

Multiple Choice Questions

Answer Key.

= False!

1

Which of the following statements does not apply to characteristic properties?

- A) To be a characteristic property, a property must apply to all substances. **F**
- B) Characteristic properties allow the identification of substances. **T**
- C) Characteristic properties indicate possible uses of a substance. **T**
- D) The quantitative and qualitative characteristic properties will be constant for a given substance. **T**

2

Why is the melting point of a pure substance considered a characteristic property?

- A) The melting point is measured with a thermometer.
- B) The melting point is a qualitative property.
- C) The melting point is a property that may identify a pure substance. **ID**
- D) The melting point is a quantitative property.

3

Louis found five unmarked bottles in a workroom. Each of the bottles contained a pure substance. He noted the following properties for each of these colourless liquids :

- 1) Boiling point
 - 2) Mass
 - 3) Volume
 - 4) Density
- characteristic*

Which properties does Louis need to know to identify these liquids?

- A) 1 and 2
- B) 1 and 3
- C) 2 and 4
- D) 1 and 4

4

Ten properties of a piece of gold are listed below. Using the chart provided, decide which of the ten are characteristic properties of gold.

- 1. colour : yellow
- 2. mass : 18.9 g
- 3. density : 8.9 g/cm³
- 4. temperature of the piece : 32°C
- 5. melting point : 1064°C
- 6. volume : 2.12 cm³
- 7. state : solid
- 8. surface area : 3.05 cm²
- 9. boiling point : 3080°C
- 10. electrical conductivity : very good

yes according to gold but only if # was involved

Properties	1	2	3	4	5	6	7	8	9	10
Characteristic			X		X				X	X

Using the chart below, associate each of the properties in the left-hand column with the appropriate substance in the right-hand column.

Substances	Characteristics						
	state at 20°C	Colour	Temperature		Density (g/l or g/cm ³)	Conductivity	
			Melting (°C)	Boiling (°C)		electrical	thermal
Aluminum	Solid	Grey	660	2467	2.70	Very good	Very good
Nitrogen	Gas	Colourless	-210	-196	1.17	None	None
Wood	Solid	Varies	-	-	0.61	Poor	Poor
Carbon	Solid	Black	3650	4827	2.25	Good	Poor
Copper	Solid	Yellow	1083	2567	8.92	Very good	Very good
Water	Liquid	Colourless	0	100	1.00	None	None
Fluorine	Gas	Colourless	-219	-188	1.58	None	None
Carbon dioxide	Gas	Colourless	sublimes at -78		1.89	None	None
Helium	Gas	Colourless	-272	-269	0.17	None	None
Hydrogen	Gas	Colourless	-259	-253	0.07	None	None
Mercury	Liquid	Grey	-39	357	13.6	Very good	Very good
Gold	Solid	Yellow	1064	3080	18.9	Very good	Very good
Oxygen	Gas	Colourless	-219	-183	1.33	None	None
Lead	Solid	Grey	327	1750	11.3	Very good	Very good
Vinyl	Solid	Colourless	-	-	0.93	Poor	Poor

Properties

- C The substance which liquifies at the lowest temperature
- B Oxygen has the same melting point as this substance
- A This solid has the lowest density at 20°C.

- (A) 1c, 2b and 3a
 (B) 1c, 2d and 3a
 (C) 1c, 2b and 3e
 (D) 1c, 2b and 3a

Substances

- a) carbon
 b) fluorine
 c) helium
 d) hydrogen
 e) aluminum

boo boo here!

always only 1 answer for MCQs.

*= lowest mp.
 I take this question = if mp is characteristic then 2 diff mp = would be diff if mps were taken to a few dp!*

hence sig figs!

6

In the laboratory, you are given samples of three different liquids. One of these samples is an acidic solution.

What should you do to identify the acidic solution?

- A) Observe the colour of each liquid.
- B) Perform the litmus paper test on each liquid.
- C) Find the mass of 5 mL of each liquid.
- D) Perform the cobalt chloride paper test.

if it's aqueous it does contain water!

7

You are given a liquid substance and told that it is an aqueous solution.

Which test will tell you whether this solution contains water?

- A) Litmus paper test
- B) Electrical conductivity test
- C) Density test
- D) Cobalt chloride paper test

stupid

8

Which one of the following tests should be used to determine whether an aqueous solution is basic?

- A) Litmus Paper Test
- B) Electrical Conductivity Test
- C) Density Test
- D) Cobalt Chloride Paper Test

doing the lab this week

9

The properties of four solids are given in the table below.

Solid	Mass	Volume	Shape	Density
1	223 g	82 cm ³	cylindrical	2.7 g/cm ³
2	38 g	14 cm ³	cubic	2.7 g/cm ³
3	113 g	25 cm ³	cubic	4.5 g/cm ³
4	223 g	25 cm ³	spherical	8.9 g/cm ³

Which two solids are made of the same substance?

- A) 1 and 2
- B) 1 and 4
- C) 2 and 3
- D) 3 and 4

= same charac props = density

10

In the laboratory, a student made the following observations about an unknown gaseous substance that was to be identified.

Observations	Result
Colour	Colourless
Odour	Odourless
Mass	0.16 g
Volume	128 mL
Burning splint test	No reaction
Glowing splint test	No reaction
Limewater test	No reaction

$$D = \frac{m}{V} \text{ --- 2sb}$$

$$= \frac{0.16g}{128mL} \text{ --- 3sb}$$

$$= 0.00125$$

$$= 0.0013g$$

mL
answer
2 ref!

The student was also given a table with the following information :

Vade-mecum						
Gas	Observation					
	Colour	Odour	Density (g/mL)	Burning Splint Test	Glowing Splint Test	Limewater Test
Nitrogen gas	Colourless	Odourless	0.00125	No reaction	No reaction	No reaction
Hydrogen gas	Colourless	Odourless	0.00009	Popping Sound	No reaction	No reaction
Carbon dioxide	Colourless	Odourless	0.00198	No reaction	No reaction	Becomes cloudy
Helium	Colourless	Odourless	0.0018	No reaction	No reaction	No reaction

Using all the above information, identify this unknown gas.

- A) Nitrogen gas C) Carbon dioxide
 B) Hydrogen gas D) Helium

11

The properties of an unknown liquid are given in the following table.

Property	Observation
Reaction with litmus paper	No change
Reaction with cobalt chloride paper	No change
Conducts electricity	No
Mass	1 g
Volume	1.25 mL

not an A or a B
not water
not A B or S!
lab this week

$D = \frac{m}{V} = \frac{1g}{1.25mL}$
 $D = 0.8g/mL$
not water

The following information is also provided.

Substance	Conducts electricity	Density (g/mL)
Water	No	1.00
Glycerine	No	1.25
<u>Propanol</u>	No	<u>0.80</u>
Salt solution	Quite well	1.05

Using all the above information, identify the unknown liquid.

- A) Water
- B) Glycerine
- C) Propanol
- D) Salt solution

12

Most electrical wiring used in houses is made of copper.

Which of the following properties of copper account for its use in electrical wiring?

- A) Its electrical conductivity and its ductility
 - B) It electrical conductivity and its mass
 - C) Its ductility and its melting point
 - D) Its mass and its melting point
- ✓ = ability to be drawn into a wire*

13

You observed and noted the properties of a solid substance.

Property	Observation
Mass	7.87 g
Volume	0.885 cm ³
Magnetic	Yes
Conducts electricity	Yes

$$D = \frac{m}{V} = \frac{7.87g}{0.885 \text{ cm}^3}$$

$$= \frac{8.89g}{\text{cm}^3}$$

$$1 \text{ cm}^3 = 1 \text{ mL}$$

Given the observations above and the information in the table below, you are to identify the substance you have observed.

Substance	Density	Conducts Electricity	Magnetic
Cobalt, Co	8.89 g/cm ³	Yes	Yes
Copper, Cu	8.95 g/cm ³	Yes	No
Iron, Fe	7.87 g/cm ³	Yes	Yes
Sulfur, S	2.07 g/cm ³	No	No

Which substance did you observe?

- A) Cobalt
- B) Copper
- C) Iron
- D) Sulfur

14

Which of the following is a characteristic property of tin, Sn?

- A) Temperature of 27°C
- B) Melting point of 232°C
- C) Cylindrical shape
- D) Volume of 25 cm³

Answer the ten questions below by associating each one with the correct property in the list on the right-hand side of the page. A property cannot be chosen more than once.

1. What property of asbestos makes it suitable for use in protective firefighting apparel? n
2. What property of aluminum makes it an excellent outdoor mirror when polished? q
3. What property of rubber makes it suitable for many types of balloons when it is rolled into thin sheets? r
4. What property of mercury makes it suitable for use in thermometers? c
5. What property of polystyrene makes it useful in life-preservers? o
6. What property of copper allows it to be drawn into wires for the electrical coils in motors? m
7. What property of the diamond makes it suitable for cutting glass? a
8. What property of carbon dioxide justifies its use in chemical extinguishers? h
9. What property of lead makes it suitable for use in the protective shields around nuclear reactors? j
10. What property of magnesium makes it suitable for use in flash bulbs? p

List of properties

- a) Harder than all the other minerals 7
- b) Turns litmus paper red A
- c) Strong thermal expansion 4
- d) Burns readily, releasing a light-blue flame
- e) Extremely soluble in water
- f) Emits a bright light when it burns 10
- g) Produces an odour of disinfectant
- h) Does not support combustion 8
- i) Boiling point lower than that of water
- j) Acts as a barrier against radiation 9
- k) Electrical insulator
- l) Emits carbon dioxide when burned
- m) Strong electrical conductivity 6
- n) Thermal insulator
- o) Lower density than that of water 5
- p) Tarnishes as a result of the formation of carbonates
- q) Does not tarnish 2
- r) Good air retention 3

Long-Answer Questions

16

To find the density of a solid, a student measured its mass and then determined its volume by the displacement of water.

The measurement results are given in the table below.

Mass	Volume	
	Water	Water + Solid
12.32 g	15.0 mL	19.4 mL

What is the density of this solid?

water displacement

$$D = \frac{m}{V}$$

$$\begin{array}{r} 19.4 \text{ mL} \\ - 15.0 \text{ mL} \\ \hline \end{array}$$

$$4.4 \text{ mL} = V \text{ of solid}$$

$$D = \frac{12.32 \text{ g} - 4 \text{ sb}}{4.4 \text{ mL} - 2 \text{ sb}}$$

$$= \frac{2.8 \text{ g}}{\text{mL}} \text{ answer} = 2 \text{ sf.}$$

17

Three test tubes numbered 1, 2 and 3 contain the same unknown gas. This gas could be carbon dioxide (CO_2), hydrogen gas (H_2) or oxygen gas (O_2).

In order to identify the unknown gas, for each test tube, you must:

- name the gas that may be in that test tube;
- name the test to be used for that test tube;
- give the expected result for that test.

Test Tube	Possible Gas	Test to Be Used	Expected Result
1	CO_2	LWT	cloudy
2	O_2	GST	relights
3	H_2	LST	pop & goes out

18

You are given three beakers containing different substances. You compile your observations in the table below :

Observations	Beaker 1	Beaker 2	Beaker 3
State	liquid	liquid	liquid
Colour	colourless	colourless	colourless
Volume	125 mL	120 mL	100 mL
Cobalt chloride paper = water	no change	turns pink	turns pink
Blue litmus paper "BRA"	no change	turns red = A	no change
Red litmus paper	no change	no change	no change
Electrical Conductivity	no	yes	yes

a) In which of the beaker(s) was water present?

2 + 3

b) Which of the beaker(s) contained an acid?

2

Copper, whose density is 8.92 g/cm^3 , is a metallic substance used to make pennies.

You wish to find the density of a penny to see if this value equals the density of copper.

Explain the procedure you would use to determine whether the density of the penny equals the density of copper.

In your explanation, indicate the materials to be used and the steps involved in your procedure and then describe everything you must do with the resulting measurements (work involved in analyzing the measurements).

THE EXPERIMENTAL PROCEDURE IS AS FOLLOWS :

- mass penny
- put vol of water in a g = mark vol
- add penny = note new vol
- subtract the 2 vol = vol of penny
- $D = \frac{\text{mass}}{\text{volume}}$