UNIQUE STUDY POINT

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Class: VI	**Subject:** Science	**Session:** 2025-26
Chapter: 06 - Materials Around Us	**Time:** 1½ Hours	**Max. Marks:** 40

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

SECTION A - Multiple Choice Questions (1 mark each)

1. Which of the following pairs is INCORRECTLY matched?

(a) Glass - Transparent
(b) Butter paper - Translucent
(c) Iron - Lustrous
(d) Water - Opaque

2. The correct abbreviation for kilogram is:

(a) Kg
(b) kg
(c) KG
(d) kgs

3. Which property helps aquatic animals and plants to survive?

(a) Oxygen is insoluble in water
(b) Oxygen is soluble in water
(c) Water is transparent
(d) Water has volume

4. An object can be made from:

(a) Only one material
(b) Different materials
(c) Both (a) and (b)
(d) None of these

5. Which of the following does NOT dissolve in water?

(a) Common salt
(b) Chalk powder
(c) Sugar
(d) Lemon juice

6. The correct way to write 7 kilograms is:

(a) 7 kg
(b) 7kg
(c) 7 kgs
(d) 7Kg

7. Which is NOT an example of matter?

(a) Air
(b) Water
(c) Light
(d) Stone

8. Materials lose their lustre due to:

(a) Effect of sunlight only
(b) Effect of air and moisture
(c) Effect of heat only
(d) Effect of pressure only

9. Which material would be best for making a window?

(a) Wood
(b) Iron
(c) Clear glass
(d) Cloth

10. Classification of objects is done based on:

(a) Common property
(b) Random selection
(c) Size only
(d) Color only

SECTION B - Short Answer Questions (2 marks each)

11. Write the SI units for mass and volume. How should these units be written correctly?

12. "All that glitters is not gold." Explain this statement with reference to lustrous materials.

13. Why is air considered as matter even though we cannot see it?

14. Explain the difference between opaque and translucent materials with one example each.

SECTION C - Short Answer Questions (3 marks each)

15. Water plays an important role in the functioning of our body. Explain this statement by discussing the property of water that makes it so important. Also, give one practical application related to health.

16. You are given the following materials: vinegar, honey, mustard oil, water, and wheat flour. How would you group them based on their solubility in water? Perform the activity and explain your observations.

17. Explain why different materials are used for making different parts of a bicycle. Give at least three examples of bicycle parts and the materials they are made of, along with reasons.

SECTION D - Long Answer Question (5 marks)

18. Describe in detail the various properties of materials that help us classify them. Give examples for each property. Also explain how understanding these properties helps us in choosing the right material for the right purpose.

SECTION E - Case Study Based Questions (4 marks each)

19. Case Study 1:

Ghulan, Sheeta and Sara are playing hide and seek with their friends. Ghulan hides behind a wall, Sheeta hides behind a big tree in the garden while Sara hides behind the frosted glass door. Sheeta's younger brother can see all of this happening through a glass window of his house.

Based on the above case study, answer the following questions:

(a) Why did Ghulan choose to hide behind a wall? (1 mark)
(b) Could Sheeta's brother see Sara clearly through the frosted glass door? Why? (1 mark)
(c) Why could Sheeta's brother see the children through the glass window? (1 mark)
(d) Classify the materials mentioned (wall, tree, frosted glass door, glass window) as transparent, translucent, or opaque. (1 mark)

20. Case Study 2:

Ayurveda, one of the Indian medical systems, has a system of grouping things based on 20 properties (guṇa). These properties include guru (heavy) - laghu (light), manda (slow) - tīkṣhṇa (quick), hima (cold) - uṣhṇa (hot), snigdha (unctuous) - rukṣha (dry), śhlakṣhaṇa (smooth) - khara (rough), sāndra (solid) - drava (liquid), mṛidu (soft) - kaṭhina (hard), sthira (stable) - khāla (moving), sūkṣhma (subtle) - sthūla (big), and viśhada (non slimy) - picchhila (slimy). These properties can be used to describe all physical matter, living systems, environment, and food.

Based on the above case study, answer the following questions:

(a) How many pairs of opposite properties are mentioned in Ayurveda for classification? (1 mark)
(b) Identify one property pair from the Ayurvedic classification that is similar to the modern classification discussed in your textbook. (1 mark)
(c) Why is classification important in both ancient and modern sciences? (1 mark)
(d) Give an example of how the property 'guru-laghu' (heavy-light) relates to mass. (1 mark)

DETAILED ANSWER KEY - PAPER 03

SECTION A - Answers to MCQs

1. (d) Water - Opaque

This pair is incorrectly matched. Water is transparent, not opaque. Materials through which things can be seen clearly are called transparent, and water allows light to pass through it completely.

2. (b) kg

The correct abbreviation for kilogram is 'kg' in lowercase. There is no space between 'k' and 'g', and no full stop after the symbol except at the end of a sentence.

3. (b) Oxygen is soluble in water

Oxygen gas dissolves in water, and this dissolved oxygen is very important for the survival of animals and plants that live in water. They breathe this dissolved oxygen.

4. (c) Both (a) and (b)

An object can be made from a single material or from different materials. For example, a glass is made from one material (glass), while a pen is made from different materials (plastic body, metal tip, ink).

5. (b) Chalk powder

Chalk powder does not dissolve in water. It is insoluble and remains visible even after stirring. Common salt, sugar, and lemon juice are soluble in water.

6. (a) 7 kg

The correct way to write 7 kilograms is '7 kg' with a space between the number and the unit. The abbreviation 'kg' should be in lowercase, and there should be no 's' added for plural.

7. (c) Light

Light is not matter because it does not occupy space and does not have mass. Matter is defined as anything that occupies space and has mass. Air, water, and stone all have mass and occupy space, so they are matter.

8. (b) Effect of air and moisture

Some metals may lose their lustre and start to look dull or non-lustrous due to the effect of air and moisture on them. This is why we often notice the lustre only on their freshly cut surfaces.

9. (c) Clear glass

Clear glass would be best for making a window because it is transparent, allowing light to pass through and enabling people to see outside. It is also hard, durable, and weather-resistant.

10. (a) Common property

Classification of objects is done based on a common property that they share. Objects can be classified on the basis of similarities or differences in their properties.

SECTION B - Answers to Short Answer Questions

11.

SI Unit for Mass: Kilogram, abbreviated as 'kg' (lowercase)

SI Unit for Volume: Cubic metre, abbreviated as 'm³' (with superscript 3)

Correct way to write these units:

1. Always leave a space between the numerical value and the unit
2. Example for mass: 7 kg (not 7kg or 7kgs)
3. Example for volume: 2 m³ (not 2m³ or 2m3)
4. There is no full stop after the unit symbol except at the end of a sentence
5. Units should not have an 's' added for plural (7 kg not 7 kgs)

12.

This statement means that not all materials that shine or glitter are gold or even metals.

Explanation:

Materials that have shiny surfaces are said to have a lustrous appearance. While metals like gold, silver, iron, copper typically show lustre, not all shiny materials are metals.

Surfaces of some materials are made shiny by polishing or coating them with thin layers of plastic, wax, or any other material which makes them look shiny. These materials may not be metals but still appear lustrous.

Examples:

- Polished wooden furniture looks shiny but wood is not a metal
- Plastic items with glossy coating appear shiny but plastic is not a metal
- Waxed apples look shiny but they are not metallic

13.

Air is considered as matter even though we cannot see it because it possesses the two fundamental properties of matter:

1. Mass: Air has mass. We can prove this by weighing a balloon before and after inflating it with air. The inflated balloon will be heavier, proving that air has mass.

2. Volume: Air occupies space. We can prove this by trying to push an empty (actually air-filled) bottle into water. The air inside prevents water from entering, showing that air occupies space.

Since anything that occupies space and has mass is called matter, air qualifies as matter despite being invisible to us.

14.

Opaque Materials: Materials through which you are not able to see at all are called opaque. They do not allow light to pass through them, and objects behind them cannot be seen.

Example: Wood, cardboard, metal

Translucent Materials: Materials through which objects can be seen, but not clearly, are known as translucent. They allow some light to pass through but scatter it, making vision unclear.

Example: Frosted glass, butter paper

Key Difference: Opaque materials block light completely, while translucent materials allow partial passage of light but do not provide clear visibility.

SECTION C - Answers to Short Answer Questions

15.

Role of Water in Body Functioning:

Water plays an important role in the functioning of our body because it can dissolve a large number of materials. This property of water is called its solvent property.

How this property helps:

1. **Nutrient Transport:** Water dissolves nutrients from food, making them available for absorption and transport to different parts of the body
2. **Waste Removal:** Water dissolves waste products from cells and helps remove them from the body through urine and sweat
3. **Chemical Reactions:** Many important chemical reactions in the body occur in water as it provides a medium for these reactions
4. **Temperature Regulation:** Water helps maintain body temperature through sweating

Practical Application related to Health:

Oral Rehydration Solution (ORS): ORS is used to treat dehydration due to diarrhea or other illnesses. It works because water dissolves sugar and salt, which are then absorbed by the body to restore the balance of fluids and electrolytes.

Preparation of ORS: Mix six teaspoons of sugar and half a teaspoon of common salt in one litre of boiled and cooled water. The sugar and salt dissolve in water, making them easy for the body to absorb and utilize.

16.

Activity to Test Solubility:

Materials Required: Vinegar, honey, mustard oil, water, wheat flour, glass tumblers, spoon

Procedure:

1. Take four glass tumblers and fill them about two-thirds with water
2. Label them as A, B, C, and D
3. Add vinegar to tumbler A
4. Add honey to tumbler B
5. Add mustard oil to tumbler C
6. Add wheat flour to tumbler D
7. Stir each tumbler well with a spoon
8. Wait for a few minutes and observe

Observations:

Soluble in Water:

- **Vinegar:** Completely mixes with water and disappears (soluble)
- **Honey:** Dissolves completely in water after stirring (soluble)

Insoluble in Water:

- **Mustard Oil:** Does not mix with water, forms a separate layer on top (insoluble)
- **Wheat Flour:** Does not dissolve, particles remain suspended or settle at the bottom (insoluble)

Conclusion: Materials can be grouped based on their solubility in water. Some liquids like vinegar and honey are soluble in water, while others like mustard oil are not. Similarly, some solids like wheat flour do not dissolve in water.

17.

Different materials are used for making different parts of a bicycle because each part requires specific properties to perform its function effectively:

1. Frame (Made of Steel/Aluminium):

Properties Required: Hard, strong, durable, lightweight
Reason: The frame needs to support the entire weight of the rider and withstand various forces while riding. Metal provides the necessary strength and durability. Aluminium is preferred over steel in modern bicycles as it is lighter while maintaining strength.

2. Seat/Saddle (Made of Leather/Foam covered with Vinyl):

Properties Required: Soft, comfortable, water-resistant
Reason: The seat needs to be comfortable for long rides, so it must be soft and cushioned. Leather or foam provides comfort, while vinyl coating makes it water-resistant and easy to clean. A hard metal seat would be very uncomfortable.

3. Tyres (Made of Rubber):

Properties Required: Flexible, elastic, provides good grip, durable
Reason: Rubber is flexible and can absorb shocks from uneven roads, making the ride smoother. Its elastic property allows tyres to return to original shape after being compressed. Rubber also provides excellent grip on roads, ensuring safety.

Additional Examples:

4. Handlebars (Made of Steel/Aluminium with Rubber Grips):

Metal core provides strength for steering, while rubber grips prevent slipping and provide comfort

5. Chain (Made of Steel):

Needs to be strong, durable, and flexible to transfer power from pedals to wheels

Conclusion: Each part of a bicycle requires different properties, and therefore different materials are chosen to ensure optimal performance, safety, comfort, and durability.

SECTION D - Answer to Long Answer Question

18.

Materials can be classified based on various properties. Understanding these properties helps us select appropriate materials for specific purposes.

1. APPEARANCE (Based on Lustre):

Lustrous Materials: Materials that have shiny surfaces

Examples: Iron, copper, gold, silver, aluminium
Use: Metals are used for jewelry, utensils, and decorative items because of their shiny appearance

Non-lustrous Materials: Materials that do not have shiny surfaces

Examples: Wood, paper, cloth, rubber
Use: Used for everyday items where appearance is not the primary concern

2. HARDNESS:

Hard Materials: Difficult to compress or scratch

Examples: Iron, stone, diamond, glass
Use: Used for making tools, construction, furniture that needs durability
Application: Iron is used for making tools because it is hard and doesn't break easily

Soft Materials: Can be compressed or scratched easily

Examples: Sponge, rubber, cotton, foam
Use: Used for making mattresses, cushions, erasers
Application: Sponge is used for cleaning because it is soft and absorbent

3. TRANSPARENCY:

Transparent Materials: Objects can be seen clearly through them

Examples: Clear glass, water, air
Use: Windows, spectacles, aquariums
Application: Glass is used for windows to allow light and visibility

Translucent Materials: Objects can be seen but not clearly

Examples: Frosted glass, butter paper, oiled paper
Use: Bathroom windows, lampshades, tracing paper
Application: Frosted glass provides privacy while allowing light to pass

Opaque Materials: Objects cannot be seen through them

Examples: Wood, metal, cardboard
Use: Doors, walls, containers for privacy and security
Application: Wooden doors provide privacy and security

4. SOLUBILITY IN WATER:

Soluble Materials: Dissolve completely in water

Examples: Sugar, salt, glucose
Use: Making beverages, cooking, medicines
Application: Sugar dissolves in water to make sweet drinks

Insoluble Materials: Do not dissolve in water

Examples: Sand, chalk powder, sawdust, oil
Use: Construction, cleaning products
Application: Sand is used in construction as it doesn't dissolve

5. MASS AND VOLUME:

These are universal properties of all matter

Mass: Quantity of matter in an object
Examples: A bag of rice has more mass than a bag of cotton of same size
Use: Important for packaging, transportation, and dosage in medicines

Volume: Space occupied by matter
Examples: 1 L water bottle, 500 mL milk packet
Use: Important for storage, selling liquids, cooking measurements

How Understanding Properties Helps:

1. **Right Material for Right Purpose:** Knowing that glass is transparent helps us use it for windows, while knowing wood is opaque helps us use it for doors
2. **Safety:** Understanding that some materials are inflammable helps us avoid using them near fire
3. **Efficiency:** Using light materials for aircraft and strong materials for buildings
4. **Cost-Effective:** Choosing appropriate materials saves money and resources
5. **Durability:** Selecting hard materials for tools ensures they last longer
6. **Functionality:** Understanding solubility helps in medicine and cooking

Practical Example: When making a water bottle, we need a material that:

- Is waterproof (doesn't absorve water)
- Is transparent or translucent (to see water level)
- Is lightweight (easy to carry)
- Is hard enough (doesn't break easily)
- Is safe (non-toxic)

This is why plastic or glass is used - they meet all these requirements.

Conclusion: Understanding properties of materials is essential for scientific study, practical applications, and making informed decisions about material selection in everyday life and industry.

SECTION E - Answers to Case Study Based Questions

19.

(a) Ghulan chose to hide behind a wall because the wall is **opaque**. Opaque materials do not allow light to pass through them, and objects behind them cannot be seen at all. This makes it a good hiding place as no one can see through the wall.

(b) No, Sheeta's brother could not see Sara clearly through the frosted glass door. Frosted glass is a **translucent** material. Through translucent materials, objects can be seen but not clearly. Light passes through partially but is scattered, making the vision hazy or blurred.

(c) Sheeta's brother could see the children through the glass window because glass is **transparent**. Transparent materials allow light to pass through them completely, enabling clear visibility of objects on the other side.

(d) Classification of materials:

Transparent: Glass window
Translucent: Frosted glass door
Opaque: Wall, Tree

20.

(a) Ten pairs of opposite properties are mentioned in Ayurveda for classification of materials. The total number of properties is 20, which form 10 pairs of opposite properties.

(b) The property pair **mṛidu (soft) - kaṭhina (hard)** from Ayurvedic classification is similar to the modern classification of materials as **soft and hard** discussed in the textbook. This property describes whether materials can be easily compressed or scratched (soft) or are difficult to compress or scratch (hard).

(c) Classification is important in both ancient and modern sciences because:

1. **Organization:** It helps in systematic organization of knowledge
2. **Understanding Patterns:** Classification helps in studying and observing patterns in properties
3. **Practical Application:** It makes it easier to select appropriate materials for specific purposes
4. **Communication:** It provides a common framework for discussing and understanding materials
5. **Scientific Study:** Classification forms the basis for deeper scientific investigation

Both ancient Ayurvedic classification and modern scientific classification serve the same fundamental purpose - to understand, organize, and effectively use materials based on their properties.

(d) The property 'guru-laghu' (heavy-light) relates directly to the concept of **mass** in modern science.

Example: If we take two objects of the same size - one made of iron and another made of sponge - the iron object will be 'guru' (heavy) because it has more mass, while the sponge object will be 'laghu' (light) because it has less mass. This Ayurvedic property pair essentially describes what we now scientifically measure as mass - the quantity of matter present in an object.
