Date :
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TEST ID: XIICH0601
CHEMISTRY

6.GENERAL PRINCIPLES AND PROCESSES OF ISOLATION OF ELEMENTS

Single Correct Answer Type

1. van-Arker method of purification of metals involves converting the metal to a
   a) Volatile stable compound
   b) Non-volatile stable compound
   c) Volatile unstable compound
   d) None of the above
2. In the electrolysis of alumina, cryolite is added to:
   a) Lower the melting point of alumina and to increase the electrical conductivity
   b) Minimise the anode effect
   c) Remove impurities from alumina
   d) None of the above
3. The pyrolusite ore contains:
   a) Fe
   b) Al
   c) Mn
   d) Cu
4. Purest form of iron is
   a) Pig iron
   b) Wrought iron
   c) Cast iron
   d) Steel
5. Pig iron is manufactured by:
   a) An electric furnace
   b) A blast furnace
   c) An open hearth furnace
   d) None of these
6. During the process of electrolytic refining of copper, some metals present as impurity settle as 'anode mud'. These are
   a) Fe and Ni
   b) Ag and Au
   c) Pb and Zn
   d) Se and Ag
7. By which process Pb and Sn are extracted respectively?
   a) Carbon reduction—self reduction
   b) Self reduction—carbon reduction
   c) Electrolytic reduction—cyanide process
   d) Cyanide process—electrolytic reduction
8. CO on passing over heated nickel gives:
   a) $NiCO_3$
   b) $Ni(CO)_4$
   c) $CO_2 + H_2$
   d) $CO + H_2$
9. Cassiterite is concentrated by
   a) Liquation
   b) Floatation
   c) Electromagnetic separation
   d) Levigation
10. In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with:
    a) Iron sulphide (FeS)
    b) Carbon monoxide (CO)
    c) Copper(I) sulphide (Cu_2S)
    d) Sulphur dioxide (SO_2)
11. Which of the following metal is thrown as anode mud during electrolytic refining of copper?
    a) Zn
    b) Fe
    c) Ag
    d) Ni
12. Which metal is a liquid at room temperature?
    a) Mercury
    b) Potassium
    c) Sodium
    d) Titanium
13. 'Lapis-Lazuli' is a blue coloured precious stone. It is mineral of the class
    a) Sodium alumino silicate
    b) Basic copper carbonate
    c) Zinc cobalt
    d) Prussian blue
14. Which of the following factors is of **no significance** for roasting sulphide ores to the oxides and not subjecting the sulphide ores to carbon reduction directly?
    a) Metal sulphides are thermodynamically more stable than CS_2

b) CO_2 is bthermodynamically more stable than CS_2
c) Metal sulphides are less stable than the corresponding oxides
d) $CO_2$is more volatile than CS_2

15. The inner lining of a blast furnace is made up of:
a) Graphite bricks b) Silica bricks c) Fire clay bricks d) Basic bricks
16. Which one is an ore of sodium?
a) Sylvine b) Siderite c) Spodumene d) Soda ash
17. Titanium containing mineral found in our country is
a) Bauxite b) Chalcopyrites c) Elmanite d) dolomite
18. Argentite is a mineral of
a) Gold b) Silver c) Copper d) Platinum
19. In blast furnace, iron oxide is reduced by
a) Silica b) Carbon c) Limestone d) CO
20. Heating of ores with flux to remove non-fusible mass is called:
a) Smelting b) Calcination c) Roasting d) Cupellation
21. Gold is extracted using:
a) Amalgamation process
b) Carbon reduction process
c) Oxidation process
d) Electrolytic process
22. Which of the following metals cannot be extracted by carbon reduction process?
a) Zn b) Al c) Hg d) Pb
23. The most malleable metal is:
a) Silver b) sodium c) Gold d) Platinum
24. Granulated zinc is obtained by:
a) Suddenly cooling molten zinc
b) Adding molten zinc to water
c) Heating zinc to 100-150°C
d) Dropping molten zinc drop by drop
25. Most of the plants contain:
a) Fe b) Zn c) Na d) K
26. Which of the following ores does not represent the ores of iron?
a) Cassiterite b) Limonite c) Haematite d) Magnetite
27. The metal obtained by self reduction process is:
a) Cu b) Hg c) Pb d) All of these
28. The cryolite is:
a) Al_2O_3 b) Na_3AlF_6 c) $KAlSi_3O_8$ d) $Al_3O_2OH_2O$
29. Blanc fixe is:
a) $BaSO_4$ b) $BaCl_2$ c) $BaCO_3$ d) None of these
30. Sulphide ores are generally concentrated by
a) Hand picking b) Forth floatation process
c) Gravity separation d) Magnetic separation

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ANSWER KEY

1)	a	2)	a	3)	c	4)	b
5)	b	6)	b	7)	b	8)	b
9)	c	10)	c	11)	c	12)	a
13)	a	14)	c	15)	c	16)	d
17)	c	18)	b	19)	d	20)	a
21)	a	22)	b	23)	c	24)	b
25)	d	26)	a	27)	d	28)	b
29)	a	30)	b				

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HINTS AND SOLUTIONS

1 **(a)**

$$Ti + 2I_2 \xrightarrow{500\ K} \underset{\text{volatile stable compound}}{TiI_4} \xrightarrow{1700\ K} \underset{\text{pure metal}}{Ti} + 2I_2$$

2 **(a)**
Cryolite has these two functions during electrolysis of alumina.

3 **(c)**
Pyrolusite is an ore of Mn containing MnO_2.

4 **(b)**
Wrought or malleable iron is the purest form of iron

5 **(b)**
__do___

6 **(b)**
During electrolysis, noble metals (inert metals) like Ag, Au and Pt are not affected band separate as anode mud from the impure anode

7 **(b)**
$PbS + 2PbO \longrightarrow 3Pb + SO_2$ (Self reduction)
$SnO + C \longrightarrow Sn + CO$ (Carbon reduction)

8 **(b)**
At about 330 K nickel is attacked by carbon monoxide with the formation of a volatile nickel carbonyl $Ni(CO)_4$.

10 **(c)**
It involves auto-reduction.

$$2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2$$

11 **(c)**
In electrolytic refining of Cu, impurities of Fe, Ni, and Zn pass into solution and others like Au and Ag fall down, as anode mud.

12 **(a)**
Mercury is the only metal which is liquid at room temperature.

13 **(a)**
Lapis lazuli is the sodium alumino silicate present in earth rocks as blue stone

14 **(c)**
$2MS + C \rightarrow 2M + CS_2$ ΔG_1 =positive
$2MO + C \rightarrow 2M + CO_2$ ΔG_2 =negative
The value of ΔG for the9 formation of $CO_2$is negative, *ie*, it is thermodynamically more than CS_2.Also metal sulphides are thermodynamically more stable than CS_2.Metal sulphides are more stable than the corresponding oxides, so they are roasted to convert into less stable oxides

15 **(c)**
It is a fact.

16 **(d)**

Soda ash (Na_2CO_3) is an ore of sodium

17 **(c)**
Titanium is quite abundant in nature and mainly occurs as elmanite, $FeO.TiO_2$

20 **(a)**
It is a fact.

21 **(a)**
It is a fact.

22 **(b)**
Al is highly electropositive. It can be obtained only by electrolytic reduction

23 **(c)**
Malleable nature (*i.e.*, can be pressed out into sheets) is maximum in gold.

24 **(b)**
It is a fact.

25 **(d)**
It is a fact.

26 **(a)**
Cassiterite is an ore of tin

27 **(d)**
$2PbS + 3O_2 \rightarrow 2PbO + 2SO_2$
$PbS + 2PbO \rightarrow 3Pb + SO_2$

28 **(b)**
Cryolite is an ore of Al containing Na_3AlF_6.

29 **(a)**
Blanc fixe is $BaSO_4$.

30 **(b)**
Forth floatation method is based on the fact that the surface of sulphide ores is preferentially wetted by oil while that of gangue is wetted by water