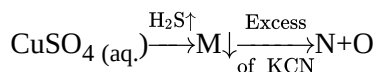
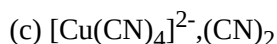
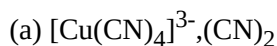


1.



Then final products N and O are respectively.



2.

CrO_4^{2-} (yellow) changes to $\text{Cr}_2\text{O}_7^{2-}$ (orange) in $\text{pH} = x$ and vice versa in $\text{pH} = y$. Hence, x and y are:

(a) 6,8

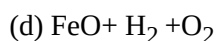
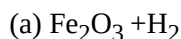
(b) 6,5

(c) 8,6

(d) 7,7

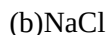
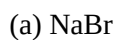
3.

When steam is passed over red hot iron, the substances formed are:



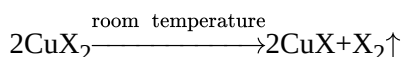
4.

Which of the following solid salt on heating with $\text{K}_2\text{Cr}_2\text{O}_7$ and Conc. H_2SO_4 orange, red vapours are evolved which turn aqueous NaOH solution yellow?

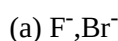


5.

Consider the following transformation:

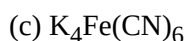
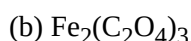


Then X^- can be :



6.

The iron salt used in blue prints is:



7.

Which has highest melting point?

1. Cr

2. Fe

3. Cu

4. Mo

8.

The colour of KMnO_4 is due to

1. d-d transition

2. Charge transfer spectra

3. Polarisation of ion

4. p-d transition

9.

Which of the following element does not show the variable oxidation state?

1. Fe

2. Mn

3. Cu

4. Zn

10.

With F highest stable oxidation state of Mn is

1. +6

2. +4

3. +7

4. +3

11.

12. $\text{Cr}_2\text{O}_7^{2-} + \text{X} \xrightarrow{\text{H}^+} \text{Cr}^{3+} + \text{H}_2\text{O} + \text{oxidized product of X}$, X in the above reaction cannot be
1. $\text{C}_2\text{O}_4^{2-}$
 2. Fe^{2+}
 3. SO_4^{2-}
 4. S^{2-}
13. The pair having similar magnetic moment is
1. $\text{Ti}^{3+}, \text{V}^{3+}$
 2. $\text{Cr}^{3+}, \text{Mn}^{2+}$
 3. $\text{Mn}^{2+}, \text{Fe}^{3+}$
 4. $\text{Fe}^{2+}, \text{Mn}^{2+}$
14. In the dichromate ion $\text{Cr}_2\text{O}_7^{2-}$,
1. 4 Cr-O bonds are equivalent
 2. 6 Cr-O bonds are equivalent
 3. All Cr-O bonds are equivalent
 4. None of Cr-O bonds are equivalent
15. Electronic configuration of a transition element X in +3 Oxidation state is $[\text{Ar}]3d^5$. What is its atomic number?
1. 25
 2. 26
 3. 27
16. Magnetic moment of $\text{K}_3[\text{Fe}(\text{CN})_5(\text{H}_2\text{O})]$ is
1. 0
 2. 4.92
 3. 3.87
 4. 2.83
17. HgCl_2 and I_2 both when dissolved in water containing I^- ions the pair of species formed is
- (a) $\text{HgI}_2, \text{I}_3^-$
 - (b) HgI_2, I^-
 - (c) $\text{HgI}_4^{2-}, \text{I}_3^-$
 - (d) $\text{Hg}_2\text{I}_2, \text{I}^-$
18. Which one of the following statements related to lanthanons is incorrect?
- (a) Europium shows +2 oxidation state
 - (b) The basicity decreases as the ionic radius decreases from Pr to Lu
 - (c) All the lanthanons are much more reactive than aluminium
 - (d) Ce (+4) solution are widely used as oxidising agent in volumetric analysis
19. Gadolinium belongs to 4f series. It's atomic number is 64. Which of the following is the correct electronic configuration of gadolinium?
- (a) $[\text{Xe}]4f^86d^2$
 - (b) $[\text{Xe}]4f^95s^1$
 - (c) $[\text{Xe}]4f^75d^16s^2$
 - (d) $[\text{Xe}]4f^65d^26s^2$
20. Assuming complete ionisation, same moles of which of the following compounds will require the least amount of acidified KMnO_4 for complete oxidation?
- (a) FeSO_4
 - (b) FeSO_3
 - (c) FeC_2O_4
 - (d) $\text{Fe}(\text{NO}_2)_2$
21. Reason of lanthanoid contraction is

- (a) negligible screening effect of 'f' orbitals
(b) increasing nuclear charge
(c) decreasing nuclear charge
(d) decreasing screening effect
22.
Which of the following lanthanoid ions is diamagnetic?
(At. nos. Ce=58, Sm=62, Eu=63, Yb = 70)
- (a) Ce^{2+}
(c) Eu^{2+}
(b) Sm^{2+}
(d) Yb^{2+}
23.
 KMnO_4 can be prepared from K_2MnO_4 as per reaction
- $$3 \text{MnO}_4^{2-} + 2\text{H}_2\text{O} \rightleftharpoons 2 \text{MnO}_4^- + \text{MnO}_2 + 4 \text{OH}^-$$
- The reaction can go to completion by removing OH^- ions by adding
- (a) HCl
(b) KOH
(c) CO_2
(d) SO_2
24.
Identify the alloy containing a non-metal as a constituent in it.
- (a) Invar
(b) Steel
(c) Bell metal
(d) Bronze
25.
Which of the following ions will exhibit colour in aqueous solutions ?
- (a) La^{3+} (Z=57)
(b) Ti^{3+} (Z=22)
(c) Lu^{3+} (Z=71)
(d) Sc^{3+} (Z=21)
26.
In which of the following pairs are both the ions coloured in aqueous solution?
- (a) Ni^{2+} , Ti^{3+} (b) Sc^{3+} , Ti^{3+}
(c) Sc^{3+} , Co^{2+} (d) Ni^{2+} , Cu^+
(At. no : Sc =21, Ti = 22, Ni = 28, Cu = 29, Co = 27)

27.
Which of the following order of CFSE is incorrect?
- (a) $[\text{Co}(\text{en})_3]^{3+} > [\text{Co}(\text{NH}_3)_6]^{3+} > [\text{Co}(\text{H}_2\text{O})_6]^{3+}$
(b) $[\text{PtCl}_4]^{2-} > [\text{PdCl}_4]^{2-} > [\text{NiCl}_4]^{2-}$
(c) $[\text{Ni}(\text{DMHH})_2] < [\text{Ni}(\text{en})_2]^{2+}$
(d) $[\text{Co}(\text{ox})_3]^{3-} < [\text{Co}(\text{en})_3]^{3+}$
28.
The CFSE for $[(\text{CoCl})_6]^{4-}$ complex is 18000 cm^{-1} .
The Δ for $[(\text{CoCl})_4]^{2-}$ will be:
- (a) 18000 cm^{-1} (b) 16000 cm^{-1}
(c) 8000 cm^{-1} (d) 2000 cm^{-1}
29.
Which of the following is called Wilkinson's catalyst?
- (a) $[\text{RhCl}(\text{PPh}_3)_3]$ (b) $\text{TiCl}_4 + (\text{C}_2\text{H}_5)_3\text{Al}$
(c) $(\text{C}_2\text{H}_5)_4\text{Pb}$ (d) $[\text{PtCl}_2(\text{NH}_3)_2]$
30.
$$\left(\text{X} \right) + \text{K}_2\text{CO}_3 + \text{Air} \xrightarrow{\text{heat}} \left(\text{Y} \right)$$

$$\left(\text{Y} \right) + \text{Cl}_2 \rightarrow \left(\text{Z} \right) \text{Pink}$$

Which of the following is correct?
- (a) X= black, MnO_2 , Y=Blue, K_2CrO_4 , Z = KMnO_4
(b) X= green, Cr_2O_3 , Y=Yellow, K_2CrO_4 , Z = $\text{K}_2\text{Cr}_2\text{O}_7$
(c) X= black, MnO_2 , Y = green, K_2MnO_4 , z = KMnO_4
(d) x = black, Bi_2O_3 , Y = Colourless, KBiO_2 , z = KBiO_3
31.
Acidified permanganate solution does not oxidize:
- (a) $\text{C}_2\text{O}_4^{2-}(\text{aq})$ (b) $\text{NO}_3^-(\text{aq})$
(c) $\text{S}^{2-}(\text{aq})$ (d) $\text{F}^-(\text{aq})$
32.
Which of the following solid salt on heating with solid $\text{K}_2\text{Cr}_2\text{O}_7$ and conc. H_2SO_4 orange red vapours are evolved which turn aqueous NaOH solution yellow?
- (a) NaBr (b) NaCl

- (c) NaNO_3 (d) NaI
33. Which of the following is true for the species $3d^4$ configuration ?
- (A) Cr^{2+} is reducing in nature
(B) Mn^{3+} is oxidising in nature.
(C) Both (A) and (B)
(D) None of these
34. In which compound does vanadium have an oxidation number of +4?
- (A) NH_4VO_2
(B) $\text{K}_4[\text{V}(\text{CN})_6]$
(C) VSO_4
(D) VOSO_4
35. Arrange the following species in the increasing order of their magnetic properties.
- VCl_3 VOSO_4 Na_3VO_4 $[\text{V}(\text{H}_2\text{O})_6]\text{SO}_4 \cdot \text{H}_2\text{O}$
I II III IV
- (A) $\text{III} < \text{II} < \text{I} < \text{IV}$
(B) $\text{III} < \text{IV} < \text{II} < \text{I}$
(C) $\text{II} < \text{III} < \text{I} < \text{IV}$
(D) $\text{IV} < \text{I} < \text{II} < \text{III}$
36. Which of the following increasing order of oxidising power is correct for the following species?
- VO_2^+ , MnO_4^- , $\text{Cr}_2\text{O}_7^{2-}$
- (A) $\text{VO}_2^+ < \text{Cr}_2\text{O}_7^{2-} < \text{MnO}_4^-$
(B) $\text{VO}_2^+ < \text{MnO}_4^- < \text{Cr}_2\text{O}_7^{2-}$
(C) $\text{Cr}_2\text{O}_7^{2-} < \text{VO}_2^+ < \text{MnO}_4^-$,
(D) $\text{Cr}_2\text{O}_7^{2-} < \text{MnO}_4^- < \text{VO}_2^+$
37. At 300°C , FeCl_3 :
- (A) Decomposes into FeCl_2 and Cl_2 .
(B) Decomposes into Fe and Cl_2 .
(B) Sublimes to give liquid FeCl_3
(D) Sublimes to give gaseous dimer $(\text{FeCl}_3)_2$.
38. Anhydrous ferric chloride is prepared by
- (A) Heating hydrated ferric chloride at a high temperature in a stream of air.
(B) Heating metallic iron in a stream of dry chlorine gas.
(C) Reaction of ferric oxide with HCl (aq).
(D) Reaction of metallic iron with HCl (aq).
39. Select the correct statement :
- (A) PH_3 reduces AgNO_3 to metallic Ag .
(B) Organic tissues turn AgNO_3 black by reducing it to Ag .
(C) AgCN is soluble in KCN .
(D) All are correct statements.
40. Which of the following products are formed when potassium bromide reacts with potassium permanganate in alkaline pH?
1. BrO_3^- , MnO_2
2. BrO_4^- , Mn^{2+}
3. Br_2 , MnO_2
4. B_2O^- , MnO_4^{2-}
41. Which of the following pairs of compounds are more stable
- (A) $\text{K}_2[\text{NiCl}_6]$, $[\text{Pt}(\text{CN})_4]^{2-}$
(B) NiCl_4 , PtCl_4
(C) $[\text{Ni}(\text{CN})_4]^{2-}$, $\text{K}_2[\text{Pt}(\text{Cl}_6)]$
(D) PtCl_2 , NiCl_2
42. Which of the following has maximum number of unpaired electrons?
- (A) Fe^{2+}

(B) Fe^{3+}

(C) Co^{3+}

(D) Co^{2+}

43.

Heating of Ag with dil. HNO_3 give

(A) NO

(B) NO_2

(C) N_2O

(D) N_2O_3

44.

When excess of SnCl_2 is added to HgCl_2 , the substance formed is

(A) Hg_2Cl_2

(B) Sn

(C) Hg

(D) Cl_2

45.

Which of the following elements form stable dinuclear ions

(A) Zn

(B) Cd

(C) Hg

(D) Fe

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