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|---------------------------------------|------------------------|----------------------------|
| Date Planned : __ / __ / __           | Daily Tutorial Sheet-3 | Expected Duration : 90 Min |
| Actual Date of Attempt : __ / __ / __ | JEE Main (Archive)     | Exact Duration : _____     |

31. The correct order of  $E_{M^{2+}/M}^\circ$  values with negative sign for the four successive elements, Cr, Mn, Fe and Co is :  
 (A) Cr > Mn > Fe > Co (B) Mn > Cr > Fe > Co (2010)  
 (C) Cr > Fe > Mn > Co (D) Fe > Mn > Cr > Co
32. The outer electronic configuration of Gd (Atomic number : 64) is : (2011)  
 (A)  $4f^3 5d^5 6s^2$  (B)  $4f^8 5d^0 6s^2$  (C)  $4f^4 5d^4 6s^2$  (D)  $4f^7 5d^1 6s^2$
33. In context of the lanthanoids, which of the following statement is not correct ? (2011)  
 (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 lanthanides is not easy  
 (D) Availability of 4f electrons results in the formation of compounds in +4 state for all the members of the series
34. Iron exhibits +2 and +3 oxidation states. Which of the following statements about iron is incorrect ?  
 (A) Ferrous compounds are relatively more ionic than the corresponding ferric compounds  
 (B) Ferrous compounds are less volatile than the corresponding ferric compounds  
 (C) Ferrous compounds are more easily hydrolysed than the corresponding ferric compounds  
 (D) Ferrous oxide is more basic in nature than the ferric oxide (2012)
35. Which of the following arrangements does not represent the correct order of the property stated against it? (2013)  
 (A)  $Sc < Ti < Cr < Mn$  : number of oxidation states  
 (B)  $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{2+}$  : paramagnetic behaviour  
 (C)  $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$  : ionic size  
 (D)  $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$  : stability in aqueous solution
36. Four successive members of the first row transition elements are listed below with atomic numbers. Which one of them is expected to have the highest  $E_{M^{3+}/M^{2+}}^\circ$  value ? (2013)  
 (A) Co (Z = 27) (B) Cr (Z = 24) (C) Mn (Z = 25) (D) Fe (Z = 26)
37. The equation which is balanced and represents the correct product(s) is : (2014)  
 (A)  $CuSO_4 + 4KCN \longrightarrow K_2[Cu(CN)_4] + K_2SO_4$   
 (B)  $Li_2O + 2KCl \longrightarrow 2LiCl + K_2O$   
 (C)  $[CoCl(NH_3)_5]^+ + 5H^+ \longrightarrow Co^{2+} + 5NH_4^+ + Cl^-$   
 (D)  $[Mg(H_2O)_6]^{2+} + (EDTA)^{4-} \xrightarrow{\text{excess NaOH}} [Mg(EDTA)]^{2-} + 6H_2O$

- 38.** Match the catalyst to the correct processes : **(2015)**
- | <b>Catalyst</b>                                 | <b>Process</b>                                  |
|-------------------------------------------------|-------------------------------------------------|
| <b>(P)</b> $\text{TiCl}_4$                      | <b>(i)</b> Wacker process                       |
| <b>(Q)</b> $\text{PdCl}_2$                      | <b>(ii)</b> Ziegler-Natta polymerization        |
| <b>(R)</b> $\text{CuCl}_2$                      | <b>(iii)</b> Contact process                    |
| <b>(S)</b> $\text{V}_2\text{O}_5$               | <b>(iv)</b> Deacon's process                    |
| <b>(A)</b> P-(ii), (Q)-(iii), (R)-(iv), (S)-(i) | <b>(B)</b> P-(iii), (Q)-(i), (R)-(ii), (S)-(iv) |
| <b>(C)</b> P-(iii), (Q)-(ii), (R)-(iv), (S)-(i) | <b>(D)</b> P-(ii), (Q)-(i), (R)-(iv), (S)-(iii) |
- 39.** The colour of  $\text{KMnO}_4$  is due to : **(2015)**
- |                                                                       |                                           |
|-----------------------------------------------------------------------|-------------------------------------------|
| <b>(A)</b> $\text{L} \rightarrow \text{M}$ charge transfer transition | <b>(B)</b> $\sigma - \sigma^*$ transition |
| <b>(C)</b> $\text{M} \rightarrow \text{L}$ charge transfer transition | <b>(D)</b> $d - d$ transition             |
- \*40.** Which of the following statements is false ? **(2015)**
- |                                                                                  |                                                                                       |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>(A)</b> $\text{CrO}_4^{2-}$ is tetrahedral in shape                           | <b>(B)</b> $\text{Cr}_2\text{O}_7^{2-}$ has a $\text{Cr} - \text{O} - \text{Cr}$ bond |
| <b>(C)</b> $\text{Na}_2\text{Cr}_2\text{O}_7$ is a primary standard in volumetry |                                                                                       |
| <b>(D)</b> $d - d$ transition                                                    |                                                                                       |
- 41.** A pink coloured salt turns blue on heating. The presence of which cation is most likely ? **(2015)**
- |                             |                             |                             |                             |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| <b>(A)</b> $\text{Cu}^{2+}$ | <b>(B)</b> $\text{Fe}^{2+}$ | <b>(C)</b> $\text{Zn}^{2+}$ | <b>(D)</b> $\text{Co}^{2+}$ |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
- 42.** Which one of the following species is stable in aqueous solution ? **(2016)**
- |                             |                                |                                |                          |
|-----------------------------|--------------------------------|--------------------------------|--------------------------|
| <b>(A)</b> $\text{Cr}^{2+}$ | <b>(B)</b> $\text{MnO}_4^{2-}$ | <b>(C)</b> $\text{MnO}_4^{3-}$ | <b>(D)</b> $\text{Cu}^+$ |
|-----------------------------|--------------------------------|--------------------------------|--------------------------|
- 43.** In the following reactions,  $\text{ZnO}$  is respectively acting as a/an : **(2017)**
- |                                                                                      |                                                                     |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>I.</b> $\text{ZnO} + \text{Na}_2\text{O} \longrightarrow \text{Na}_2\text{ZnO}_2$ | <b>II.</b> $\text{ZnO} + \text{CO}_2 \longrightarrow \text{ZnCO}_3$ |
| <b>(A)</b> acid and acid                                                             | <b>(B)</b> acid and base                                            |
| <b>(C)</b> base and acid                                                             | <b>(D)</b> base and base                                            |
- 44.** The pair of compounds having metals in their highest oxidation state is : **(2017)**
- |                                                                                |                                                            |
|--------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>(A)</b> $[\text{Fe}(\text{CN})_6]^{3-}$ and $[\text{Cu}(\text{CN})_4]^{2-}$ | <b>(B)</b> $[\text{FeCl}_4]^-$ and $\text{Co}_2\text{O}_3$ |
| <b>(C)</b> $[\text{NiCl}_4]^{2-}$ and $[\text{CoCl}_4]^{2-}$                   | <b>(D)</b> $\text{MnO}_2$ and $\text{CrO}_2\text{Cl}_2$    |
- 45.** Which of the following ions does not liberate hydrogen gas on reaction with dilute acids ? **(2017)**
- |                             |                             |                            |                             |
|-----------------------------|-----------------------------|----------------------------|-----------------------------|
| <b>(A)</b> $\text{Mn}^{2+}$ | <b>(B)</b> $\text{Ti}^{2+}$ | <b>(C)</b> $\text{V}^{2+}$ | <b>(D)</b> $\text{Cr}^{2+}$ |
|-----------------------------|-----------------------------|----------------------------|-----------------------------|