Physical Properties of Metals

Name: _____ Class: _____ Date: _____

Part A: Multiple Choice (6 marks)

1. Which property describes the ability of a metal to be hammered into thin sheets?

A. Ductility B. Malleability C. Brittleness D. Solubility

2. Which property makes copper suitable for electrical wiring?

A. Low density B. Transparency C. Electrical conductivity D. Brittleness

3. Which metal is liquid at room temperature (20–25°C)?

A. Iron B. Aluminium C. Mercury D. Copper

4. Which is generally a characteristic of metals?

A. Poor thermal conductivity B. Dull appearance C. Brittleness D. Shiny appearance

5. What allows metals to conduct electricity?

A. Mobile delocalised electrons B. Protons moving between atoms C. Neutrons moving through metal D. Atoms disappearing

6. Which property makes aluminium useful for aircraft?

A. High density B. Relatively low density C. Poor thermal conductivity D. High brittleness

Part B: Matching (6 marks)

Property	Description
1. Malleability	A. Ability to transfer thermal energy
2. Ductility	B. Mass per unit volume
3. Lustre	C. Ability to be drawn into wires
4. Electrical conductivity	D. Shiny appearance
5. Thermal conductivity	E. Ability to be hammered into sheets
6. Density	F. Ability to allow electric current to flow

Answers: 1. ____ 2. ____ 3. ____ 4. ____ 5. ____ 6. ____

Part C: Fill in the Blanks (6 marks)

Word bank: ductile • malleable • electrons • lustre • heat • brittle

Metals usually have a shiny appearance called _____.

Metals conduct electricity because they contain mobile _____.

A metal that can be drawn into wires is _____.

A metal that can be hammered into sheets is _____.

Metals generally conduct _____ efficiently.

A material that breaks easily rather than bending is _____.

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Part D: Short Answer (10 marks)

1. Explain why metals conduct electricity. (2 marks)

_____

_____

2. Explain how thermal energy is transferred through a metal. (2 marks)

_____

_____

3. Explain malleability and ductility, with an example of each. (3 marks)

_____

_____

4. State three general physical differences between metals and non-metals. (3 marks)

_____

_____

Part E: Metals in Everyday Life (8 marks)

For each object, identify one useful property (1 mark) and explain its suitability (1 mark).

Object	Useful property	Explanation
Copper electrical wire		
Aluminium cooking pan		
Aluminium foil		
Gold jewellery		

Part F: Thinking and Applying (4 marks)

1. “All metals are hard, strong solids with high melting points.” Explain why this is not completely correct, giving one example. (2 marks)

_____

_____

2. A saucepan has a metal base and a plastic or wooden handle. Explain why these different materials are used. (2 marks)

_____

_____

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Teacher Answer Key

Part A

1 B; 2 C; 3 C; 4 D; 5 A; 6 B.

Part B

1 E; 2 C; 3 D; 4 F; 5 A; 6 B.

Part C

1 lustre; 2 electrons; 3 ductile; 4 malleable; 5 heat; 6 brittle.

Part D

1. Metals contain mobile delocalised electrons (1) that carry electrical charge through the structure (1).

2. Delocalised electrons transfer kinetic energy rapidly through the metal (1); lattice vibrations also pass thermal energy between particles (1).

3. Malleability means being shaped into sheets, e.g. aluminium foil (1 + example); ductility means being drawn into wires, e.g. copper wire (1 + example); distinguish both clearly (1).

4. Typical comparisons: metals are shiny vs many non-metals dull; metals conduct heat/electricity well vs most non-metals poorly; metals are malleable/ductile vs solid non-metals often brittle. Accept valid exceptions.

Part E

• Copper wire: high electrical conductivity; allows current to pass efficiently.

• Aluminium pan: good thermal conductivity; transfers heat to food.

• Aluminium foil: malleability; can be rolled into thin flexible sheets.

• Gold jewellery: lustre and/or malleability; attractive shiny finish or easy shaping.

Part F

1. Generalisation has exceptions (1); e.g. mercury is liquid at room temperature, or sodium is soft and has a relatively low melting point (1).

2. Metal base conducts heat efficiently to food (1); plastic/wood handle conducts heat poorly, reducing heat transfer to the hand (1).

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