

# IIT-JEE-Chemistry-Paper 2-2007

## Paper II

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1. Consider a titration of potassium dichromate solution with acidified Mohr's salt solution using diphenylamine as indicator. The number of moles of Mohr's salt required per mole of dichromate is

- (A) 3
- (B) 4
- (C) 5
- (D) 6

2. Among the following metal carbonyls, the C-O bond order is lowest in

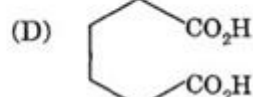
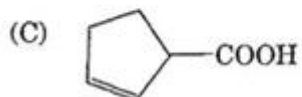
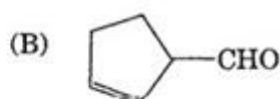
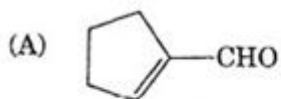
- (A)  $[\text{Mn}(\text{CO})_6]^+$
- (B)  $[\text{Fe}(\text{CO})_5]$
- (C)  $[\text{Cr}(\text{CO})_6]$
- (D)  $[\text{V}(\text{CO})_6]^-$

3. A solution of a metal ion when treated with KI gives a red precipitate which dissolves in excess KI to give a colourless solution. Moreover, the solution of metal ion on treatment with a solution of cobalt (II) thiocyanate gives rise to a deep blue crystalline precipitate. The metal ion is

- (A)  $\text{Pb}^{2+}$
- (B)  $\text{Hg}^{2+}$
- (C)  $\text{Cu}^{2+}$
- (D)  $\text{Co}^{2+}$

GRAVITY CLASSES

4. Cyclohexene and ozonolysis followed by reaction with zinc dust and water gives compound E. Compound E on further treatment with aqueous KOH yields compound F. Compound F is



5. The number of stereoisomers obtained by bromination of trans-2-butene is

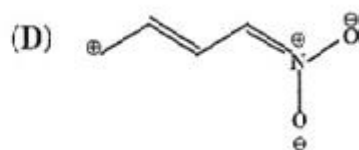
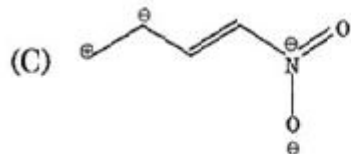
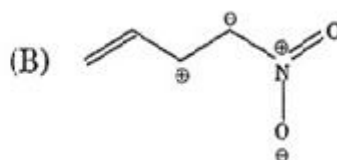
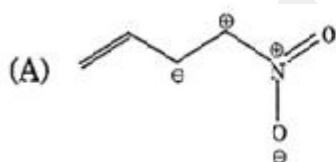
(A) 1

(B) 2

(C) 3

(D) 4

6. Among the following, the least stable resonance structure is



7. A positron is emitted from  $^{23}\text{Na}_{11}$ . The ratio of the atomic mass and atomic number of the resulting nuclide is

(A) 22/10

(B) 22/11

(C) 23/10

## GRAVITY CLASSES

(D) 23/12

8. For the process  $\text{H}_2\text{O}(\text{l}), (1 \text{ bar}, 373 \text{ K}) \rightarrow \text{H}_2\text{O}(\text{g}) (1 \text{ bar}, 373 \text{ K})$ , the correct set of thermodynamic parameters is

(A)  $\Delta G = 0, \Delta S = +ve$

(B)  $\Delta G = 0, \Delta S = -ve$

(C)  $\Delta G = +ve, \Delta S = 0$

(D)  $\Delta G = -ve, \Delta S = +ve$

9. Consider a reaction  $a\text{G} + b\text{H} \rightarrow \text{Products}$ . When concentration of both of the reactants G and H is doubled, the rate increases by eight times. However, when concentration of G is doubled keeping the concentration of H fixed, the rate is doubled. The overall order of the reaction is

(A) 0

(B) 1

(C) 2

(D) 3

10. STATEMENT-1 : Alkali metals dissolve in liquid ammonia to give blue solutions.

because

STATEMENT-2: Alkali metals in liquid ammonia give solvates species of the type  $[\text{M}(\text{NH}_3)_n]^+$  (M = alkali metals).

(A) Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for statement-1.

(B) Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for statement-1.

(C) Statement-1 is True, Statement-2 is False

(D) Statement-1 is False, Statement-2 is True

## GRAVITY CLASSES

11. STATEMENT-1: Glucose gives a reddish-brown precipitate with Fehling's solution.

Because

STATEMENT-2: Reaction of glucose with Fehling's solution gives CuO and gluconic acid.

- (A) Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for statement-1.
- (B) Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for statement-1.
- (C) Statement-1 is True, Statement-2 is False
- (D) Statement-1 is False, Statement-2 is True

12. STATEMENT-1: Molecules that are not superimposable on their mirror images are chiral.

Because

STATEMENT-2: All chiral molecules have chiral centers.

- (A) Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for statement-1.
- (B) Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for statement-1.
- (C) Statement-1 is True, Statement-2 is False
- (D) Statement-1 is False, Statement-2 is True

13. STATEMENT-1: Band gap is germanium is small.

Because

## GRAVITY CLASSES

STATEMENT-2: The energy spread of each germanium atomic energy level is infinitesimally small.

- (A) Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for statement-1.
- (B) Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for statement-1.
- (C) Statement-1 is True, Statement-2 is False
- (D) Statement-1 is False, Statement-2 is True

14. Among the following, identify the correct statement.

(D) Statement-1 is False, Statement-2 is True

14. Among the following, identify the correct statement.

- (A) Chloride ion is oxidized by  $O_2$
- (B)  $Fe^{2+}$  is oxidized by iodine
- (C) Iodide ion is oxidized by chlorine
- (D)  $Mn^{2+}$  is oxidized by chlorine

15. While  $Fe^{3+}$  is stable,  $Mn^{3+}$  is not stable in acid solution because

- (A)  $O_2$  oxidises  $Mn^{2+}$  to  $Mn^{3+}$
- (B)  $O_2$  oxidises both  $Mn^{2+}$  to  $Mn^{3+}$  and  $Fe^{2+}$  to  $Fe^{3+}$
- (C)  $Fe^{3+}$  oxidizes  $H_2O$  to  $O_2$
- (D)  $Mn^{3+}$  oxidizes  $H_2O$  to  $O_2$

16. Sodium fusion extract, obtained from aniline, on treatment with iron(II) sulphate and  $H_2SO_4$  in presence of air gives a Prussian blue precipitate. The blue colour is due to the formation of

GRAVITY CLASSES

- (A)  $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$
- (B)  $\text{Fe}_3[\text{Fe}(\text{CN})_6]_2$
- (C)  $\text{Fe}_4[\text{Fe}(\text{CN})_6]_2$
- (D)  $\text{Fe}_3[\text{Fe}(\text{CN})_6]_3$

17. Which one of the following reagents is used in the above reaction?

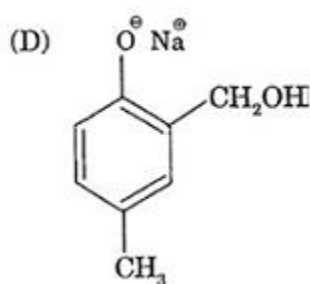
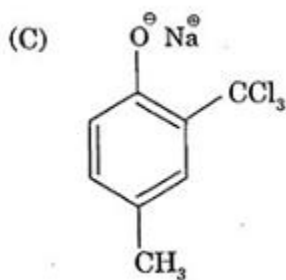
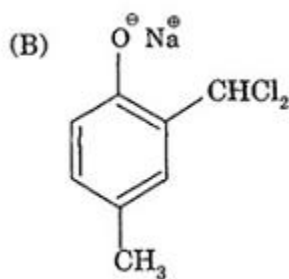
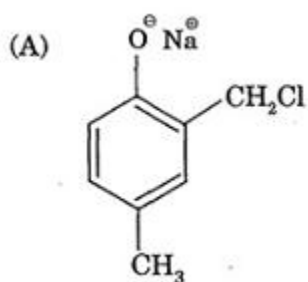
- (A) aq.  $\text{NaOH} + \text{CH}_3\text{Cl}$
- (B) aq.  $\text{NaOH} + \text{CH}_2\text{Cl}_2$
- (C) aq.  $\text{NaOH} + \text{CHCl}_3$
- (D) aq.  $\text{NaOH} + \text{CCl}_4$

18. The electrophile in this reaction is

- (A)  $:\text{CHCl}$
- (B)  $+\text{CHCl}_2$
- (C)  $:\text{CCl}_2$
- (D)  $.\text{CCl}_3$

19. The structure of the intermediate I is

## GRAVITY CLASSES



20. Match the reactions in Column I with nature of the reactions/type of the products in Column II.

Column I		Column II	
(A)	$O_2^- \rightarrow O_2 + O_2^{2-}$	(p)	redox reaction.
(B)	$CrO_4^{2-} + H^+$	(q)	one of the products has trigonal planar structure
(C)	$MnO_4^- + NO_2^- + H^+$	(r)	dimeric bridged tetrahedral metal ion
(D)	$NO_3^- + H_2SO_4 + Fe^{2+}$	(s)	disproportionation

21. Match the compounds/ions in Column I with their properties/reactions in Column II.

Column I		Column II	
(A)	$C_6H_6CHO$	(p)	Gives precipitate with 2, 4-dinitrophenylhydrazine
(B)	$CH_3C\equiv CH$	(q)	Gives precipitate with $AgNO_3$
(C)	$CN^-$	(r)	Is a nucleophile
(D)	$I^-$	(s)	Is involved in cyanohydrins formation

## GRAVITY CLASSES

22. Match the crystal system/unit cells mentioned in Column I with their characteristic features mentioned in Column II.

Column I		Column II	
(A)	Simple cubic and face-centred cubic	(p)	Have these cell parameters $a = b = c$ and $\alpha = \beta = \gamma$
(B)	Cubic and rhombohedral	(q)	Are two crystal systems
(C)	Cubic and tetragonal	(r)	Have only two crystallographic angles of $90^\circ$
(D)	Hexagonal and monoclinic	(s)	Belong to same crystal system

GRAVITY CLASSES