Single correct :

Q.1 Cl_2 can disproportionate in
(A) NaOH, HF (B) K_2MnO_4, NaOH (C) K_2MnO_4, HF (D) $Ca(OH)_2$, H_2O

Q.2 Which of the following cation is paramagnetic ?
(A) La^{3+} (B) Lu^{3+} (C) Ce^{4+} (D) Nd^{3+}

Q.3 Potassium sulphite solution was mixed potassium hydroxide & the potassium permanganate solution was added into it, then final colour of the solution is
(A) Blue (B) Colourless (C) Light Pink (D) Green

Q.4 Which is correct reaction of lanthanoid (Ln) ?
(A) $Ln + O_2 \rightarrow LnO_2$ (B) $Ln + H_2O \rightarrow LnH_3 + Ln(OH)_3$
(C) $Ln + dil.\ HCl \rightarrow LnCl_3 + H_2\uparrow$ (D) $Ln + N_2 \rightarrow LnN_3$

Q.5 Which pair of species comproportionate in acidic medium.
(A) $KMnO_4$, Mn^{2+} (B) NO_3^- , NO (C) Cl^-, OCl^- (D) $K_2Cr_2O_7$, Cr^{3+}

Q.6 Which of the following pair of salts is water insoluble but both are soluble in excess of hypo solution ?
(A) $Fe_2(SO_4)_3 \cdot BaCO_3$ (B) AgI, Ag_2CO_3
(C) $CuSO_4$, HgI_2 (D) $Fe(OH)_2$, Ag_2S

Q.7 Cu^{2+} (aq) does **not** undergo redox reaction with solution of
(A) $(NH_4)_2S$ (B) $Na_2S_2O_3$ (C) KCN (D) NH_4SCN

Q.8 **Incorrect** statement is
(A) Cr^{2+} (aq) has strong reducing character
(B) Mn^{3+}(aq) has strong oxidizing character
(C) Co^{2+} (aq) is stable but it is easily oxidized in presence of complexing reagent.
(D) CuCl undergoes disproportionation in excess of water

Q.9 HCl is **not** used to make the medium acidic in reactions of $KMnO_4$, because
(A) $KMnO_4$ does not play role of self indicator
(B) $KMnO_4$ is a weaker oxidising agent than HCl
(C) Both HCl and $KMnO_4$ act as oxidising agent
(D) $KMnO_4$ oxidises HCl into Cl_2 which is also an oxidising agent

Q.10 $\underset{\text{(Purple)}}{KMnO_4} + \underset{\text{(Hot conc.)}}{NaOH} \xrightarrow{\Delta}$ Green solution $\xrightarrow{\text{excess water}}$ purple colour along with black residue.

Which of the following statement is/are correct regarding above information ?
(A) The oxidation state of Mn in green solution is +6
(B) Both steps take place through redox reaction
(C) MnO_2 is obtained in the form of black residue
(D) All of these

Q.11 When $KMnO_4$ separately reacts with H_2O_2 in weakly alkaline medium and acidic medium, then products of $KMnO_4$ are respectively ?
(A) K_2MnO_4 and Mn^{2+}(aq) (B) MnO_2 and MnO_2
(C) MnO_2 and Mn^{2+} (aq) (D) Mn^{2+} (aq) and MnO_2

Q.12 In which of the following reactions K_2MnO_4 is **not** formed ?
(A) $KMnO_4(s) \xrightarrow{\Delta}$ (B) $MnO_2 + 2KOH + KNO_3 \xrightarrow{\Delta}$
(C) $3MnO_2 + 6KOH + KClO_3 \xrightarrow{\Delta}$ (D) $2KMnO_4 + KI + H_2O \longrightarrow$

Q.13 Which oxide exhibits strongest oxidizing character among given oxides ?
(A) CrO_3 (B) MoO_3 (C) WO_3 (D) Mn_2O_7

Q.14 When solution of potassium permanganate is run from a burette into a flask containing aqueous solution of oxalic acid and dilute sulphuric acid, the rate of reaction suddenly increases considerably as more potassium permaganate is added. The correct reason for this observation is
(A) Reaction is catalysed by Mn^{2+}(aq) ions produced in the reaction
(B) pH of solution in the flask increases
(C) Reaction is exothermic and the heat energy liberated affects the rate
(D) Sulphuric acid removes water and so causes the reaction to proceed more rapidly to completion

Comprehension

Comprehension (Q.15 to Q.16)

$$\underbrace{X}_{\text{Water soluble salt}} \xrightarrow{\text{Excess KI}} Y\downarrow + \underbrace{Z}_{\text{Coloured (solution)}} \xrightarrow{Na_2S_2O_3} \underbrace{Y\downarrow}_{\text{White}} + \text{Colourless products}$$

Q.15 Salt 'X' is
(A) $Fe_2(SO_4)_3$ (B) $CuSO_4.5H_2O$ (C) KNO_2 (D) $Hg(NO_3)_2$

Q.16 Salt 'X' does not produce precipitate with solution of
(A) $K_4[Fe(CN)_6]$ (B) $BaCl_2$ (C) NaOH (D) Excess NH_4OH

More than one may be correct

Q.17 For reaction :

$$Cu^{2+}(aq) + X^{-}(aq) \xrightarrow[\text{on standing}]{\text{R.T.}} P\downarrow + X_2\uparrow$$

X^{-}(aq) can be
(A) SCN^{-}(aq) (B) CN^{-}(aq) (C) I^{-}(aq) (D) $S_2O_3^{2-}$(aq)

Q.18 Consider the following reactions
$P + Q \longrightarrow R + K_2SO_4$
$R \longrightarrow 2CuI + I_2$
$Ag^{+} + Q \longrightarrow S + K^{+}$
Then according to given information the correct match is
(A) P = $CuSO_4$ (B) Q = KI (C) R = CuI_2 (D) S = AgI

Q.19 Chemical behaviour of excess of hypo solution towards Ag^+ (aq) is same as with :
(A) Hg^{2+}(aq) (B) Cu^{2+}(aq) (C) Pb^{2+}(aq) (D) Bi^{3+}(aq)

Q.20 Fe^{3+} (aq) undergoes redox reaction with solution of
(A) SO_2 (B) NH_4SCN (C) KI (D) $Na_2S_2O_3$

Q.21 $K_2Cr_2O_7(s) \xrightarrow{\Delta} A + B + C(g)$
If 'A' forms precipitate with $Ba(OH)_2$, then correct statement(s) for given reaction and products is/are
(A) Gas 'C' is also formed when solid $K_2Cr_2O_7$ is warmed with conc. H_2SO_4
(B) Compound 'A' is also formed when 'B' is warmed with solution of Br_2 in KOH
(C) Solution of 'B' in dil. HCl produces coloured compound with excess NH_3
(D) Compound 'A' is more thermally stable than $K_2Cr_2O_7$

Q.22 Aqueous solution of which of the following compound(s) is acidic ?
(A) $HgCl_2$ (B) MnO_2 (C) VCl_5 (D) $FeCl_3$

Q.23 In which of the following compound(s) observed colour is due to charge transfer spectrum ?
(A) $Fe_4[Fe(CN)_6]_3$ (B) $[Fe(H_2O)_5(NO)]^{2+}$
(C) $Ba_3(PO_4)_2$ (D) K_2MnO_4

Q.24 Which of the following pair of oxides can be separated on their fusion with solid Na_2CO_3 followed by extraction with water ?
(A) Fe_2O_3, Al_2O_3 (B) CuO, ZnO (C) MnO_2, Cr_2O_3 (D) PbO, Na_2O

Q.25 $KMnO_4$, which is used as laboratory reactant can be prepared by :
(A) Electrolytic oxidation of K_2MnO_4 in alkaline medium
(B) Reaction of K_2MnO_4 with O_3
(C) Reaction of K_2MnO_4 with Cl_2
(D) Reaction of K_2MnO_4 with dil H_2SO_4

Q.26 Select **incorrect** order
(A) Ionization energy : Ga > Tl
(B) Electron gain enthalpy : S > O > Se
(C) Atomic size : La > Y
(D) Melting point : Cr > Mn

Subjective

Q.27 Find total number of properties which are changed when transition metal form interstatial carbide among given properties.
Ductility, Malleability, Density, Hardness, Solidstate structure,
Electrical conductivity, Number of free electrons, physical state.

Q.28 Find out number of ions which absorbs wavelength (x) in aqueous medium.
Where range of wavelength x is [yellow colour $\leq$ x $\leq$ red colour].
Fe^{2+}, Fe^{3+}, Cr^{3+}, Cu^{2+}, Ni^{2+}, Zn^{2+}, Sc^{3+}, Ba^{2+}, Ti^{3+}, V^{4+}

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Electrical conductivity, Number of free electrons, physical state.
Ans. 4

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