

PREVIOUS YEARS' QUESTIONS

EXERCISE-II

1. Which of the following alloys contains (s) Cu and Zn?
[JEE 1993]
(1) Bronze (2) Brass
(3) Gun metal (4) Type metal
2. Which compound does not dissolve in hot, dilute HNO_3 ?
[JEE 1996]
(1) HgS (2) PbS
(3) CuS (4) CdS
3. Ammonium dichromate is used in some fireworks. The green coloured powder blown in the air is -
[JEE 1997]
(1) CrO_3 (2) Cr_2O_3
(3) Cr (4) $\text{CrO}(\text{O}_2)$
4. In the dichromate anion,
[JEE 1999]
(1) 4 Cr - O bonds are equivalent
(2) 6 Cr - O bonds are equivalent
(3) all Cr - O bonds are equivalent
(4) all Cr - O bonds are non-equivalent
5. Anhydrous ferric chloride is prepared by:
[JEE 2002]
(1) heating hydrated ferric chloride at a high temperature in a stream of air
(2) heating metallic iron in a stream of dry chlorine gas
(3) reaction of ferric oxide with HCl
(4) reaction of metallic iron with HCl
6. What would happen when a solution of potassium chromate is treated with an excess of dilute nitric acid -
[AIEEE-2003]
(1) Cr^{3+} and $\text{Cr}_2\text{O}_7^{2-}$ are formed
(2) $\text{Cr}_2\text{O}_7^{2-}$ and H_2O are formed
(3) $\text{Cr}_2\text{O}_7^{2-}$ is reduced to +3 state of Cr
(4) $\text{Cr}_2\text{O}_7^{2-}$ is oxidised to +7 state of Cr
7. When MnO_2 is fused with KOH , a coloured compound is formed, the product and its colour is:
[JEE 2003]
(1) K_2MnO_4 , green
(2) KMnO_4 , purple
(3) Mn_2O_3 , brown
(4) Mn_3O_4 , black
8. Calomel on reaction with NH_4OH gives
[AIEEE-2004]
(1) HgNH_2Cl (2) $\text{NH}_2\text{-Hg-Hg-Cl}$
(3) Hg_2O (4) HgO
9. The product of oxidation of I^- with MnO_4^- in alkaline medium is -
[JEE 2004]
(1) IO_3^- (2) I_2
(3) IO^- (4) IO_4^-
10. $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ on heating liberates a gas. The same gas will be obtained by -
[JEE 2004]
(1) heating NH_4NO_2
(2) heating NH_4NO_3
(3) treating H_2O_2 with NaNO_2
(4) treating Mg_3N_2 with H_2O
11. Iron exhibits +2 and +3 oxidation states. Which of the following statements about iron is **incorrect**?
[AIEEE-2012]
(1) Ferrous compounds are more easily hydrolysed than the corresponding ferric compounds.
(2) Ferrous oxide is more basic in nature than the ferric oxide.
(3) Ferrous compounds are relatively more ionic than the corresponding ferric compounds.
(4) Ferrous compounds are less volatile than the corresponding ferric compounds.
12. Which of the following arrangements does not represent the correct order of the property stated against it?
[JEE MAIN-2013]
(1) $\text{V}^{2+} < \text{Cr}^{2+} < \text{Mn}^{2+} < \text{Fe}^{2+}$: paramagnetic behaviour
(2) $\text{Ni}^{2+} < \text{Co}^{2+} < \text{Fe}^{2+} < \text{Mn}^{2+}$: ionic size
(3) $\text{Co}^{3+} < \text{Fe}^{3+} < \text{Cr}^{3+} < \text{Sc}^{3+}$: stability in aqueous solution
(4) $\text{Sc} < \text{Ti} < \text{Cr} < \text{Mn}$: number of oxidation states
13. Consider the following reaction : [JEE MAIN-2013]
$$x\text{MnO}_4^- + y\text{C}_2\text{O}_4^{2-} + z\text{H}^+ \rightarrow x\text{Mn}^{2+} + 2y\text{CO}_2 + \frac{z}{2}\text{H}_2\text{O}$$

The values of x, y and z in the reaction are respectively :-
(1) 5, 2 and 16
(2) 2, 5 and 8
(3) 2, 5 and 16
(4) 5, 2 and 8

14. Potassium dichromate when heated with concentrated sulphuric acid and a soluble chloride, gives brown - red vapours of:

[JEE MAIN-2013, Online]

- (1) CrO_3 (2) Cr_2O_3
 (3) CrCl_3 (4) CrO_2Cl_2

15. The element with which of the following outer electron configuration may exhibit the largest number of oxidation states in its compounds :

[JEE MAIN-2013, Online]

- (1) $3d^74s^2$ (2) $3d^84s^2$
 (3) $3d^54s^2$ (4) $3d^64s^2$

16. When a small amount of KMnO_4 is added to concentrated H_2SO_4 , a green oily compound is obtained which is highly explosive in nature. Compound may be :

[JEE MAIN-2013, Online]

- (1) Mn_2O_3 (2) MnSO_4
 (3) Mn_2O_7 (4) MnO_2

17. The equation which is balanced and represents the correct product (s) is :

[JEE MAIN-2014]

- (1) $[\text{Mg}(\text{H}_2\text{O})_6]^{2+} + (\text{EDTA})^{4-} \xrightarrow{\text{excess NaOH}} [\text{Mg}(\text{EDTA})]^{2-} + 6\text{H}_2\text{O}$
 (2) $\text{CuSO}_4 + 4\text{KCN} \rightarrow \text{K}_2[\text{Cu}(\text{CN})_4] + \text{K}_2\text{SO}_4$
 (3) $\text{Li}_2\text{O} + 2\text{KCl} \rightarrow 2\text{LiCl} + \text{K}_2\text{O}$
 (4) $[\text{CoCl}(\text{NH}_3)_5]^{+} + 5\text{H}^{+} \rightarrow \text{Co}^{2+} + 5\text{NH}_4^{+} + \text{Cl}^{-}$

18. Which series of reactions correctly represents chemical relations related to iron and its compound?

[JEE MAIN-2014]

- (1) $\text{Fe} \xrightarrow{\text{Cl}_2, \text{heat}} \text{FeCl}_3 \xrightarrow{\text{heat, air}} \text{FeCl}_2 \xrightarrow{\text{Zn}} \text{Fe}$
 (2) $\text{Fe} \xrightarrow{\text{O}_2, \text{heat}} \text{Fe}_3\text{O}_4 \xrightarrow{\text{CO}, 600^\circ\text{C}} \text{FeO} \xrightarrow{\text{CO}, 700^\circ\text{C}} \text{Fe}$
 (3) $\text{Fe} \xrightarrow{\text{dil H}_2\text{SO}_4} \text{FeSO}_4 \xrightarrow{\text{H}_2\text{SO}_4, \text{O}_2} \text{Fe}_2(\text{SO}_4)_3 \xrightarrow{\text{Heat}} \text{Fe}$
 (4) $\text{Fe} \xrightarrow{\text{O}_2, \text{heat}} \text{FeO} \xrightarrow{\text{dil H}_2\text{SO}_4} \text{FeSO}_4 \xrightarrow{\text{Heat}} \text{Fe}$

19. Which of the following is **not** formed when H_2S reacts with acidic $\text{K}_2\text{Cr}_2\text{O}_7$ solution ?

[JEE MAIN-2014, Online]

- (1) K_2SO_4 (2) $\text{Cr}_2(\text{SO}_4)_3$
 (3) S (4) CrSO_4

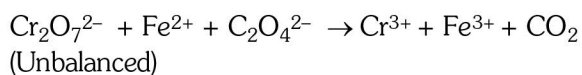
20. Which one of the following exhibits the largest number of oxidation states ?

[JEE MAIN-2014, Online]

- (1) Mn(25) (2) V(23) (3) Cr (24) (4) Ti (22)

21. How many electrons are involved in the following redox reaction ?

[JEE MAINS-2014, Online]



- (1) 3 (2) 4 (3) 5 (4) 6

22. Amongst the following, identify the species with an atom in +6 oxidation state:

[JEE MAIN-2014, Online]

- (1) $[\text{MnO}_4]^{-}$ (2) $[\text{Cr}(\text{CN})_6]^{3-}$
 (3) Cr_2O_3 (4) CrO_2Cl_2

23. Copper becomes green when exposed to moist air for a long period. This is due to :-

[JEE MAIN-2014, Online]

- (1) the formation of a layer of cupric oxide on the surface of copper.
 (2) the formation of basic copper sulphate layer on the surface of the metal
 (3) the formation of a layer of cupric hydroxide on the surface of copper.
 (4) the formation of a layer of basic carbonate of copper on the surface of copper.

24. Match the catalysts to the correct processes :-

[JEE MAIN-2015]

| | Catalyst | | Process |
|-----|------------------------|-------|------------------------------|
| (A) | TiCl_3 | (i) | Wacker process |
| (B) | PdCl_2 | (ii) | Ziegler-Natta polymerization |
| (C) | CuCl_2 | (iii) | Contact process |
| (D) | V_2O_5 | (iv) | Deacon's process |

- (1) A-ii, B-iii, C-iv, D-i
 (2) A-iii, B-i, C-ii, D-iv
 (3) A-iii, B-ii, C-iv, D-i
 (4) A-ii, B-i, C-iv, D-iii

25. Which of the following statements is false :-

[JEE MAIN-2015, Online]

- (1) $\text{Cr}_2\text{O}_7^{2-}$ has a Cr - O - Cr bond
 (2) CrO_4^{2-} is tetrahedral in shape
 (3) $\text{Na}_2\text{Cr}_2\text{O}_7$ is a primary standard in volumetry
 (4) $\text{K}_2\text{Cr}_2\text{O}_7$ is less soluble than $\text{Na}_2\text{Cr}_2\text{O}_7$

26. The correct statement(s) about Cr^{2+} and Mn^{3+} is (are)
[Atomic numbers of Cr = 24 and Mn = 25]

[JEE Advance 2015]

- (1) Cr^{2+} is a reducing agent
- (2) Mn^{3+} is an oxidizing agent
- (3) Both Cr^{2+} and Mn^{3+} exhibit d^4 electronic configuration
- (4) When Cr^{2+} is used as a reducing agent, the chromium ion attains d^5 electronic configuration

27. What will occur if a block of copper metal is dropped into a beaker containing a solution of 1M ZnSO_4 ?

[JEE Main 2016]

- (1) The copper metal will dissolve and zinc metal will be deposited
- (2) No reaction will occur
- (3) The copper metal will dissolve with evolution of oxygen gas
- (4) The copper metal will dissolve with evolution of hydrogen gas

28. In the following reactions, ZnO is respectively acting as a/an :
[JEE MAIN-2017]

- (a) $\text{ZnO} + \text{Na}_2\text{O} \rightarrow \text{Na}_2\text{ZnO}_2$
 - (b) $\text{ZnO} + \text{CO}_2 \rightarrow \text{ZnCO}_3$
- (1) base and acid
 - (2) base and base
 - (3) acid and acid
 - (4) acid and base

29. Which of the following ions does **not** liberate hydrogen gas on reaction with dilute acids?

[JEE MAIN-2017, Online]

- (1) Ti^{2+}
- (2) Cr^{2+}
- (3) Mn^{2+}
- (4) V^{2+}

30. Which of the following combination will produce H_2 gas ?
[JEE Advance 2017]

- (1) Zn metal and $\text{NaOH}(\text{aq})$
- (2) Au metal and $\text{NaCN}(\text{aq})$ in the presence of air
- (3) Cu metal and conc. HNO_3
- (4) Fe metal and conc. HNO_3

| PREVIOUS YEARS QUESTIONS | | | ANSWER KEY | | | | Exercise-II | | | |
|--------------------------|-----|----|------------|----|----|-------|-------------|----|----|----|
| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Ans. | 2,3 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| Que. | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Ans. | 1 | 1 | 3 | 4 | 3 | 3 | 4 | 2 | 4 | 1 |
| Que. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | 4 | 4 | 4 | 4 | 3 | 1,2,3 | 2 | 4 | 3 | 1 |