1. Which of the following change is possible in Aqueous Medium-

(1) $2\ Cu^{+} \longrightarrow Cu^{2+} + Cu^{0}$

(2) $2Cu^{0} \xrightarrow[-3^-]{} Cu^{+} + Cu^{+2}$

(3) $2Cu^{+2} \xrightarrow[+3e^-]{} Cu^{0} + Cu^{+}$

(4) $Cu^{+2} + e^{-} \longrightarrow Cu^{+}$

2. Possible oxidation states for titanium can be

(1) +2, +3 & +4 (2) Only +3

(3) +2 & +3 (4) Only +2

3. What changes does not occur when $K_2Cr_2O_7$ react with H_2O_2 solution :-

(1) Orange colour of solution turns blue

(2) O.S. of Cr atom decreases

(3) O.S. of Cr atom remains constant

(4) None of these

4. Ferric Ion + Mono valent anion $\longrightarrow$ x + y

(element having atomic Number = 53)

x & y are-

(1) Fe^{0} & Iodate ion

(2) Fe^{+2} & Per iodate ion

(3) Fe^{2+} & I_2

(4) Fe^{+2} & FeI_3

5. Pr, Nd, Tb & Dy show +4 oxidation state in the form of-

(1) Chromates & Halides

(2) Mangnate & Chromate

(3) Both of the above

(4) Oxide

6. Electronic configurations related to Praseodymium, Neodymium & Promethium are respectively-

(1) $4f^3 6s^2$, $4f^4 6s^2$ & $4f^6 6s^2$

(2) $4f^7 6s^2$, $4f^{13} 6s^2$ & $4f^6 6s^2$

(3) $4f^3 6s^2$, $4f^4 6s^2$ & $4f^5 6s^2$

(4) $4f^{14} 5d^1 6s^2$, $4f^{14} 6s^2$ & $4f^6 6s^2$

7. Which products are formed (respectively) by reaction of lanthanoids with hydrogen oxide, burns in O_2 and heated with sulphur

(1) $Ln(OH)_3$, Ln_2O_3, Ln_2S_3

(2) Ln. xH_2O, Ln. O_2 & heterocyclic sulphides

(3) Lna_2O_3 , $Ln(OH)_3$ & LnS

(4) Macrocyclic ligands containing OH^- ions, LnO & Homo cyclic sulphides

8. Catalyst related to polymerisation of monomers having two carbon atoms having one double bond

(1) V_2O_5 + Asbestos + $TiCl_4$

(2) Zeolite + Feldspar

(3) $TiCl_4$ + Tri-methyl aluminium

(4) MnO_2 + $KMnO_4$ + $PdCl_2$

9. Which of the following arrangements does not represent the correct order of the property stated against it?

(1) $V^{2+} < Cr^{2+} < Mn^{2} < Fe^{2+}$: paramagnetic behaviour

(2) $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: ionic size

(3) $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$: stability in aqueous solution

(4) Sc < Ti < Cr < Mn : number of oxidation states

10. The yellow colour solution of Na_2CrO_4 changes to orange red on passing CO_2 gas due to the formation of :-

(1) CrO_5 (2) CrO_3

(3) $Na_2Cr_2O_7$ (4) Cr_2O_3

11. What is incorrect about the reactions of $KMnO_4$ and oxalic acid

(1) CO_2 is formed

(2) decolourisation is fast in begining but become slow after some time

(3) Mn^{2+} is autocatalyst

(4) It is a redox change

12. Which statement is correct

(1) Most common oxidation state of lanthanoid is +2

(2) HCl can be used to acidify $KMnO_4$ during redox reaction

(3) In presence of CO_2, orange dichromate solution changes to yellow chromate

(4) To separate Fe_2O_3 and Al_2O_3, NaOH can be used

13. 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 the compound is

(1) Mn_2O_7 (2) MnO_2

(3) $MnSO_4$ (4) Mn_2O_3

14. $CrO_4^{2-} \underset{pH=Y}{\overset{pH=X}{\rightleftharpoons}} Cr_2O_7^{-2}$

The pH values of (X) and (Y) are respectively

(1) 4 and 5 (2) 4 and 8

(3) 8 and 4 (4) 8 and 9

15. Which is correct :-

Process	Result
(1) $\left(Ti(H_2O)_6\right)Cl_3$ is heated	Colour is intensified
(2) $CuSO_4$ reacts with KCN	$K_2\left[Cu(CN)_4\right]$ is formed
(3) $KMnO_4$ reacts with HF	MnF_6 is formed
(4) K_2MnO_4 reacts with CO_2	$KMnO_4$ (purple) and MnO_2 (brown) is formed

16. $KMnO_4$ is a strong oxidizing agent in acidic medium. To provide acid medium dil. H_2SO_4 is used instead of HCl. This is because

(1) H_2SO_4 is a stronger acid than HCl

(2) HCl is oxidized by $KMnO_4$ to Cl_2

(3) H_2SO_4 is a dibasic acid

(4) rate is faster in the presence of H_2SO_4

17. In which of the following oxoanions the oxidation state of central atom is not same as that of its group number in periodic table?

(1) MnO_4^- (2) $Cr_2O_7^{-2}$ (3) VO_4^{-3} (4) FeO_4^{-2}

18. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following is not the characteristic property of interstitial compounds?

(1) They have high melting points in comparison to pure metals.

(2) They are very hard

(3) They retain metallic conductivity

(4) They are chemically very reactive

19. When $KMnO_4$ acts as an oxidizing agent and ultimately forms $[MnO_4]^{-2}$, MnO_2, Mn_2O_3, and Mn^{+2}, then the number of electrons transferred in each case, respectively, is:

(1) 4, 3, 1 and 5

(2) 1, 5, 3 and 7

(3) 1, 3, 4 and 5

(4) 3, 5, 7 and 1

20. What would happen when a solution of potassium chromate is treated with an excess of dilute nitric acid?

(1) $Cr_2O_7^{2-}$ and H_2O are formed

(2) CrO_7^{2-} is reduced to +3 state of Cr

(3) CrO_7^{2-} is oxidized to +7 state of Cr

(4) Cr^{3+} and $Cr_2O_7^{2-}$ are formed

21. Heating Cu_2O and Cu_2S will give

(1) Cu_2SO_3 (2) CuO + CuS

(3) Cu + SO_3 (4) Cu + SO_2

22. Which of the following arrangements does not represent the correct order of the property stated against it?

(1) $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{2+}$:
paramagnetic behaviour

(2) $Ni^{2+} < Co^{2+} < Mn^{2+}$: ionic size

(3) Sc < Ti < Cr < Mn :
number of oxidation states

(4) None

23. Which has lowest boiling point ?

(1) Sc (2) Cr (3) Mn (4) Zn

24. Chloro compound of Vanadium has only spin magnetic moment of 1.73 BM. This Vanadium chloride has the formula : (at, no. of V = 23)

(1) VCl_4 (2) VCl_3

(3) VCl_2 (4) VCl_5

25. Which of the following is not formed when H_2S reacts with acidic $K_2Cr_2O_7$ solution?

(1) K_2SO_4 (2) $Cr_2(SO_4)_3$

(3) S (4) $CrSO_4$

26. Ammonium dichromate is used in some fireworks. The green-colored powder blown in the air is:

(1) CrO_3 (2) Cr_2O_3

(3) Cr (4) $CrO(O_2)$

27. In the dichromate dianion:

(1) Four Cr — O bonds are equivalent

(2) Six Cr — O bonds are equivalent

(3) All Cr — O bonds are equivalent

(4) All Cr — O bonds are non-equivalent

28. On heating ammonium dichromate, the gas evolved is:

(1) Oxygen (2) Ammonia

(3) Nitrous oxide (4) Nitrogen

29. When MnO_2 is fused with KOH, a colored compound is formed, the product and its color are:

(1) K_2MnO_4, green (2) $KMnO_4$, purple

(3) Mn_2O_3,brown (4) Mn_3O_4, black

30. $(NH_4)_2\ Cr_2O_7$ on heating gives a gas which is also given by:

(1) Heating NH_4NO_2

(2) Heating NH_4NO_3

(3) $Mg_3N_2 + H_2O$

(4) Na(compound)+ H_2O_2

31. Which of the following statements is/are not correct, when a mixture of NaCl and $K_2Cr_2O_7$ is gently warmed with concentrated H_2SO_4?

(1) Deep red vapors are evolved

(2) The vapors when passed into NaOH solution give a yellow solution of Na_2CrO_4

(3) Chlorine gas is evolved

(4) Chromyl chloride is formed

32. In aqueous solution, Eu^{2+} ion acts as:

(1) An oxidizing agent

(2) An reducing agent

(3) Either (1) or (2)

(4) None

33. The actinoids showing +7 oxidation state are:

(1) U,Np (2) Pu, Am

(3) Np, Pu (4) Am, Cm

34. Among the lanthanoids the one obtained by synthetic method is:

(1) Lu (2) Pm

(3) Pr (4) Gd

35. Across the lanthanoid series, the basicity of the lanthanoid hydroxides:

(1) Increases

(2) Decreases

(3) First increases and then decreases

(4) First decreases and then increases

36. The maximum oxidation state exhibited by actinoid elements is:

(1) +5 (2) +4 (3) +7 (4) +8

37. Lanthanoids for which +II and +III oxidation states are common is:

(1) La (2) Nd

(3) Ce (4) Eu

38. Transition elements form binary compounds with halogens. Which of the following elements will form MF_3 type

(1) Zn (2) Co

(3) Cu (4) Hg

39. Which of the following is incorrectly match?

Catalyst	**Process**
(1) V_2O_5	Contact process
(2) $CuCl_2$	deacon process
(3) Finely divided Fe	Vegetable oil to ghee
(4) $TiCl_4 + Al(CH_3)_3$	Zieglar Natta Catalyst

40. K_2MnO_4 can be converted into $KMnO_4$ by :

(1) Passing CO_2 gas

(2) by passing Cl_2

(3) Electrolytic oxidation

(4) All of these

41. Which of the following is not correctly matched?
(1) Fenton reagent $FeSO_4 + H_2O_2$
(2) Adam's catalyst PtO_2
(3) Wilkinson catalyst $[RhCl(PPh_3)_3]$
(4) Zeiglar natta catalyst - $[(C_2H_5)_3B + TiCl_3$

42. Incorrect match is:
(1) Bauxite – $Al_2O_3 \cdot X\ H_2O$
(2) Philospher wool – ZnO
(3) Malachite – Green pigment
(4) None

43. Which of the following is an interstitial carbide?
(1) SiC (2) WC
(3) CaC_2 (4) Be_2C

44. Highest fluoride and highest oxide of Mn are respectively:
(1) MnF_7 , Mn_2O_7 (2) MnF_6,MnO_3
(3) MnF_4, Mn_2O_7 (4) MnF_7, MnO_2

45. Which of the following does not contain transition metal?
(1) Haemoglobin (2) Vitamin B_{12}
(3) cis platine (4) Chlorophyll

46. Which of the following does not give disproportionation reaction in acidic or basic medium?
(1) MnO_4^{-2} (2) HNO_2
(3) CrO_4^{-2} (4) Cl_2

47. Acidified $KMnO_4$ act as oxidising agent. It is acidified by:
(1) Conc. H_2SO_4 (2) dil HCl
(3) Conc. HNO_3 (4) dil.H_2SO_4

48. Which of the following compounds does not exist?
(1) FeF_3 (2) BiF_5
(3) CuI_2 (4) CoF_3

d AND f-BLOCK ELEMENTS ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**1**	**1**	**2**	**3**	**4**	**3**	**1**	**3**	**1**	**3**	**2**	**4**	**1**	**2**	**4**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**2**	**4**	**4**	**3**	**1**	**4**	**1**	**4**	**1**	**4**	**2**	**2**	**4**	**1**	**1**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**3**	**2**	**3**	**2**	**2**	**3**	**4**	**2**	**3**	**4**	**4**	**4**	**2**	**3**	**4**
Que.	46	47	48												
Ans.	**3**	**4**	**3**												