \text{ J}$
 - d. $10.5 \times 10^{10} \text{ J}$

SECTION - B : EVERYDAY SCIENCE

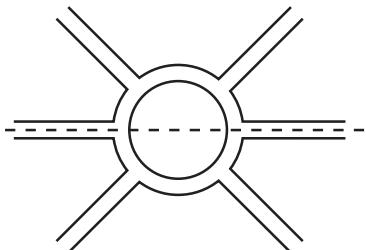
16. Heavy rock is thrown from a cliff of height H in a given direction. The speed with which it hits the ground must be
- dependent on the speed of projection.
 - independent of the speed of projection.
 - larger than the speed of projection.
 - Both a and c
17. Two observers moving with respect to each other at a same speed ' v ' along a straight line. They observe a block of mass ' m ' moving a distance l on a rough surface. Which of the following quantity will be same as observed by the two observers?
- Work done by friction
 - Kinetic energy of the block at time t
 - Acceleration of the block
 - None of these
18. Walking up to the top of a steep hill usually seems to be easier if a zigzag path is used instead of climbing by the steepest route. Why is this so?
- a. Less energy is needed
b. Less friction has to be overcome
c. Less power is needed
d. Less time is needed
19. A truck and a car moving with the same kinetic energy are stopped by applying same retarding force by means of brakes. Which statements is correct?
- Car will stop at a smaller distance
 - Truck will stop at a larger distance
 - Both truck and car will stop at a same distance
 - None of these
20. Aman and Aditi run up a hill in the same time. Aman weight more than Aditi. Which of the following statement is correct about power produced?
- Aman produces more power.
 - Aditi produces more power.
 - Both of them will produce same power.
 - It can't be determined that who will produce more power.

SECTION - C : BRAINBOX

21. Three different stones are being lifted from the ground level to different heights on different planets as given below.
- Case I : A 250 g stone is lifted upto 10 m on the Earth
- Case 2: A 6 kg stone is lifted upto 2 m on the Moon
- Case 3: A 1 kg stone is lifted upto 1 m on the Jupiter
- Given that the accelerations due to gravity on the Earth, the Moon and the Jupiter are

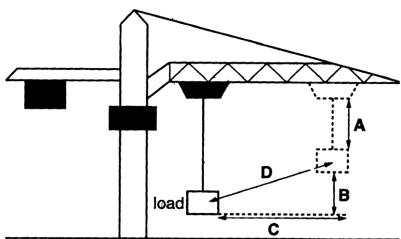
- 10 m s^{-2} , 2 m s^{-2} and 25 m s^{-2} respectively, which of the following statements is true?
- More energy is required for case 2 than case 1.
 - More energy is required for case 1 than case 3.
 - Case 1 and case 2 require the same amount of energy.
 - Case 1 and case 3 require the same amount of energy.

22. A boy is moving on a straight road against a frictional force of 5N. After travelling a distance of 1.5 m, he forgot the correct path at a round about of radius 100 m as shown in the figure. However, he moves on the circular path for one and half cycle and then he moves forward upto 2 km. Calculate the work done by him.



- a. 1850 J b. 18500 J
c. 58100 J d. 8510 J

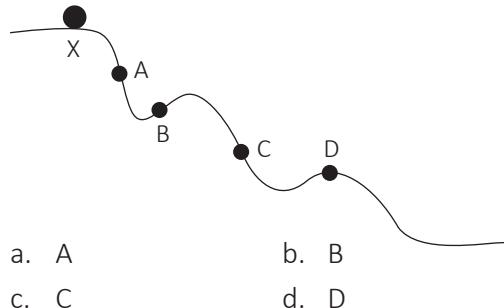
23. A crane moves its load diagonally, as shown. By which distance must the weight of the load be multiplied in order to find the increase in gravitational potential energy of the load?



- a. A b. B c. C d. D

Darken your choice with HB pencil -

24. A ball starting at point X, rolls down the hill shown in the diagram. At which point does the ball have half of its maximum kinetic energy? (Ignore friction).



- a. A b. B
c. C d. D

25. A man used a simple machine to lift a 1000 N weight to a height of 2 m in 5s. What will happen if the man applies a higher force?

- (1) The average power to lift weight will increase.
(2) The work will be completed in a shorter time.
(3) The chemical potential energy in the man will be used up faster.
- a. 1 and 2 only
b. 1 and 3
c. 2 and 3 only
d. 1,2 and 3

1.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
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17.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
18.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
19.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
20.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
21.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

22.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
23.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
24.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
25.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

Why Do We Fall Ill?

- ▶ Health of the organism is determined by the environmental factors. This includes the surrounding areas of an organism's nativity or their place of stay
 - Microbes or Infectious agents, poor nourishment, genetic abnormalities and lack of public services can cause diseases.
 - A symptom is a manifestation of a disease, indicating the nature of the disease, which is noticed in the patient. These are the changes seen during the diseased state of the body. They help in identification and proper treatment of the disease. For example: headache, vomiting, etc.
- ▶ Infectious agents spread through:-
 - Air (For example: Common cold, Tuberculosis)
 - Water (For example: Cholera, Jaundice)
 - Sexual act (For example: Syphilis, AIDS)
 - Blood to blood contact (For example: AIDS)
 - To reduce the effect of diseases, it is necessary to provide regular treatment to reduce the symptoms.

SECTION - A : SCIENTIFIC REASONING

1. Which of the following statement is incorrect about a malarial parasite?
 - a. It targets liver and red blood cells.
 - b. It undergoes multiple fission to release more parasites for further infection.
 - c. It targets the lungs and the eyes.
 - d. None of the above
2. Categories of infectious agents are factors that help in deciding the
 - a. kind of exercise one should do.
 - b. kind of treatment to be used.
 - c. physical common characteristics.
 - d. vector for the transmission of disease.
3. Prevention of a disease is more desirable than its cure because
 - a. some of the body functions may be damaged because of the effect of the disease.
 - b. the person suffering from the disease will not be bedridden.
 - c. the disease cannot be communicated to others during the course of the treatment.
 - d. patients do not look good during this condition.
4. Whenever the body is infected with some disease, its immune system gets activated and recruits many cells to kill the microbes. This process of recruitment results in :
 - a. Perspiration
 - b. Stimulation
 - c. Coagulation
 - d. Inflammation
5. Which of the following can make you ill, if you come in contact with an infected person?
 - a. High blood pressure
 - b. Genetic abnormalities
 - c. Sneezing
 - d. Liver cancer
6. Why is it difficult to make antiviral drugs?
 - a. Viruses make use of the host machinery.
 - b. Viruses are the connective link between the living and the non-living.
 - c. Viruses have very few biochemical mechanism of their own.
 - d. Viruses are protein coated.
7. Disease that causes poor functioning of some parts of the body will affect
 - I. Immunity
 - II. Running
 - III. Sleeping
 - IV. Health
 - a. I and IV
 - b. II and III
 - c. I, II and III
 - d. None of the above
8. To diagnose the kind of the disease, the most appropriate way is to:
 - I. observe the symptoms.
 - II. undergo specific laboratory tests.
 - III. take medicines from a chemist's shop.
 - IV. take the advice of elders at home.
 - a. I and II
 - b. II and III
 - c. Only III
 - d. Only IV
9. X is a type of disease that may require long time or even life time for their cure. They have very drastic long term affects on people's health. Here, X could be
 - a. Chronic disease
 - b. Infectious disease
 - c. Bacterial disease
 - d. Both a. and b.

10. The diseased condition shown in the given figure is because of :



- a. development of the embryo.
- b. recruiting many cells to the affected tissue to kill the disease causing microbes.
- c. activating the immune system.
- d. making the specific tissue ineffective.

11. Immunizations works on the principle that the immune system

- a. senses an infectious microbe, and does not respond against it.
- b. responds with very less affect when it senses that a particular microbe or its close relatives has reattacked.
- c. develops a memory for a particular infection by something (vaccine) that mimics the particular microbe.
- d. after the attack of an infectious microbe, forgets it.

12. What is the principle behind designing and working of drugs in a diseased body?

- a. Particular drug will work against a specific microbe.
- b. Drugs are designed to block biochemical pathways.
- c. They can act only against related groups of microbes.
- d. None of the above

13. Which of the following describes best the action of penicillin?

- a. It stops the cell wall formation in bacteria.
- b. It bursts the cell.
- c. It is toxic to the bacterial cell.
- d. It dehydrates the bacterial cells.

14. Read the following statements made on health and disease.

- I. An individual free from diseases need not be a healthy person.
- II. This is because health is a state of physical, mental as well as social well beings.

Which of the following option is correct for the above statements?

- a. Statement I is correct and II is incorrect
- b. Statement I is correct and II is correct explanation of the statement I
- c. Statement I is incorrect and statement II is correct
- d. Both statements I and II are wrong

15. Mukul is 6 years old and suffering from AIDS. What are the various possible means through which he would have been susceptible to it?

- I. Blood to blood contact
 - II. Sexual transmission
 - III. Infected mother to her baby during pregnancy
 - IV. Infected mother to her baby through breast feeding
- a. I and II
 - b. II and III
 - c. I, III and IV
 - d. III and IV

SECTION - B : EVERYDAY SCIENCE

16. "Infectious diseases are also called communicable diseases". Which of the following statement justifies this line?

- I. Communicable diseases are transferred from diseased person to healthy person.

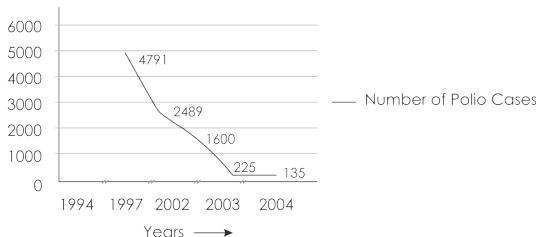
- II. Communicable diseases are not transferred from diseased person to healthy person.
- III. Both communicable diseases and infectious diseases are caused by pathogens.

- a. I and II b. II and III d. They appear because of social reasons

c. I and III d. Only I

19. Suman visits AIDS care centre in her town

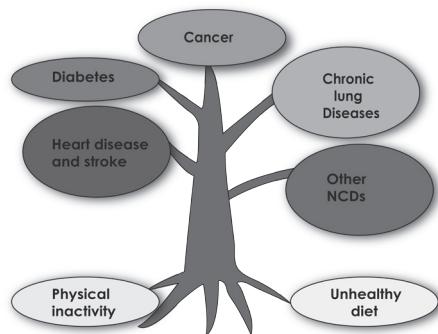
17. The given graph is based on the number of polio cases in India since 1994 to 2004.



According to the graphs

- a. The Incidence of poliomyelitis has decreased dramatically in India since 1994.
 - b. This explains the successful implementation of Pulse Polio immunization campaign established by the Government of India in 1994 to eradicate poliomyelitis.
 - c. This shows successful completion of the mission of vaccination of all children under age five against polio virus.
 - d. All of the above

18. The diseases shown in the given chart do not spread in community because



- a. They are caused by external agents or infectious agents
 - b. They are caused by economic reasons
 - c. They are caused due to genetic abnormalities

- d. They appear because of social reasons

19. Suman visits AIDS care centre in her town to spend some time with the patients suffering from AIDS. But once her father was diagnosed with Tuberculosis, she maintained a safe distance from her father during this time. What do you think is the reason behind the different behavior of Suman towards AIDS patient and towards TB patient?

- a. Tuberculosis is an infectious disease which spreads through air when people with an active TB infection cough, sneeze, or otherwise transmit their saliva through air.
 - b. AIDS is also an infectious disease like Tuberculosis but the mechanism of spreading of the disease is different in both the cases.
 - c. AIDS can be transmitted from an infected person to a healthy individual via unprotected sexual intercourse, contaminated blood transfusions and hypodermic needles, and from a mother to a child during pregnancy, delivery, or breastfeeding.
 - d. All of the above

20. Match the following and choose correct option for it.

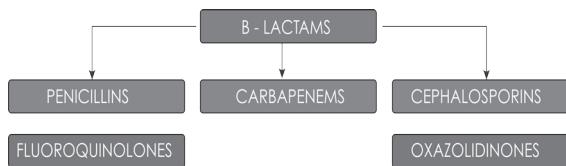
	I	II
A.	Malaria	I. Bacteria
B.	Kalaazar	II. Plasmodium
C.	Cholera	III. Leishmania
D.	AIDS	IV. Virus

- a. A-III, B-II, C-I, D-IV
 - b. A-II, B-IV, C-III, D-I
 - c. A-II, B-III, C-I, D-IV
 - d. A-I, B-II, C-III, D-IV

SECTION - C : BRAINBOX

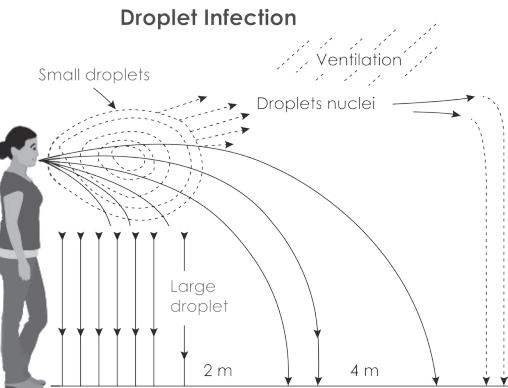
21. "AIDS is the terminal stage of infection by the HIV". This is because
- I. HIV infection reaches the immune system and damages its functioning by attacking the cells of the immune system T-cells
 - II. Gradual decrease in the number of immune cells weaken the immune system
 - III. It creates a state in which the body no longer fights off the minor infections that we face daily, resulting in AIDS
- I and III
 - I and II
 - Only II
 - I, II and III

22. The chart shown here reflects list of some medicines that help in treatment of diseases. Which of the following statement is correct about these medicines?



- They help in curing viral diseases by rendering the viruses ineffective
- They help in curing protozoan diseases by rendering the protozoans ineffective
- They help in curing bacterial diseases, as the biochemical pathways important for them are blocked by these medicines
- They help in curing worms, as they are present inside the body

23. Observe the diagram shown here carefully and choose correct option showing fate of the small and large droplet of the nasal discharge.



- Small droplets evaporate and form small droplet nuclei that are easily carried in air currents, transmitting infection to the healthy people present in the diameter of 4m.
- Large droplets are heavier than the smaller droplets and hence they settle down on the ground in few seconds.
- Large droplets hardly travel a distance of even 2m and hence are less infectious in nature.
- All of the above

24. What happens if the body is suffering from a disease?

- If the body is suffering from a disease, one or more organs of the body will not work.
 - The coordination with other organs is disturbed causing discomfort.
- I and II
 - Only I
 - Only II
 - None of these

25. Fill in the missing words in the given table:

Disease	Category of Pathogen	Causative agent
Typhoid	q	Salmonella typhi
Malaria	Protozoa	r
p	Bacteria	Mycobacterium
AIDS	Virus	HIV
Elephantiasis	Round worm	s
Whooping cough	Bacteria	Bordetella pertuss

p

- a. Tuberculosis
- b. Jaundice
- c. Dwarfness
- d. Plasmodium

q

- Bacteria
- Virus
- Bacteria
- Protozoa

r

- Plasmodium
- Elephantiasis
- Plasmodium
- Elephantiasis

s

- Filarial worm
- Filarial worm
- Filarial worm
- E.Coli

Darken your choice with HB pencil –

1.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
2.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
3.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
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14.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

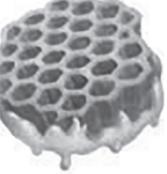
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18.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
19.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
20.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
21.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

22.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
23.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
24.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
25.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

- Improvement in food resource involves selection or production of a crop variety that can give a good yield and has desirable characters like resistance to abiotic and biotic factors, short maturity duration, wider adaptability, etc.
 - Techniques used for this are hybridisation and genetic engineering.
 - In the crop variety improvement method, it is recommended to grow crops that possess desirable characteristics like- higher yield, resistance to abiotic and biotic factors, shorter maturity duration, wider adaptability and desirable agronomic characteristics.
 - Crop production should be done by the use of improved farming practices and techniques like nutrient management, irrigation and farming practices like mixed cropping, intercropping and crop rotation.
 - Crop protection management is done by protecting crops from weeds, insects pests and diseases during the production of the crop.
 - Dairy animals are protected from parasites that can cause diseases; affect their health and the production of milk.

SECTION - A : SCIENTIFIC REASONING

1. What are the desirable agronomic characteristics for fodder crops?
 - a. Dwarfness and thick branches
 - b. Tallness and profuse branching
 - c. Tallness and thin branches
 - d. Dwarfness and scarce branching
2. The nutrients supplied by green manures are:
 - a. Nitrogen and phosphorus
 - b. Phosphorus and potassium
 - c. Sulphur and potassium
 - d. Potassium and magnesium
3. Which of the following statement is wrong with respect to compost?
 - a. Compost and vermi-compost require decomposition of farm waste material in pits.
 - b. Compost is rich in organic matter and nutrients.
 - c. Use of earthworms to hasten decomposition of plant and animal waste to produce vermi-compost.
 - d. Compost is used in very little quantities.
4. Composite fish culture increases the fish yield from a pond by growing a number of fish species in such a way, that they don't compete for:
 - a. Air
 - b. Food
 - c. Sunlight
 - d. Water
5. Which of the following statement is incorrect?
 - a. Photoperiods are related to the duration of sunlight.
 - b. Different crops require different climatic conditions, temperature and photo periods for their growth and completion of their life cycle.
 - c. Crops grown in rainy season are called kharif crops.
 - d. Mustard, linseed and peas are grown in kharif season.
6. Which of the following statement is incorrect with respect to hybridization?
 - a. It is done to incorporate desirable characteristics into crop varieties.
 - b. It refers to crossing between genetically dissimilar plants.
 - c. It may be intervarietal or interspecific.
 - d. It can be done only between the same species.
7. Which of the following correctly represents the macronutrients supplied by soil?
 - a. Carbon, oxygen, nitrogen, phosphorus, copper and chlorine
 - b. Carbon, oxygen, hydrogen, calcium, sulphur and zinc
 - c. Nitrogen, phosphorus, potassium, calcium, magnesium and sulphur
 - d. Iron, manganese, boron, zinc, copper, molybdenum and chlorine
8. An exception to the basic principle of cropping system is:
 - a. to choose a similar species of crops.
 - b. choose crops that complement each other.
 - c. choose crop and a cropping system that maintain and enhance the soil fertility.
 - d. choose crop and a cropping system which utilize available resources efficiently.

9. What do we call the crossing between plants of different varieties?
- Interspecific hybridisation
 - Intervarietal hybridisation
 - Intergeneric hybridisation
 - None of these
10. The Leguminous plants shown in the given figure are used for the production of
- Pesticides
 - Green manure
 - Antibiotics
 - Vermi-compost
- 
11. Which of the following statement is correct about the object shown in the given figure?
- These are vertical sheets of wax composed of double layers of hexagonal cells.
 - Its storage cells contain honey and pollen.
 - It is a part of apiculture.
 - All of the above
- 
12. After culturing the anther of a plant, a few diploid plants grew along with haploid plants. The part, which might have given birth to the diploid plants must have been the –
- Vegetative cell of the pollen grain
13. Which of the following represents correct example of the crop plant?
- Oilseeds – Mustard, Groundnut
 - Fodder crops – Berseem, Oats
 - Pulses – Gram, Pigeon pea
 - All of these
14. Read the given statements and choose the incorrect one –
- Fish culture is sometimes done in combination with rice crops as fishes are grown in water accumulated in the paddy fields.
 - Fish feed is used in different zones of pond to make the most efficient use of the available food.
 - Sahiwal and Muraah are exotic breeds used extremely in cattle farming.
 - All of these
15. What do we call the technique of reproducing new plants by cells instead of seeds?
- Recombinant DNA technology
 - Gene splicing
 - Tissue culture
 - Gene manipulation

SECTION - B : EVERYDAY SCIENCE

16. Jersey and Brown Swiss of cow gives large amount of milk as compared to other breed of cow. This is because
- They have longer lactation period
 - They are hybrid variety with improved characteristics that allow them to produce more milk
17. BT crop, which is recently recommended for cultivation in India is
- Wheat
 - Rice
 - Cotton
 - Soyabean

18. Choose correct option for P, Q, R and S.

Crops	Use
Sunhemp	Q
P	Biopesticide
Turmeric	Biopesticide
Gajar ghas	R
Berseem	S
Oats	Food for livestock

	P	Q	R	S
a.	Neem	Manure	Weeds	Food for livestock
b.	Manure	Weeds	Papaya	Pesticides
c.	Weeds	Manure	Food for livestock	Food for livestock
d.	Sorghum	Manure	Weeds	Food for livestock

19. “Organic farming works in harmony with nature rather than against it”. Which of the following statements justify this line?

- I. Continuous use of fertilisers can destroy soil quality and fertility because the organic matter in the soil is not replenished and micro-organisms in the soil are harmed by the fertilisers used

II. In organic farming, manure is used to enrich the soil with nutrients and organic matter

III. Manure is prepared from biological waste material that helps in protecting the soil from the excessive use of fertilisers

- a. I and III
- b. I and II
- c. I, II and III
- d. None of the above

20. “Terror of Bengal”, a most invasive aquatic weed, is widely spread and expands rapidly in the growing season. How does it affect aquatic life?

- a. Rapid growth and death of water hyacinth increases heterotrophic activity of the microbes.
- b. Increased microbial activity results in the reduction of the dissolved oxygen in water, thereby resulting in the death of fishes.
- c. Increased microbial activity results in the increase of BOD in water, thereby resulting in the death of aquatic animals.
- d. All of these

SECTION - C : BRAINBOX

21. Which of the following shows the advantages of composite fish culture system?

- I. Food available in all the parts of the pond is used.
 - II. No competition for food between the cultured species.
 - III. Fishes breed very fast.
- a. I and III b. I and II
 - c. I, II and III d. None of the above

22. The table shown here shows the names of two different types of diseases. Which of the following statements are incorrect about these diseases?

X - Leaf spot of rice
Y - Smut of bajra

- I. X is a seed borne disease.
- II. Y is a soil borne disease.
- III. Both X and Y are beneficial to the crop plants.

- IV. X can be treated by using fungicides.
- V. Y can be treated by using insecticides.
- a. III and V b. II, III and V
- c. I, II and III d. I, II and V
23. Which of the following is correct about the plant part shown in the given figure?
- 
- I. It is used as bio-pesticides.
 II. It is used as herbicides.
 III. It is used to impart desired smell to the grains.
 IV. It acts as larvicide and fungicide.
 V. It acts as antifeedant.
- a. I, III, IV and V b. I, IV and V
 c. I, II, III and V d. III, IV and V
24. Which of the following statement is correct about the animal shown in the given figure?
- 
- I. It feeds on decaying plants and detritus.
 II. It is a surface feeder.
 III. It is a bottom feeder.
 IV. It feeds in the middle zone of the pond i.e. column feeder.
- a. I and III
 b. I and IV
 c. I and II
 d. II and III
25. Identify X, Y and Z according to the classification table shown here.
- ```

graph TD
 X[X] --> Jersey[Jersey
Foreign breed]
 Y[Y] --> RedSindhi[Red Sindhi
Indigenous breed]
 Jersey --> LongLactation[long lactation periods]
 RedSindhi --> Resistance[resistance to diseases]
 LongLactation --> CrossBreeding[Cross breeding]
 Resistance --> CrossBreeding
 CrossBreeding --> Calf[Calf
(Long lactation periods & resistance to disease)]
 Calf --> Z[Z]

```
- a. X- Sea horse Y- Red Sindhi Z- Calf  
 b. X- Jersey Y- Red Sindhi Z- Calf  
 c. X- Jersey Y- Dolly Z- Jonkey  
 d. X-Hercules Y- Red Sindhi Z- Calf

Darken your choice with HB pencil -

|                                                                                                    |                                                                                                     |                                                                                                     |                                                                                                     |
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| 5. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 12. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 19. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d |                                                                                                     |
| 6. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 13. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 20. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d |                                                                                                     |
| 7. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 14. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 21. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d |                                                                                                     |

- ▶ Life on the Earth is dependent on many factors like resources available on the Earth, energy from the sun, etc.
  - Different layers of the Earth are lithosphere (land and soil), biosphere (life supporting zone) and hydrosphere (water resources).
  - Our atmosphere has biotic and abiotic components.
  - Abiotic – non-living things, Biotic – living things.
  - Atmosphere maintains the temperature of the Earth.
  - Our environment got polluted due to pollutants mixed with air, water, soil, etc.
  - Chipko movement is a movement related with forest conservation which was led by Shree Sunder Lal Bahuguna in Garhwal Himalayas.
  - Various biogeochemical cycles exist in the nature which represent interaction between biotic and abiotic components of the biosphere to make a stable system.

## SECTION - A : SCIENTIFIC REASONING

1. If there was not an atmosphere around the Earth, the temperature of the earth would :
  - a. increase.
  - b. decrease.
  - c. increase during the day and decrease during the night.
  - d. not be affected.
2. Rainfall patterns depends on:
  - a. the underground water table.
  - b. the number of water bodies in an area.
  - c. the density pattern of human population.
  - d. the prevailings reason in an area.
3. A lake with an inflow of domestic sewage rich in organic waste may result in :
  - a. death of fish due to lack of O<sub>2</sub>
  - b. increased population of aquatic organisms
  - c. drying of lake due to algal bloom
  - d. increased production of fish due to lot of nutrients
4. Match the Column A with Column B.

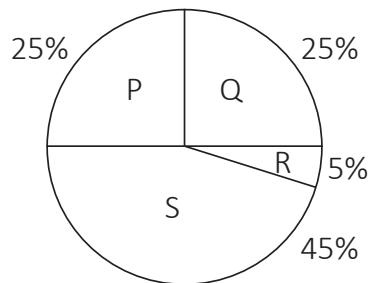
| Column A               | Column B                         |
|------------------------|----------------------------------|
| p – Heat               | i) Non-degradable soil pollutant |
| q – Detergent          | ii) Degradable soil pollutant    |
| r – Plastic materials  | iii) Air pollutant               |
| s – Particulate matter | iv) Physical water pollutant     |
| t – Fruit Peels        | v) Chemical water pollutant      |

Choose the correct option :

- a. p – (iv), q – (v), r – (i), s – (iii), t – (ii)
- b. p – (v), q – (iv), r – (i), s – (ii), t – (iii)

- c. p – (iv), q – (v), r – (i), s – (ii), t – (iii)
- d. p – (iii), q – (ii), r – (v), s – (iv), t – (i)

5. Study the given chart showing the proportion of solid components in soil.



What are P, Q, R, and S here?

|    | P              | Q         | R              | S        |
|----|----------------|-----------|----------------|----------|
| a. | Air            | Water     | Organic matter | Minerals |
| b. | Air/water      | Air/water | Organic matter | Minerals |
| c. | Organic matter | Air       | Water          | Minerals |
| d. | Organic matter | Water     | Air            | Minerals |

6. Which of the following factors are responsible for soil weathering?

- (I) Sun, water, wind
- (II) Hydrolysis, Oxidation, Reduction
- (III) Microbes, Moases, Nematodes

Choose the correct option

- a. I and II
- b. II and III
- c. I, II and III
- d. I and III

7. Organisms like lichens are very sensitive to the levels of:
- $\text{CO}_2$
  - $\text{SO}_2$
  - CO
  - $\text{CH}_4$
8. Read the given statements. Which one of the following is not an effect of acid rain?
- It reduces soil fertility.
  - It corrodes monuments.
  - It enriches food & drinking waste with minerals.
  - It causes death of aquatic organisms.
9. Which of the following diseases are caused by toxic chemicals?
- Cholera
  - Minemata
  - Jaundice
  - Both a and b
10. Which one of the following is not considered as ODS (Ozone Depleting Substance)?
- Halons
  - CFCs
  - $\text{SO}_3$
  - $\text{CH}_3\text{Br}$

## SECTION - B : EVERYDAY SCIENCE

11. Oxygen is very important for all the living organisms. There is an oxygen cycle in nature.
- It maintains the level of  $\text{O}_2$  in the atmosphere.
  - It plays an important role in nitrogen fixation as well.
  - It is responsive for decay of organic matter.
  - All of these
12. Nitrogen is circulated continuously through all the biotic & abiotic components through a cyclic process, known as a nitrogen cycle. Ramya wrote the steps of nitrogen cycle as
- Ammonification
  - Nitrification
  - Nitrogen fixation
  - $\text{N}_2$  assimilation
- I, II, III, IV
  - III, IV, I, II
  - III, I, IV, III
13. A group of students collected data about the amount of pollutants. Which one of these rivers, can continue to support the most number of aquatic organisms?
- 
- The graph illustrates the long-term impact of pollution on different rivers. River W remains relatively clean. River X initially has high pollution but becomes more stable at a higher level. River Y starts with high pollution but stabilizes at a lower level than X. River Z shows a continuous and steady increase in pollution over time.
- W
  - X
  - Y
  - Z

## SECTION - C : BRAINBOX

14. Choose the correct statement.
- $\text{CO}_2$  in atmosphere → Decomposes → 'C' in animals → Organic 'C' in plants
  - Organic 'C' in animals → Decomposes →  $\text{CO}_2$  in atmosphere → Organic 'C' in plants.
  - Inorganic Carbonates → Organic 'C' in plants → Organic 'C' in animals → Scavengers.
  - $\text{CO}_2$  in atmosphere → Organic 'C' in plants → Organic 'C' in animals → Inorganic 'C' in soil.
15. Why does the moon have very cold and very hot temperature variations ( $-190^{\circ}\text{C}$  to  $110^{\circ}\text{C}$ ) even though it is at the same distance from the sun as the earth is?
- Because Moon has no atmosphere.
  - Air acts as a temperature buffer on the Earth.
  - Both a and b
  - Water on the earth checks the excessive rise of the temperature.

Darken your choice with HB pencil

|                                                                                                    |                                                                                                    |                                                                                                     |                                                                                                     |
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| 3. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 7. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 11. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 15. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d |
| 4. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 8. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | 12. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d |                                                                                                     |

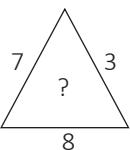
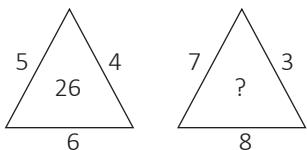
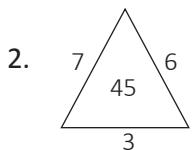
**Chapter  
15**

# Logical Reasoning

\*Study the given series and find the missing term/letter for Q. No. 1 to 3.

1.  $2, 7, 22, 67, \underline{\quad}, ?$ .

- a. 200
- b. 201
- c. 202
- d. 240



- a. 26
- b. 27
- c. 28
- d. 29

3.  $1215, 405, 135, \underline{\quad}, 15.$

- a. 405,
- b. 45
- c. 54
- d. 10

\* Unscramble the jumbled words to find the correct word with help of given clues (Q. No. 4 and 5)

4. One of the big cat family

- a. THEPARN
- b. HFGA
- c. OTCL
- d. GEHIN

5. Correspondance

- a. TRELET
- b. TTRFEE
- c. KOOB
- d. REOYUJN

\* Choose the odd one out (Q. No. 6 and 7)

6. Which one is different from the others?

- a. 14, 12
- b. 24, 7
- c. 37, 4
- d. 42, 4

7. a. ALMZ
- b. BTUY
- c. CPQX
- d. DEFY

8. Study the given pattern of word pairs and find the word to replace question mark.

(SHOUT → SHOT) (SOLDER → SOLF)  
(FLUTED → ?)

- a. FLUE
- b. LUDE
- c. LUTE
- d. TELD

Direction – In the following questions there are 3 pairs of words given. Complete the 3rd pair in the same way as the first 2 pairs are done.  
(Q. No. 9–10)

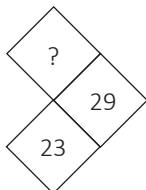
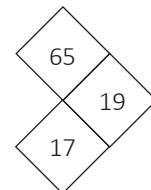
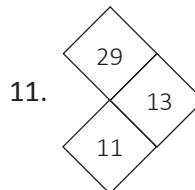
9. (CAMERA, MACE) (SENTRY, NEST), (CASKET, ?)

- a. TAKE
- b. SACK
- c. CASE
- d. CAKE

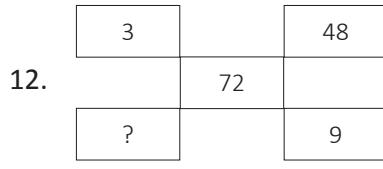
10. (DEFINE, FIND), (POSTED, STEP) (MOTHER, ?)

- a. THEM
- b. OTHE
- c. THERE
- d. MOTH

\*Replace the question mark with a suitable number (Q. No. 11 – 12)



- a. 100
- b. 88
- c. 137
- d. 181



- a. 12
- b. 16
- c. 32
- d. 24

Direction – Answer Q. No. 13–15 based on the arrangement given below:

YW@1&CN3PLB9↑=D\*e2£MV\$7#4FGS

13. How many such symbols are there in this arrangement which are not immediately preceded by a number and also not immediately followed by a letter?

- a. Zero
- b. One
- c. Two
- d. Three

14. C13W:74VG in the same way as N@B=:2

- a. \$F2D
- b. VF2D
- c. \$F2\*
- d. \$F£D

15. Three of the given groups are alike in a certain way based on the given arrangement. Which one of the following does not belong to the group?

- a. \*V2M
- b. ↑2DE
- c. LDB=
- d. VF74

16. Five girls Annu, Kavya, Khushboo, Myra and Nidhi measure themselves to see who is the tallest. Annu is taller than Nidhi but not as tall as Kavya. Khushboo is the same height as Annu, but taller than Nidhi and Myra. Who is the tallest one?

- a. Nidhi
- b. Annu
- c. Khushboo
- d. Kavya

17. If P is husband of Q and R is the mother of S and Q, then what is R to P?

- a. Mother
- b. Aunt
- c. Sister
- d. Mother-in-law

18. If P + Q means P is the son of Q and P = Q means P is the sister of Q. Then what does P = R + Q mean?

- a. P is the daughter of Q
- b. P is the father of Q
- c. P is the brother of Q
- d. P is the uncle of Q

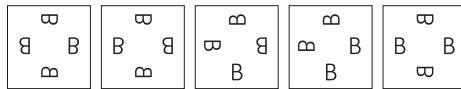
19. Anushka walked a distance of 75 metres towards North. She then turned left and walked 80 metres. Finally she turned right at an angle of 45°. In which direction is she moving finally?

- a. North
- b. South
- c. North-east
- d. South-east

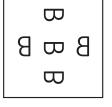
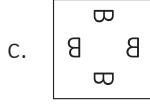
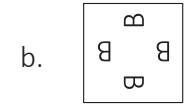
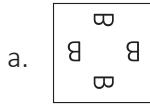
20. If North is changed to West and East to North and so on, then what will come in place of North-west?

- a. South-west
- b. North-east
- c. South-east
- d. East-west

21. What comes next?



?

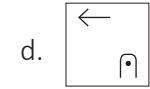
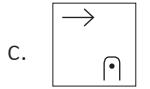
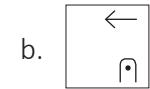
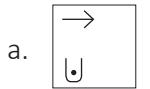


22. Find the water image of A1M3b.

- a. A1M3b
- b. A3M1A
- c. C3M1A
- d. D3M1A

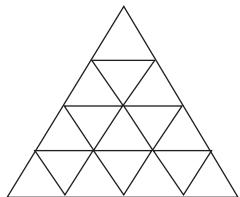


23. Find the mirror image of



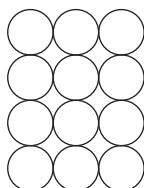
24. Count the number of parallelogram in the given figure.

- a. 34
- b. 42
- c. 45
- d. 47



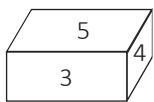
25. Study the given figure. If the centres of all the circles are joined by horizontal and vertical lines, then find the number of squares that can be formed.

- a. 12
- b. 11
- c. 10
- d. 8



26. Find the opposite faces of 5 and 4 respectively.

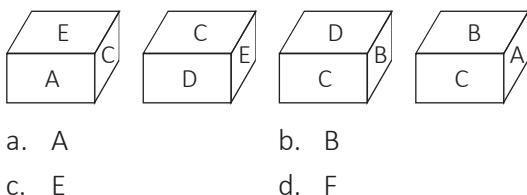
- a. 6, 2
- b. 1, 2
- c. 2, 6
- d. 2, 1



27. A cube is painted yellow on all faces and cut into 27 small cubes of equal size. How many small cubes are painted as one faced cubes/cube only?

- a. 1
- b. 6
- c. 8
- d. 12

28. Study the given figures of cubes. Which letter will be opposite to letter D?



- a. A
- b. B
- c. E
- d. F

29. A group of students went on a picnic and planned to spend Rs. 96 on eatables. Four of them, however, did not turn up. As consequence, the remaining students had to contribute Rs. 4 each extra. How many

students attended the picnic?

- a. 20
- b. 16
- c. 44
- d. 48

30. The number of boys in a class is 3 times the numbers of girls. Which one of the following cannot represent the total number of students in the class?

- a. 40
- b. 42
- c. 44
- d. 48

31. A train covers a distance in 50 minutes, if it runs at a speed of 48 km/h on an average. What will be the speed of the train to reduce the time of journey to 40 minutes?

- a. 40 km/h
- b. 50 km/h
- c. 55 km/h
- d. 60 km/h

32. A car covers 4 successive 3 km. tracks at a speed of 10 km/h, 20 km/h, 30 km/h and 60 km/h respectively. What is the average speed of the car?

- a. 20 km/h
- b. 25 km/h
- c. 30 km/h
- d. 35 km/h

33. Find the area of a right angled triangle whose hypotenuse is 10 cm & base is 8 cm.

- a. 20 cm<sup>2</sup>
- b. 34 cm<sup>2</sup>
- c. 34 cm<sup>2</sup>
- d. 36 cm<sup>2</sup>

34. A person incurred a loss of 10% when he sold goods at Rs. 153. What should be selling price to gain 20%?

- a. 250
- b. 230
- c. 204
- d. 245

35. Arrange all the words of the given statement in alphabetical order.

"Meeta meets mysterious Mridul many times." Which word will be in the centre?

- a. Meeta
- b. Meets
- c. Mridul
- d. Mysterious

36. In a row of girls, Meenu is 20<sup>th</sup> from the right end and Sheenu is 10<sup>th</sup> from the left end. When they interchange their positions, Meenu becomes 25<sup>th</sup> from right end. How many girls are there in the row?

- a. 24
- b. 34
- c. 44
- d. 54

37. If English alphabets are divided into two equal halves from A to M and N to Z such as A corresponds to N, then which letter in the later half would be corresponding to Y?

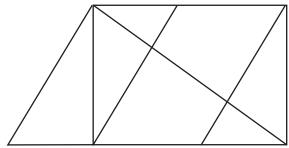
- a. Q
- b. W
- c. X
- d. V

38. If A denotes X, B denotes  $\div$ , C denotes + and D denotes  $-$ , then what will be the value of

**16C24B8D6B2A3** ?

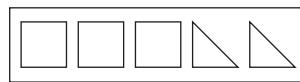
- a.  $\frac{13}{6}$
- b.  $14\frac{1}{2}$
- c. 10
- d.  $-\frac{1}{6}$

39. How many minimum number of straight lines are required to make the given figure?



- a. 8
- b. 10
- c. 12
- d. 13

40. Which one of the following figures can be formed from the pieces given in the figure?



- a.
- b.
- c.
- d.

Darken your choice with HB pencil

|                             |                         |                         |                         |                             |                         |                         |                         |                             |                         |                         |                         |                             |                         |                         |                         |
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| 1. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 11. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 21. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 31. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 2. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 12. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 22. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 32. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 3. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 13. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 23. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 33. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 4. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 14. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 24. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 34. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 5. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 15. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 25. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 35. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 6. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 16. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 26. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 36. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 7. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 17. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 27. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 37. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 8. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 18. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 28. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 38. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 9. <input type="radio"/> a  | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 19. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 29. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 39. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |
| 10. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 20. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 30. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d | 40. <input type="radio"/> a | <input type="radio"/> b | <input type="radio"/> c | <input type="radio"/> d |

# Answers

## Chapter 1: Matter in Our Surroundings

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | d | 2.  | b | 3.  | a | 4.  | d | 5.  | b | 6.  | d | 7.  | d | 8.  | a | 9.  | b | 10. | a |
| 11. | c | 12. | a | 13. | d | 14. | d | 15. | d | 16. | a | 17. | a | 18. | c | 19. | a | 20. | d |
| 21. | c | 22. | b | 23. | c | 24. | d | 25. | b |     |   |     |   |     |   |     |   |     |   |

## Chapter 2: Is Matter Around Us Pure?

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | c | 2.  | c | 3.  | a | 4.  | b | 5.  | d | 6.  | a | 7.  | d | 8.  | a | 9.  | c | 10. | b |
| 11. | d | 12. | c | 13. | c | 14. | c | 15. | b | 16. | d | 17. | b | 18. | d | 19. | d | 20. | c |
| 21. | d | 22. | b | 23. | a | 24. | b | 25. | a |     |   |     |   |     |   |     |   |     |   |

## Chapter 3: Atoms and Molecules

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | b | 2.  | c | 3.  | b | 4.  | a | 5.  | a | 6.  | b | 7.  | a | 8.  | c | 9.  | c | 10. | c |
| 11. | c | 12. | b | 13. | b | 14. | d | 15. | a | 16. | b | 17. | c | 18. | c | 19. | d | 20. | d |
| 21. | b | 22. | a | 23. | a | 24. | a | 25. | a |     |   |     |   |     |   |     |   |     |   |

## Chapter 4: Structure of Atom

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | a | 2.  | c | 3.  | c | 4.  | c | 5.  | b | 6.  | b | 7.  | d | 8.  | d | 9.  | c | 10. | c |
| 11. | a | 12. | a | 13. | a | 14. | c | 15. | a | 16. | c | 17. | d | 18. | b | 19. | d | 20. | d |
| 21. | c | 22. | d | 23. | c | 24. | b | 25. | b |     |   |     |   |     |   |     |   |     |   |

## Chapter 5: Cell – The Fundamental Unit of Life

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | d | 2.  | d | 3.  | d | 4.  | c | 5.  | a | 6.  | c | 7.  | a | 8.  | a | 9.  | d | 10. | c |
| 11. | b | 12. | a | 13. | a | 14. | a | 15. | b | 16. | a | 17. | b | 18. | c | 19. | d | 20. | a |
| 21. | d | 22. | a | 23. | b | 24. | b | 25. | b |     |   |     |   |     |   |     |   |     |   |

## Chapter 6: Tissues

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | b | 2.  | a | 3.  | d | 4.  | a | 5.  | d | 6.  | a | 7.  | d | 8.  | b | 9.  | b | 10. | c |
| 11. | a | 12. | b | 13. | d | 14. | b | 15. | c | 16. | c | 17. | a | 18. | a | 19. | b | 20. | d |
| 21. | c | 22. | c | 23. | c | 24. | b | 25. | c |     |   |     |   |     |   |     |   |     |   |

## Chapter 7: Diversity in Living Organisms

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | d | 2.  | d | 3.  | b | 4.  | a | 5.  | d | 6.  | b | 7.  | a | 8.  | b | 9.  | b | 10. | a |
| 11. | c | 12. | c | 13. | b | 14. | d | 15. | a | 16. | b | 17. | c | 18. | b | 19. | a | 20. | b |
| 21. | c | 22. | d | 23. | c | 24. | d | 25. | a |     |   |     |   |     |   |     |   |     |   |

## Chapter 8 : Motion

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | a | 2.  | d | 3.  | d | 4.  | d | 5.  | b | 6.  | a | 7.  | c | 8.  | a | 9.  | c | 10. | a |
| 11. | b | 12. | d | 13. | a | 14. | a | 15. | b | 16. | b | 17. | d | 18. | d | 19. | a | 20. | b |
| 21. | a | 22. | b | 23. | a | 24. | c | 25. | a |     |   |     |   |     |   |     |   |     |   |

### Chapter 9 : Force and Laws of Motion

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | d | 2.  | c | 3.  | c | 4.  | c | 5.  | c | 6.  | c | 7.  | a | 8.  | b | 9.  | d | 10. | a |
| 11. | b | 12. | c | 13. | c | 14. | c | 15. | b | 16. | d | 17. | a | 18. | c | 19. | d | 20. | b |
| 21. | a | 22. | d | 23. | c | 24. | c | 25. | a |     |   |     |   |     |   |     |   |     |   |

### Chapter 10 : Gravitation and Sound Waves

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | c | 2.  | a | 3.  | d | 4.  | d | 5.  | d | 6.  | a | 7.  | d | 8.  | a | 9.  | a | 10. | c |
| 11. | d | 12. | c | 13. | d | 14. | c | 15. | b | 16. | c | 17. | b | 18. | b | 19. | a | 20. | b |
| 21. | a | 22. | c | 23. | b | 24. | a | 25. | c |     |   |     |   |     |   |     |   |     |   |

### Chapter 11 : Work and Energy

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | b | 2.  | b | 3.  | d | 4.  | a | 5.  | c | 6.  | c | 7.  | c | 8.  | d | 9.  | a | 10. | b |
| 11. | a | 12. | a | 13. | c | 14. | b | 15. | a | 16. | d | 17. | c | 18. | c | 19. | c | 20. | a |
| 21. | d | 22. | b | 23. | b | 24. | c | 25. | d |     |   |     |   |     |   |     |   |     |   |

### Chapter 12 : Why Do We Fall III?

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | c | 2.  | b | 3.  | a | 4.  | d | 5.  | c | 6.  | c | 7.  | a | 8.  | a | 9.  | a | 10. | b |
| 11. | c | 12. | b | 13. | a | 14. | b | 15. | c | 16. | c | 17. | d | 18. | c | 19. | d | 20. | c |
| 21. | d | 22. | c | 23. | d | 24. | c | 25. | a |     |   |     |   |     |   |     |   |     |   |

### Chapter 13 : Improvement in Food Resources

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | b | 2.  | a | 3.  | d | 4.  | b | 5.  | d | 6.  | d | 7.  | c | 8.  | a | 9.  | b | 10. | b |
| 11. | d | 12. | c | 13. | d | 14. | c | 15. | c | 16. | c | 17. | c | 18. | a | 19. | c | 20. | d |
| 21. | c | 22. | a | 23. | b | 24. | b | 25. | b |     |   |     |   |     |   |     |   |     |   |

### Chapter 14 : Natural Resources

|     |   |     |   |     |   |     |   |     |   |    |   |    |   |    |   |    |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|----|---|----|---|----|---|----|---|-----|---|
| 1.  | b | 2.  | b | 3.  | b | 4.  | a | 5.  | b | 6. | c | 7. | b | 8. | c | 9. | d | 10. | c |
| 11. | d | 12. | b | 13. | a | 14. | d | 15. | c |    |   |    |   |    |   |    |   |     |   |

### Chapter 15 : Logical Reasoning

|     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 1.  | c | 2.  | d | 3.  | b | 4.  | a | 5.  | b | 6.  | c | 7.  | d | 8.  | a | 9.  | b | 10. | a |
| 11. | c | 12. | a | 13. | c | 14. | d | 15. | c | 16. | c | 17. | d | 18. | a | 19. | d | 20. | a |
| 21. | a | 22. | b | 23. | d | 24. | c | 25. | d | 26. | a | 27. | b | 28. | a | 29. | d | 30. | b |
| 31. | d | 32. | a | 33. | b | 34. | c | 35. | a | 36. | b | 37. | b | 38. | c | 39. | a | 40. | c |

## My Notes

## My Notes