Metals – 2019 Nov

1. 0620/11,12,13,21,22,23/O/N/19/No.24,26

Some properties of substance X are listed.

- It conducts electricity when molten.
- It has a high melting point.
- It burns in oxygen and the oxide dissolves in water to give a solution with pH 11.

What is X?

A a covalent compound

B a macromolecule

C a metal

D an ionic compound

2. 0620/11/O/N/19/No.25

Four different metals are reacted with an equal volume of dilute hydrochloric acid. The results of the reactions are shown.

metal	rate of effervescence
calcium	very high
copper	none
iron	low
magnesium	high

What is the order of reactivity of the four metals starting with the most reactive?

A iron → magnesium → calcium → copper

B magnesium → calcium → copper → iron

C copper → iron → magnesium → calcium

D calcium → magnesium → iron → copper

3. 0620/11/O/N/19/No.26

Iron is extracted from its ore in a blast furnace.

The equations for four different reactions are shown.

1 $4Fe + 3CO_2 \rightarrow 2Fe_2O_3 + 3C$

2 $CO_2 \rightarrow C + O_2$

3 $CO_2 + C \rightarrow 2CO$

4 $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

Which equations represent reactions that occur in the blast furnace?

A 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 3 and 4 only

4. 0620/11/O/N/19/No.27

Which statement is correct?

A Aluminium is used in the manufacture of aircraft because it has a high density.

B Copper is used for cooking utensils because it is a good conductor of heat.

C Mild steel is used for car bodies because it is resistant to corrosion.

D Stainless steel is used for cutlery because it is a conductor of electricity.

5. 0620/12/O/N/19/No.26

What is added to molten iron to make steel?

A small amounts of carbon

B limestone and coke

C calcium oxide and oxygen

D hematite and air

6. 0620/12/O/N/19/No.25

Four unknown metals, Q, R, S and T, are reacted with water, steam and dilute hydrochloric acid.

The results are shown in the table.

	reaction with water	reaction with steam	reaction with dilute hydrochloric acid
Q	slow reaction	fast reaction	fast reaction
R	no reaction	no reaction	no reaction
S	no reaction	very slow reaction	slow reaction
T	fast reaction	explodes	explodes

Which statements are correct?

1 R is the least reactive metal.

2 T could be potassium.

3 S is more reactive than Q and R.

4 Metals react faster with steam than they do with water.

A 1, 2 and 4 only

B 1 and 2 only

C 2 and 3 only

D 3 and 4 only

7. 0620/12,22/O/N/19/No.27

Which row describes the uses of aluminium, copper and mild steel?

	aluminium	copper	mild steel
A	aircraft bodies	electrical wiring	car bodies
B	car bodies	cooking utensils	electrical wiring
C	electrical wiring	aircraft bodies	food containers
D	food containers	aircraft bodies	cooking utensils

8. 0620/13/O/N/19/No.25
A metal reacts vigorously with water.

Which statement about the metal is correct?

A It is above hydrogen in the reactivity series.

B It is below magnesium in the reactivity series.

C Its oxide can be reduced with carbon.

D It does not react with dilute acids.

9. 0620/13/O/N/19/No.26
Iron is extracted from its ore in the blast furnace.

Which raw material is **not** used in this process?

A bauxite

B coke

C hematite

D limestone

10. 0620/13,23/O/N/19/No.27
Which statement about metals and their uses is correct?

A Aluminium is used in the manufacture of aircraft because it has a high density.

B Copper is used to make cooking utensils because it is a poor conductor of heat.

C Mild steel is used to make car bodies because it is brittle and breaks easily.

D Stainless steel is used to make cutlery because it is resistant to corrosion.

11. 0620/21/O/N/19/No.27
Which statement is correct?

A Aluminium is used in the manufacture of aircraft because it has a high density.

B Copper is used for cooking utensils because it is a good conductor of heat.

C Mild steel is used for car bodies because it is resistant to corrosion.

D Stainless steel is used for cutlery because it is a conductor of electricity.

12. 0620/21/O/N/19/No.28
Iron rusts but aluminium does not easily corrode.

Which statement explains why aluminium does **not** easily corrode?

A It is an alloy.

B It is below iron in the reactivity series.

C It is not a transition element.

D Its surface is protected by an oxide layer.

13. 0620/21/O/N/19/No.29
Which statement about the extraction of aluminium is correct?

A Aluminium is formed at the cathode during the electrolysis of aluminium oxide.

B Hematite is mainly aluminium oxide.

C Molten cryolite is used to raise the melting point of the aluminium oxide.

D Oxygen gains electrons at the anode during the electrolysis of aluminium oxide.

14. 0620/22/O/N/19/No.28
The properties of four metals are listed.

- Metal W does not react with dilute hydrochloric acid.
- Metal X reacts with dilute hydrochloric acid.
- Metal Y displaces metal X from an aqueous solution of its ions.
- Metal Z reacts with water and dilute hydrochloric acid.

What is the order of reactivity of the metals?

	most reactive →			least reactive
A	W	X	Y	Z
B	W	Y	X	Z
C	Z	X	Y	W
D	Z	Y	X	W

15. 0620/22/O/N/19/No.29

Which statement about the extraction of aluminium from aluminium oxide is correct?

A Aluminium is formed at the positive electrode during electrolysis.

B Pure aluminium oxide is dissolved in molten cryolite.

C Pure aluminium oxide is electrolysed using aluminium as the positive electrode.

D Pure aluminium oxide is heated with carbon to form carbon dioxide and aluminium.

16. 0620/23/O/N/19/No.28

Which word equation represents a reaction which occurs?

A sodium oxide + carbon → sodium + carbon dioxide

B sodium oxide + iron → sodium + iron(II) oxide

C iron(II) oxide + copper → iron + copper(II) oxide

D iron(III) oxide + carbon → iron + carbon dioxide

17. 0620/23/O/N/19/No.29

Why is cryolite used in the extraction of aluminium by electrolysis?

A It changes bauxite to aluminium oxide.

B It decreases the melting point of the aluminium.

C It dissolves the aluminium oxide.

D It protects the anodes from corrosion.