



# CHEMISTRY

## BOOKS - NTA MOCK TESTS

### THE D-AND F-BLOCK ELEMENTS TEST

#### Single Choice

1. The atomic numbers of vanadium (V), chromium (Cr), manganese (Mn) and iron (Fe) are 23, 24, 25 and 26, respectively. Which one of

these may be expected to have the highest second ionization enthalpy?

A. V

B. Mn

C. Fe

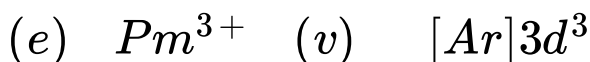
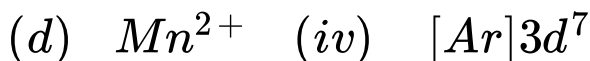
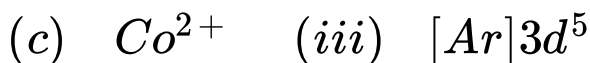
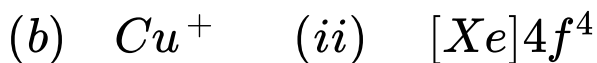
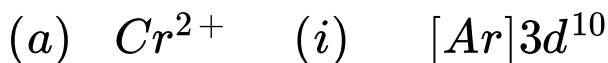
D. Cr

**Answer: D**



**View Text Solution**

## 2. Match the following:



A. (a) (b) (c) (d) (e)

(v) (i) (v) (iii) (ii)

B. (a) (b) (c) (d) (e)

(iv) (i) (v) (iii) (ii)

C. (a) (b) (c) (d) (e)

(ii) (i) (iv) (iii) (v)

D. None of these

**Answer: A**



**View Text Solution**

3. Hypo is used in photography to

A. reduce AgBr grains to metallic silver.

B. convert metallic silver to silver salt.

C. remove the undecomposed silver bromide  
as a soluble complex

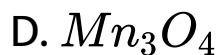
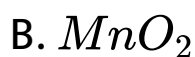
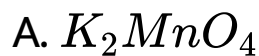
D. remove the reduced silver.

**Answer: C**



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4. In which of the following Mn has highest oxidation state?

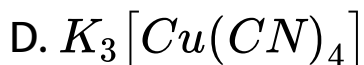
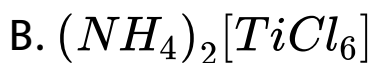


**Answer: C**



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5. Compound that is both paramagnetic and coloured is

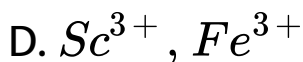
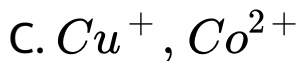
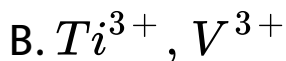
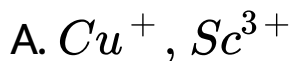


**Answer: C**



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6. Out of the following ions  $Ti^{3+}$ ,  $V^{3+}$ ,  $Cu^{+}$ ,  $Sc^{3+}$ ,  $Mn^{2+}$ ,  $Fe^{3+}$  and  $Co^{2+}$  the colourless ions will be



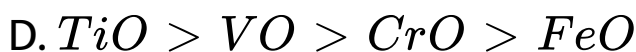
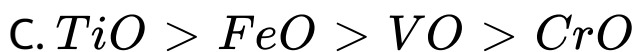
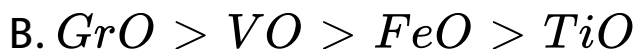
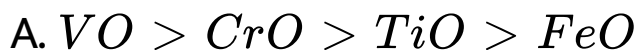
**Answer: A**



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7. The basic character of the transition metal monoxides follows the order

(Atomic numbers- Ti = 22, V = 23, Cr = 24, Fe = 26)



**Answer: D**



**View Text Solution**



8. Among the following ions, which one will have the highest paramagnetic behaviour?

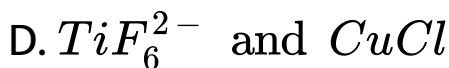


**Answer: D**



**View Text Solution**

9. Amongst  $TiF_6^{2-}$ ,  $CoF_6^{3-}$ ,  $CuCl$  and  $NiCl_4^{2-}$  (atomic number - Ti = 22, Co = 27, Cu = 29, Ni = 28), the colourless species are



**Answer: D**



**View Text Solution**

**10.** Among the following transition elements, pick out the element(s) with the highest second ionisation energy

(i) V ( $Z = 23$ )

(ii) Cr ( $Z = 24$ )

(iii) Mn ( $Z = 25$ )

(iv) Cu ( $Z = 29$ )

A. (i)

B. (ii)

C. (iii)

D. (iv)

**Answer: D**



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**11.** The sulphate of a metal A on heating gives two gases B and C and an oxide D, gas B turns  $K_2Cr_2O_7$  paper green while gas C forms a trimer in which there is no S - S bond. Compound D with concentrated HCl forms a Lewis acid E, which exists in a dimer. Identify compounds A, B, C, D and E, respectively.

A.  $FeS$ ,  $SO_2$ ,  $SO_3$ ,  $FeCl_2$ ,  $Fe_2(PO_4)_3$

B.  $FeSO_4$ ,  $SO_2$ ,  $SO_3$ ,  $Fe_2O_3$ ,  $FeCl_3$

C.  $Al_2(SO_4)_3$ ,  $SO_2$ ,  $SO_3$ ,  $Al_2O_3$ ,  $FeCl_2$

D.  $FeS$ ,  $SO_3$ ,  $SO_2$ ,  $Fe_2(SO_4)_3$ ,  $FeCl_3$

**Answer: B**



**View Text Solution**

**12.** A green coloured solution of a salt, changes its colour to light pink on the passage of ozone ( $O_3$ ). Which of the following ions will provide the green and pink colours?



**Answer: A**



**View Text Solution**

**13.** Which one of the following transition metal ions is diamagnetic?



**Answer: D**



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**14.** Which of the following pair of transition metal ions have the same calculated values of magnetic moment?

A.  $Ti^{2+}$  and  $V^{2+}$

B.  $Fe^{2+}$  and  $Cu^{2+}$

C.  $Cr^{2+}$  and  $Fe^{2+}$

D.  $Co^{2+}$  and  $Ti^{2+}$

**Answer: C**



**View Text Solution**

15. Which of the following is coloured compound?



A.  $CuF_2$

B.  $CuI$

C.  $NaCl$

D.  $MgCl_2$

**Answer: A**



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**16.** In context with the transition elements, which of the following statements is incorrect?

A. In addition to the normal oxidation state, the zero oxidation state is also shown by these elements in complexes.

B. In the highest oxidation state, the transition metal shows basic character of its oxide, and form the cationic complexes.

C. In the highest oxidation state of the first five transition elements (Sc to Mn), all the 4s and 4d electrons are used for bonding.

D. Once the  $d^5$  configuration is exceeded, the tendency to involve all the 3d electrons in bonding decreases.

**Answer: B**



**View Text Solution**

17. In the context of the lanthanides, which of the following statements is not correct?

A. There is a gradual decrease in the radii of the members with the increasing atomic number in the series.

B. All the members exhibit +3 oxidation state.

C. Because of the 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 members of the series.

**Answer: D**



**View Text Solution**

**18.** The transition elements are more metallic than the representative elements because they have

- A. Electron pairs in d-orbitals
- B. Availability of d-orbitals for bonding
- C. The electron in p-orbitals
- D. Unpaired electron in metallic orbitals

**Answer: B**



**View Text Solution**

**19.** The Potassium manganate ( $K_2MnO_4$ ) is formed, when

A.  $Cl_2$  is passed into an aqueous solution of

$KMnO_4$ .

B.  $MnO_2$  is fused with KOH.

C. formaldehyde reacts with  $KMnO_4$  in the presence of strong alkali.

D.  $KMnO_4$  reacts with concentrated



**Answer: C**



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**20.** The calculated value of magnetic moment of

$Fe^{3+}$  is

A. 1.73 BM

B. 3.87 BM

C. 4.90 BM

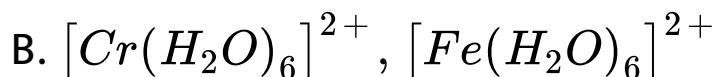
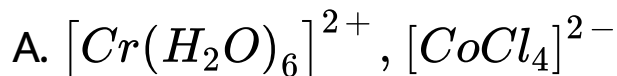
D. 5.92 BM

**Answer: D**

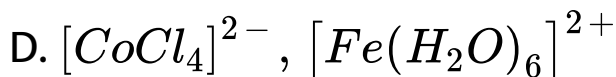
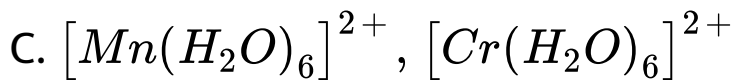


**View Text Solution**

**21.** The pair in which both species have same magnetic moment is -







**Answer: B**



**View Text Solution**

22.  $Cr^{2+}$  and  $Mn^{3+}$  both have  $d^4$  configuration. Thus

A. both are reducing agents.

B. both are oxidizing agents.

C.  $Cr^{2+}$  is an oxidizing agent while  $Mn^{3+}$  is a reducing agent.

D.  $Mn^{3+}$  is an oxidizing agent while  $Cr^{2+}$  is a reducing agent.

**Answer: D**



**View Text Solution**

23. Match the catalysts to the correct process.

	Catalyst		Process
A.	$\text{TiCl}_3$	i.	Wacker process
B.	$\text{PdCl}_2$	ii.	Ziegler – Natta polymerisation
C.	$\text{CuCl}_2$	iii.	Contact process`
D.	$\text{V}_2\text{O}_5$	iv.	Deacon's process

A.  $A \rightarrow iii, B \rightarrow i, C \rightarrow ii, D \rightarrow iv$

B.  $A \rightarrow iii, B \rightarrow ii, C \rightarrow iv, D \rightarrow i$

C.  $A \rightarrow ii, B \rightarrow i, C \rightarrow iv, D \rightarrow iii$

D.  $A \rightarrow ii, B \rightarrow iii, C \rightarrow iv, D \rightarrow i$

**Answer: C**



24. Which of the following statements is/are false?

A.  $Na_2Cr_2O_7$  is more soluble than



B.  $CrO_4^{2-}$  is tetrahedral in shape.

C.  $Na_2Cr_2O_7$  is the primary standard in volumetry.

D.  $Cr_2O_7^{2-}$  has a  $Cr - O - Cr$  bond.

**Answer: C**



**View Text Solution**

**25.** Which statements among the following are correct?

I.  $Ce^{+4}$  is an oxidizing agent & colourless.

II.  $Lu^{3+}$  is colourless.

III. Actinoids exhibit a higher number of oxidation states than lanthanoids.

IV. All 3d elements give  $H_2$  with 1 M HCl.

**A. II, III**

B. I, III

C. I, II, III

D. I, IV

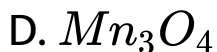
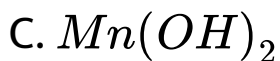
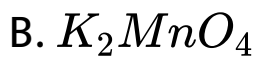
**Answer: C**



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**26.** On heating Pyrolusite with KOH in the presence of air, we get

A.  $KMnO_4$



**Answer: B**



**View Text Solution**

27. The lanthanide contraction is responsible for the fact that

A. Zr and Hf have same radius

B. Zr and Zn have the same oxidation state

C. Zr and Y have same radius

D. Zr and Nb have similar oxidation state

**Answer: A**



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**28.** Regarding transitional elements, the wrong statement is

A. they exhibit variable valences.



B. they possess low melting points.

C. they are good catalysts.

D. they form coloured complexes.

**Answer: B**



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**29.** A very slight decrease in atomic radius occurs in a transition series when compared with that of a representative series. This is due to

to

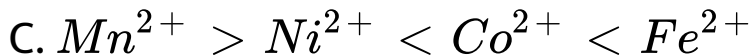
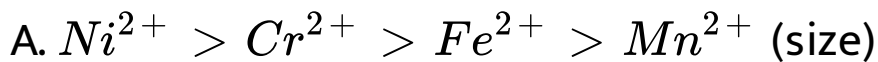
- A. shielding effect.
- B. penetrating effect.
- C. inert pair effect.
- D. bonding nature.

**Answer: A**

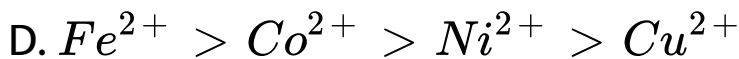


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**30.** Which of the following does not represent the correct order of the properties indicated?



(unpaired electron)



(unpaired electron)

**Answer: A**



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