



CHEMISTRY

BOOKS - BITSAT GUIDE

D AND F BLOCK ELEMENTS

Practice Exercise

1. The incorrect statement for transition elements is

A. the last electron of these elements enters in d-orbital

B. the common oxidation state of these elements is +2

C. the properties of these elements is intermediate between s- and p-block elements

D. the transition elements with smaller atomic radii is scandium

Answer: D



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2. Zinc does not exhibit variable valency due to

- A. presence of complete filled d-orbitals
- B. inert pair effect
- C. presence of 4s-orbital
- D. None of the above

Answer: A



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3. The metal which is considered as configuration of neutral titanium atom is

A. zinc

B. cadmium

C. mercury

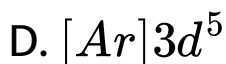
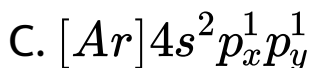
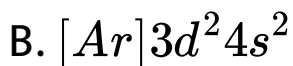
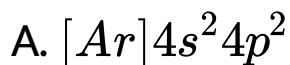
D. scandium

Answer: D



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4. The ground state electronic configuration of neutral titanium atom is

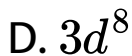


Answer: B



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5. Among the following electronic configurations of d-orbitals, the electronic configuration showing the highest magnetic moment is



Answer: B



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6. Magnetic moment

A. increases with increasing number of unpaired electrons

B. gives indication about the number of unpaired electrons present in the atom, molecule or ion

C. its unit is Bohr Magneton (BM). A single unpaired electron has 1.73 BM magnetic moment

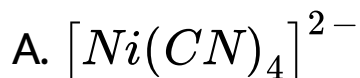
D. All of the above

Answer: D



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7. Which of the following compounds will show magnetic moment of 1.72 BM ?



D. $TiCl_4$

Answer: C



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8. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following are the characteristic properties of interstitial compounds?

I. They have high melting points in comparison

to pure metals.

II. They are very hard.

III. They retain metallic conductivity.

IV. They are chemically very reactive.

A. I, II and III

B. II, III and IV

C. I, III and IV

D. I, II and IV

Answer: A



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9. The element with maximum number of oxidation states in their compounds is

A. Eu

B. La

C. Gd

D. Am

Answer: D



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10. When Fe metal is rusted, it is

A. isomerised

B. decomposed

C. reduced

D. oxidised

Answer: D



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11. Ferric sulphate on heating gives

A. SO_2 and SO_3

B. SO_2

C. SO_3

D. S

Answer: C



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12. Iron is rendered passive by treatment with

A. HCl

B. H_2SO_4

C. H_3PO_4

D. HNO_3

Answer: D



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13. An important oxide ore of iron is

A. Smaltite

B. Garnierite

C. Pentlandite

D. Haematite

Answer: D



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14. The metal which corrodes readily in moist air, is

A. gold

B. silver

C. iron

D. nickel

Answer: C



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15. Which one of the following forms of iron can give other forms of iron?

A. Wrought iron

B. Steel

C. Pig iron

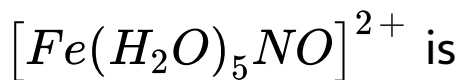
D. Cast iron

Answer: C



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16. The oxidation state of iron in



A. 1

B. 2

C. 3

D. 4

Answer: A



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17. In weak field ligand, which one of the following cations has maximum magnetic moment?

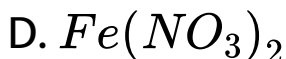


Answer: A



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18. In the test for nitrate, the composition of brown ring is



Answer: B



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19. Copper can be extracted from

A. kupfer nickel

B. dolomite

C. malachite

D. galena

Answer: C



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20. The colour of light absorbed by an aqueous solution of $CuSO_4$ is

A. orange-red

B. blue-green

C. yellow

D. violet

Answer: A



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21. The electronic configuration of Cu(II) is $3d^9$ whereas that of Cu(I) is $3d^{10}$. Which of the following is correct ?

A. Cu^{2+} is more stable than Cu^+

B. Cu^{2+} is less stable than Cu^+

C. Cu^{2+} and Cu^+ ions are equally stable

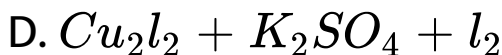
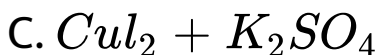
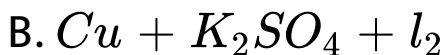
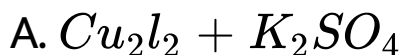
D. stability of Cu^+ and Cu^{2+} depends on the nature of copper salts

Answer: A



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22. When $CuSO_4$ reacts with aqueous KI , the products are



Answer: D



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23. Which of the following is formed, when copper (II) sulphate is treated with excess ammonia?

- A. A black precipitate
- B. A red precipitate
- C. A deep blue solution
- D. A white precipitate turning black

Answer: C



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24. When copper nitrate is strongly heated, the compound obtained is

A. copper nitrite

B. copper

C. copper nitride

D. copper oxide

Answer: D



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25. Hair dye contains

A. copper nitrate

B. gold chloride

C. silver nitrate

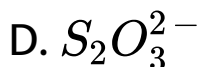
D. lead nitrate

Answer: C



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26. Which of the following ions will finally give a black precipitate with Ag^{\oplus} ion?



Answer: D



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27. In the cyanide extraction process of silver from argentite, the oxidizing and reduction agents used are:

- A. O_2 and CO
- B. O_2 and Zn dust
- C. HNO_3 and Zn dust
- D. HNO_3 and CO

Answer: B



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28. Turnbull's blue is a compound

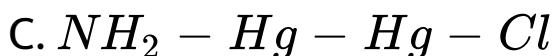
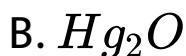
- A. ferricyanide
- B. ferrous ferrocyanide
- C. ferrous cyanide
- D. ferri ferrocyanide

Answer: B



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29. Calomel (H_2Cl_2) on reaction with ammonium hydroxide gives

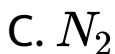
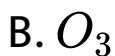


Answer: D



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30. Nitriding is a process of hardening steel by treating it in an atmosphere of



Answer: A



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31. Potassium dichromate is used

A. in leather industry

B. as an oxidant for the preparation of
many azo compounds

C. Both (a) and (b)

D. None of the above

Answer: C



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32. The structures of chromate and dichromate ions are A and B respectively. Here, A and B refer to

A. A - tetrahedral, B - octahedral

B. A - tetrahedral, B - two tetrahedral

C. A - octahedral, B - two tetrahedral

D. A - two octahedral, B - octahedral

Answer: B



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33. Consider the following statements.

I. Sodium dichromate is less soluble than potassium dichromate.

II. Crystals of potassium dichromate are of orange colour.

III. The chromates and dichromates are interconvertible in aqueous solution depending upon pH of the solution.

IV. The oxidation states of chromate and dichromate are different.

The correct statements are

A. I, II, III and IV

B. II and IV

C. I and III

D. I and II

Answer: C



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34. The photographic industry relies on the special light-sensitive properties of ...1...Here, I refers to

A. AgCl

B. AgBr

C. PdCl_2

D. either (a) or (b)

Answer: B



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35. What happens when FeSO_4 solution reacts with acidified KMnO_4 solution?

- A. Iron (II) is oxidised
- B. $KMnO_4$ is oxidised
- C. Iron (II) is reduced
- D. Iron (III) is reduced

Answer: A



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36. When pyrolusite is fused with KOH, the colour of the product is

A. red

B. pink

C. black

D. green

Answer: D



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37. Which of the following is wrong?

A. $K_2Cr_2O_7 \rightarrow$ Orange

B. $CuSO_4 \cdot 5H_2O \rightarrow$ Blue

C. $MnSO_4 \rightarrow$ Yellow

D. $Cr_2(SO_4)_3 \rightarrow$ Purple

Answer: C



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38. In which of the following compounds, Mn has highest oxidation state?

A. K_2MnO_4

B. MnO_2

C. $KMnO_4$

D. Mn_3O_4

Answer: C



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39. $KMnO_4$ is used

A. in analytical chemistry

B. as a favourite oxidant in preparative organic chemistry

C. in bleaching of wool, cotton and silk

D. All of the above

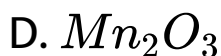
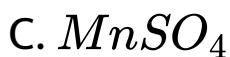
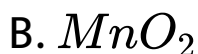
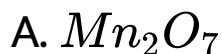
Answer: D



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40. On addition of small amount of $KMnO_4$ to concentrated H_2SO_4 , a green oily compound is obtained which is highly

explosive in nature. Identify the compound from the following.



Answer: A



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41. There are 14 elements in actinoid series. Which of the following elements does not belong to this series?

A. U

B. Np

C. Tm

D. Fm

Answer: C



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42. In context of the lanthanoids, which of the following statements is not correct?

A. There is a gradual decrease in the radii of the members with increasing atomic number in the series

B. All the members exhibit + 3 oxidation state

C. Because of similar properties, the separation of lanthanoids is not easy

D. Availability of 4f electrons results in the formation of compounds in + 4 state for all the members of the series

Answer: D



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43. Knowing that the chemistry of lanthanoids (Ln) is dominated by its +3 oxidation state, which of the following statement is incorrect?

A. Because of the large size of the Ln (III)

ions, the bonding in its compounds is
predominantly ionic in character

B. The ionic sizes of Ln (III) decrease in
general with increasing atomic number

C. Ln (III) compounds are generally
colourless

D. Ln (III) hydroxides are mainly basic in
character

Answer: C



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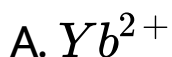
44. Across the lanthanide series, the basicity of the lanthanoid hydroxides:

- A. decreases
- B. increases
- C. first decreases and then increases
- D. first increases and then decreases

Answer: A



45. Among the following lanthanoid ions, the paramagnetic ion is



Answer: B



46. The actinoids include theA.... elements fromB.... ToC.... Here, A, B and C refer to

A. A - fourteen, B - Th , C - Lr

B. A - twelve, B - Lr , C - Th

C. A - thirteen, B - Lr , C - Th

D. A - sixteen, B - Th, C - Lr

Answer: A



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47. Larger number of oxidation states are exhibited by the actinoids than those by the lanthanoids, the main reason being

A. 4f orbitals are more diffused than the 5f orbitals

B. lesser energy difference between 5f and 6d than between 4f and 5d orbitals

C. more energy difference between 5f and 6d than between 4f and 5d orbitals

D. more reactive nature of the actinoids
than the lanthanoids

Answer: B



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48. The f - block consists of series.

A. two

B. three

C. four

D. five

Answer: A



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49. Actinoids possess

A. variable valency

B. 12 elements

C. all synthetic elements

D. only short-lived isotopes

Answer: A



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50. The lanthanoid contraction is related to

A. atomic radii

B. atomic as well as ionic radii, M^{3+}

C. valence electrons

D. oxidation states

Answer: B



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51. Lanthanoids and actinoids differ from each other because

A. of the presence of partially filled outermost shells

B. actinoids are radioactive in nature

C. they show common oxidation state of +3

D. both are known as inner-transition elements

Answer: B



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52. The one which is not the characteristic property of transition element, is

A. diamagnetic behaviour

B. formation of complexes

C. catalytic activity

D. variable oxidation states

Answer: A



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53. Dichromate ions in alkaline medium exist as





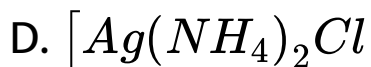
Answer: A



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54. The correct formula for diamine silver chloride is





Answer: A



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55. Which of the following is used as a white pigment?



C. NiO

D. CuO

Answer: A



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Bitsat Archives

1. Mercury is a liquid metal because

- A. it has a completely filled d-orbital that causes d - d overlapping
- B. it has completely filled d-orbital that prevents d-d overlapping
- C. it has a completely filled s-orbital
- D. it has a small atomic size

Answer: B



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2. What happens when a solution of potassium chromate is treated with an excess of dil. Nitric acid?

A. Cr^{3+} and $Cr_2O_7^{2-}$ are formed

B. $Cr_2O_7^{2-}$ and H_2O are formed

C. CrO_4^{2-} is reduced to Cr^{3+}

D. CrO_4^{2-} is oxidised to $Cr_2O_7^{2-}$

Answer: B



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3. In the extraction of Ag, Zn is removed from (Zn-Ag) alloy through

A. cupellation

B. fractional crystallisation

C. distillation

D. electrolytic refining

Answer: C



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4. Green vitriol is

A. ferrous sulphate

B. tin oxide

C. zinc oxide

D. ferrous carbonate

Answer: A



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5. Pyrolusite is a/an

A. oxide ore

B. sulphide ore

C. carbide ore

D. Not an ore

Answer: A



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6. When potassium ferrocyanide crystals are heated with concentrated sulphuric acid, the gas evolved is

A. SO_2

B. NH_3

C. CO_2

D. CO

Answer: D



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7. van-Arkel method is based on

A. cupellation method

B. furnace refining method

C. poling method

D. None of the above

Answer: D



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8. Oil paintings turn blackish after some time.

The salt formed is

A. SnS

B. CuS

C. PbS

D. CdS

Answer: C



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9. The extraction of which of the following metals involves bessemerisation?

A. Fe

B. Ag

C. Al

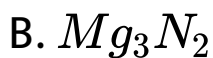
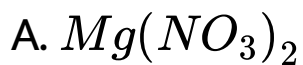
D. Cu

Answer: D



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10. A metal X on heating in nitrogen gas gives Y , Y on treatment with H_2O gives a colourless gas which when passed through $CuSO_4$ solution gives a blue colour. Y is:



Answer: B



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