INDIAN SCHOOL MUSCAT
CLASS 12
CHEMISTRY
d- BLOCK ELEMENTS

1 In which of the following pairs, both the ions are coloured in aqueous solutions?
(a) Sc^{3+}, Ti
(b) Sc^{3+}, Co^{2+}
(c) Ni^{2+}, Cu^{+}
(d) Ni^{2+}, Ti^{3+}
[Atomic no of Sc = 21, Ti = 22, Ni = 28, Co = 27, Cu = 29]

2 Which of the following is most stable in aqueous solution?
(a) Mn^{2+}
(b) Cr^{3+}
(c) V^{3+}
(d) Ti^{3+}

3 Magnetic moment of 2.83 BM is given by which of the following ion?
(a) Ti^{3+}
(b) Ni^{2+}
(c) Cr^{3+}
(d) Mn^{2+}

4 $KMnO_4$ is not acidified by HCl instead of H_2SO_4 because
(a) H_2 SO_4 is stronger acid than HCl
(b) HCl is oxidised to Cl_2 by $KMnO_4$
(c) H_2SO_4 is dibasic acid
(d) rate is faster in presence of H_2SO_4

5 Out of Mn_2O_7 V_2O_3, V_2O_5, CrO, Cr_2O_3, the basic oxides are
(a) Mn_2O_7, V_2O_3
(b) V_2O_3, V_2O_5
(c) V_2O_5, CrO
(d) V_2O_3 and CrO

6 The electronic configuration of Cu(II) is $3d^9$ whereas that of Cu(I) is $3d^{10}$. Which of the following statement is correct?
(a) Cu(II) is more stable
(b) Cu(II) is less stable
(c) Cu(I) and Cu(II) are equally stable
(d) Stability of Cu(I) and Cu(II) depends on nature of copper salts

7 Which of the following compounds will be coloured in solid state?
(a) Ag_2SO_4
(b) CuF_2

(c) ZnF_2
(d) Cu_2Cl_2

8 Anomalous electronic configuration in the 3d series are of
(a) Cr and Fe
(b) Cu and Zn
(c) Fe and Cu
(d) Cr and Cu

9 Which of the following are d-block elements but not regarded as transition elements?
(a) Cu, Ag, Au
(b) Zn, Cd, Hg
(c) Fe, Co, Ni
(d) Ru, Rh, Pd

10 Transition elements form alloys easily because they have
(a) Same atomic number
(b) Same electronic configuration
(c) Nearly same atomic size
(d) None of the above

11 Electronic configuration of a transition element X in +3 oxidation state is [Ar] $3d^5$. What is its atomic number?
(a) 25 (b) 26 (c) 27 (d) 24

12 Lanthanide contraction is due to increase in
(a) Shielding by 4 f electrons
(b) Atomic number
(c) Effective nuclear charge
(d) Size of 4 f-orbital

13 A transition element that has no electron in the ns orbital belongs to the ____.
a) 1^{st} transition series
b) 2^{nd} transition series
c) 3^{rd} transition series
d) 4^{th} transition series

14 The highest oxidation state shown by the transition element in 5d series is ____.
a) +4
b) +5
c) +8
d) +7

15 Copper has a positive Cu^{2+}/Cu reduction potential value because _____ .
a) high enthalpy of ionization
b) low enthalpy of hydration

c) high enthalpy of hydration
d) option (A) and (B)

FILL IN THE BLANKS

1. Transition metals is associated with higher catalytic activity due to_____ oxidation state.
2. There are _____ unpaired 'd' electrons in present Cr^{2+} ion.
3. Element in the 4d series that is not regarded a transition metal is _____.
4. Transition metal compounds impart characteristic color to the flame due to_____.
5. Element in the 3d series with highest oxidation state is_____.
6. Transition metals form complexes due to_____
7. Zr and Hf have similar sizes due to_____.
8. Os can show highest oxidation state of _____.
9. In _____elements the 4f orbitals are progressively filled.
10. Lanthanoid that is commonly used as analytical reagent is _____.

MATCH THE FOLLOWING

I

Column I (METAL)	Column II (CATALYST IN)
a) Cu	1. Haber's process
b) Fe	2. Ostwald's process
c) Ni	3. Deacon's process
d) Rh	4. Catalytic hydrogenation

II

Column I (lon)	Column II (Magnetic moment)
a) Cu^{2+}	1. 2.9 BM
b) Fe^{2+}	2. 4.0 BM
c) Ni^{2+}	3. 1.8 BM
d) Co^{2+}	4. 5.0 BM

ASSERTION REASONING TYPE QUESTIONS-

1 Assertion. Mercury is not considered as a transition element.

Reason. Mercury is liquid.

2 Assertion. Ti(III) salts are coloured whereas Ti(IV) salts are white.

Reason. Ti(III) is has no unpaired electrons in d compared to Ti(IV) which has one unpaired electron in d orbital.

3 Assertion. The metals of 4d and 5d transition series have greater enthalpies of atomization than the corresponding elements of the 3d series.

Reason. The metal-metal bond in 4d and 5d series are stronger than those in the 3d series.

4 Assertion. Manganese shows a number of oxidation states.

Reason. The difference of energy between 3d and 4s subshells is large.

5 Assertion. In any transition series the magnetic moment of M^{2+} ions first decreases and then increases.

Reason. In a transition series, the number of unpaired electrons first increases and then decreases

6 Assertion: Zn, Cd and Hg are normally not considered transition metals.

Reason: d-orbitals in above elements are completely filled, hence above metals do not show the general characteristic properties of the transition elements.

Answers:

Multiple choice:

1d	2b	3b	4b	5d	6a	7b	8d
9b	10c	11b	12a	13b	14c	15d	

Fill in the blanks:

1. variable	2. 4	3. Cd	4. d-d transition	5. Mn
6. small size, high ionic charge , availability of d orbitals.		7. lanthanide contraction	8. +8	9. lanthanide
10.Ce				

Match the following: I

a. 3	b. 1	c.4	d.2

II

a.3	b.4	c.1	d.2

Assertion Reasoning:

1. B	2. C	3.A	4.C	5.D	6.A