INORGANIC CHEMISTRY   SYLLABUS   TIME :30 Min

SECTION–I : (i) Only One option correct Type

This section contains **06 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.   **3(–1)**

1. Which of the following order is incorrect -
(A) Melting point $\Rightarrow H_2 < D_2 < T_2$ (B) Boiling point $\Rightarrow H_2 < D_2 < T_2$
(C) Bond energy $\Rightarrow H_2 < D_2 < T_2$ (D) None of these

2. Coke powder is spreaded over the molten electrolyte in electrolytic reduction of Al_2O_3 to :
(A) prevent the heat radiation from the surface
(B) reduce the rate of corrosion
(C) prevent oxidation of molten aluminium by air
(D) both (A) & (B)

3. Calcium and magnesium salts are present in hard water when treated with calgon $[Na_2[Na_4(PO_3)_6]]$ it gives complex salt 'X' and 'Y' . X & Y are -
(A) $Ca[Na_4(PO_3)_6], Mg[Na_4(PO_3)_6]$ (B) $Na_2[Ca_2(PO_3)_6], Na_2[Mg_2(PO_3)_6]$
(C) $Ca[Na_4(PO_3)_6], Na_2[Mg_2(PO_3)_6]$ (D) $Na_2[Ca_2(PO_3)_6], Mg_2[Na_4(PO_3)_6]$

4. Which of the following complex exists as dextro and laevo form -

(A)

(B)

(C) $[AgFCl\,BrI]^-$

(D)
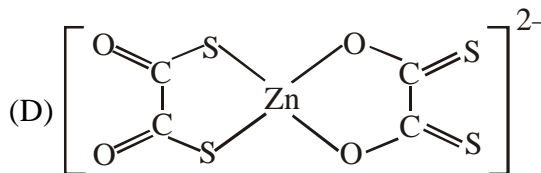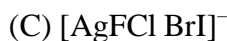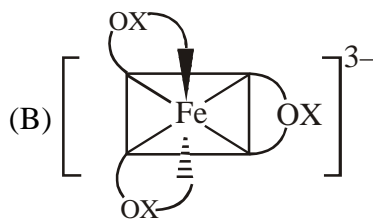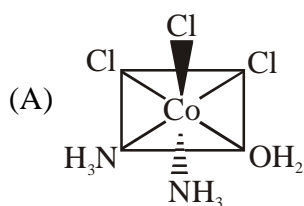
5. If curve-(1) represent BMO and curve-(2) represent ABMO then select **CORRECT** option–

(A)

(B)

(C)

(D)
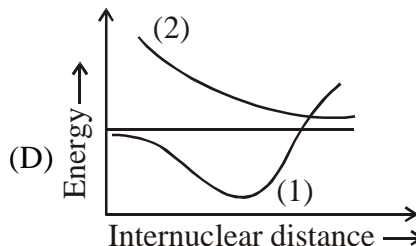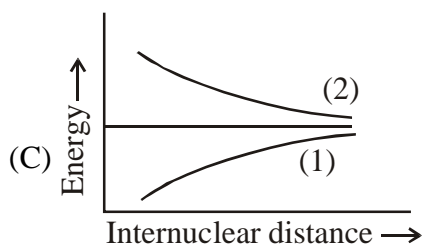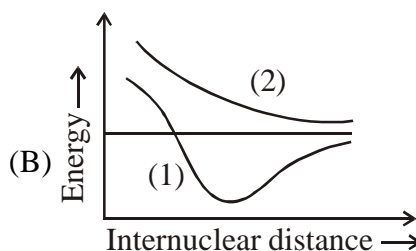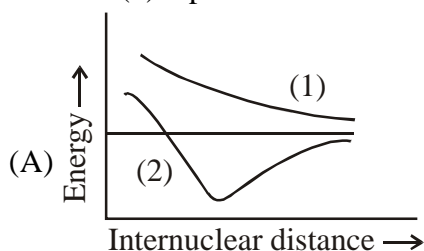
6. Which of the following process is exothermic :-
(A) $N \rightarrow N^-$ (B) $O \rightarrow O^{2-}$ (C) $He \rightarrow He^+$ (D) $Cl \rightarrow Cl^-$
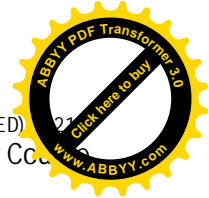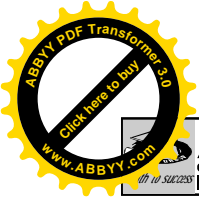
(ii) One or more options correct Type

This section contains **04 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE** are correct.   **4(–1)**

7.   In Ellingham diagram, which two metal oxides have very low decomposition temperature

(A) HgO   (B) Ag_2O (C) Al_2O_3 (D) MgO

8.   Which of the following complex(es) shows structural isomerism :

(A) $[Cr(NH_3)_2(H_2O)_2Br_2]^+$ (B) $[Co(NH_3)_6][Co(NO_2)_6]$

(C) $[Mn(H_2O)_6]Cl_3$ (D) $[PtCl_4]^{2-}$

9. $Na_2S_2O_3(solution) \xrightarrow{\text{'X'/H}^+}$ coloured solution

Where 'X' is/are -

(A) $CuSO_4(aq.)$ (B) $FeCl_3(aq.)$ (C) Cl_2 water   (D) $Cr_2O_7^{-2}$

10.   Which of the following statement(s) is / are correct for silicates –

(A) $Si_2O_7^{6-}$ is a unit of Pyrosilicate

(B) $Si_4O_{11}^{6-}$ is a unit of Amphibole chain silicate

(C) All four oxygen atoms of SiO_4^{-4} are shared in 3D silicate

(D) Three corner / oxygen atoms of SiO_4^{-4} are shared in 2D silicate
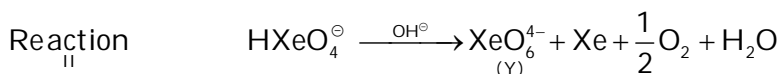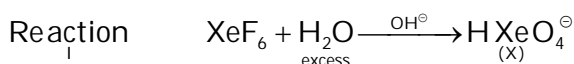
(iii) Paragraph Type

This section contains **02 paragraphs** each describing theory, experiment, data etc. **Four questions** relate to two paragraphs with two questions on each paragraph. Each question of a paragraph has **only one correct answer** among the four choices (A), (B), (C) and (D).

PARA

Qualitative analysis of inorganic salt is carried out through the reactions which are easily perceptible to our senses such as sight and smell. Such reactions involve:

(a)   Formation of a precipitate

(b)   Change in colour

(c)   Evolution of gas etc.

11.   Which of the following acidic radical when treated with sulphanilic acid in the presence of dil. acetic acid followed by the reaction with 1-nepthyl amine formed red dye. When the above acidic radical treated with conc. H_2SO_4 as brown gas is evolved.

(A) NO_2^- (B) NO_3^- (C) I^- (D) SO_3^{2-}

12.   Which of the following is the specific test of sulphide

(A) Methylene blue test   (B) layer test

(C) Chromyl chloride test   (D) Brown ring test

PARA

Reaction I $\qquad$ $XeF_6 + H_2O \underset{excess}{\xrightarrow{\ OH^{\ominus}\ }} \underset{(X)}{HXeO_4^{\ominus}}$

Reaction II $\qquad$ $HXeO_4^{\ominus} \xrightarrow{\ OH^{\ominus}\ } \underset{(Y)}{XeO_6^{4-}} + Xe + \frac{1}{2}O_2 + H_2O$

13. Which of the following is **CORRECT** for 'Y'–

(A) 'Y' have one lone pair at central atom

(B) Hybridisation of central atom is sp^3d^2

(C) Total number of 90° bond angles are 8

(D) None of these

14. During the reaction II which of the following does not occur–

(A) Oxidation of Xe $\qquad$ (B) Reduction of Xe

(C) Reduction of oxygen $\qquad$ (D) Oxidation of oxygen

SECTION–II : Matrix-Match Type

This Section contains **02 question**. Question has **four statements** (A, B, C and D) given in **Column I** and five statements (P, Q, R, S and T) in **Column II**. Any given statement in Column I can have correct matching with **ONE** or **MORE** statement(s) given in Column II. For example, if for a given question, statement B matches with the statements given in Q and R, then for the particular question, against statement B, darken the bubbles corresponding to Q and R in the ORS. **8(0)**

1. **Column-I** $\qquad$ **Column-II**

(A) CaO $\qquad$ (P) Formed by decomposotion of $CaCO_3$

(B) $Ca(OH)_2$ $\qquad$ (Q) Formed by treating quick lime with water

(C) $CaSO_4.2H_2O$ $\qquad$ (R) Formed by action of H_2SO_4 or soluble-sulphate on any soluble calcium salt.

(D) $CaSO_4 \cdot \frac{1}{2}H_2O$ $\qquad$ (S) Formed by heating gypsum at 120ºC

$\qquad$ (T) The colour of compound is white.

2. Match the column -

Column-I		**Column-II**
(Element)		**(Correct characteristics)**
(A) Ba	(P)	cation solution produces brick red ppt. with CrO_4^{2-}
(B) Pb	(Q)	cation solution produces yellow ppt .with CrO_4^{2-}
(C) Ag	(R)	salt produces apple green colour in the flame test
(D) Ca	(S)	salt produces brick red colour in the flame test
	(T)	cation solution does not produce ppt. with CrO_4^{2-} ion
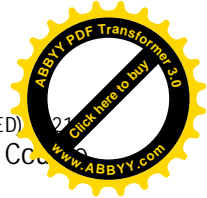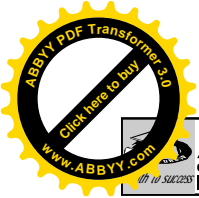
SECTION-IV : Numerical Answer

1. Find the maximum number of electrons in Cr , if $l + m \Rightarrow 2$

2. Find the number of compounds in which X–O–X linkage is present. (X = Central atom)

Cl_2O_7, $N_2O_{3(sym)}$, $H_2S_4O_6$, $(NaPO_3)_6$, S_3O_9, $H_4P_2O_{6(Tri\ Basic)}$, $Na_2B_2(O_2)_2(OH)_4$

3. How many statements are **CORRECT**?

(a) In spelter form, zinc can be separated by fractional crystallisation

(b) $MgCl_2 \cdot 6H_2O$ undergo heating at high temperature to give anhydrous $MgCl_2$

(c) In MacArthur forest cyanide process, the leaching reagent used is conc. H_2SO_4

(d) In Hoop's process for electrolytic refining of aluminium, pure molten metal will be collected from the bottom most layer

(e) In blast furnace,

$$3Fe_2O_3 + CO \longrightarrow 2Fe_3O_4 + CO_2 \text{ reaction}$$

takes place as a most prominent reaction at the portion where temperature inside the furnace is highest

(f) Thomas slag is calcium borate

4. Find the number of inner orbital complexes which are paramagnetic in nature.

$[Cr(NH_3)_6]^{3+}$; $[Co(EDTA)]^-$; $[Zn(CN)_4]^{2-}$; $[PtCl_4]^{2-}$; $[NiF_6]^{2-}$, $[Co(H_2O)_6]^{3+}$