CHEMISTRY

BOOKS - BITSAT GUIDE

QUESTION-PAPERS-2016

Chemistry

1. In PO_4^{3-} the formal charge on each O-atom and $P-O$ bond order respectively are .

  A. $-0.75, 0.6$

B. $-0.75, 1.0$

C. $-0.75, 1.25$

D. $-3, 1.25$

Answer: C

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2. The decreasing order of the ionization potential of the following elements is

A. $Ne > Cl > P > S > Al > Mg$

B. $Ne > Cl > P > S > Mg > Al$

C. $Ne > Cl > S > P > Mg > Al$

D. $Ne > Cl > S > P > Al > Mg$

Answer: B

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3. Knowing that the chemistry of lanthanoids (Ln) is dominated by its $+3$ oxidation state, which of the following statement is incorrect?

A. The ionic size of Ln (III) decrease in general with increasing atomic number

B. Ln (III) compounds are generally colourless.

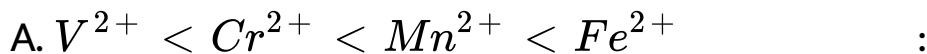C. Ln (III) hydroxide are mainly basic in character.

D. Because of the large size of the Ln (III) ions the bonding in its compounds is predominantly ionic in character.
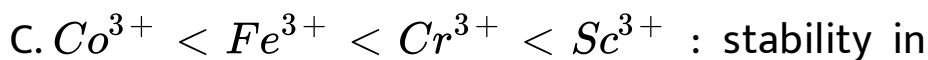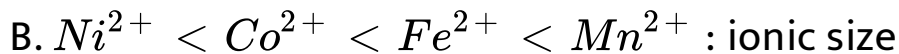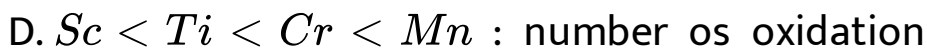
Answer: B

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

A. $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{2+}$:

paramagnetic behaviour

B. $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: ionic size

C. $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$: stability in

aqueous solution

D. $Sc < Ti < Cr < Mn$: number os oxidation
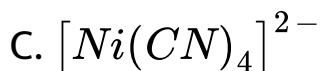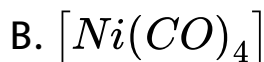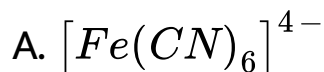
states .

Answer: A

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5. Which of the following is paramagnetic ?

A. $\left[Fe(CN)_6\right]^{4-}$

B. $\left[Ni(CO)_4\right]$

C. $\left[Ni(CN)_4\right]^{2-}$
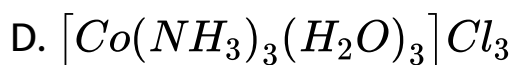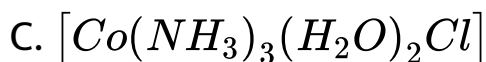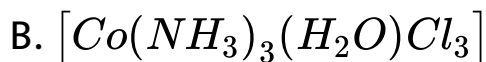
D. $\left[CoF_6\right]^{3-}$

Answer: D

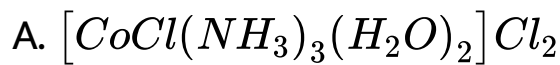▶ **Watch Video Solution**

6. The hypothetical complex chloro diaquatriammine

cobalt (II) chloride can be represented as

A. $[CoCl(NH_3)_3(H_2O)_2]Cl_2$

B. $[Co(NH_3)_3(H_2O)Cl_3]$

C. $[Co(NH_3)_3(H_2O)_2Cl]$

D. $[Co(NH_3)_3(H_2O)_3]Cl_3$

Answer: A

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7. The normality of 26% (wt/vol) solution of ammonia

(density = 0.855) is approximately :

A. 1.5

B. 0.4

C. 15.3

D. 4

Answer: C

8. 1.25 g of a sample of Na_2CO_3 and Na_2SO_4 is dissolved in 250 ml solution. 25 ml of this solution neutralises 20 ml of 0.1N H_2SO_4.The % of Na_2CO_3 in this sample is

A. 84.8 %

B. 8.48 %

C. 15.2 %

D. 42.4 %

Answer: A

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9. The compound which contains all the four $1°, 2°$, $3°$ and $4°$ carbon atoms is

A. 2, 3, 4-Trimethylpentane

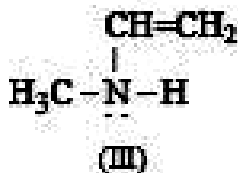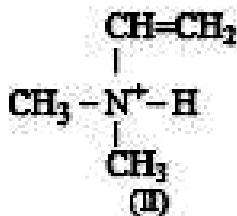B. neo-Pentane

C. 2, 2, 4-Trimethylpentane

D. None of the three

Answer: C

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10. Which of the following has two stereoisomers?

$$CH_3-\overset{\overset{\displaystyle CH=CH_2}{|}}{\underset{\underset{\displaystyle (I)}{|}}{N^+}}-H$$
$$\underset{CH_2CH_3}{}$$

$$CH_3-\overset{\overset{\displaystyle CH=CH_2}{|}}{\underset{\underset{\displaystyle (II)}{|}}{N^+}}-H$$
$$\underset{CH_3}{}$$

$$H_3C-\overset{\overset{\displaystyle CH=CH_2}{|}}{\underset{\underset{\displaystyle (III)}{}}{N}}-H$$
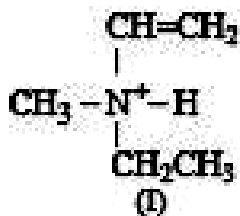
A. None of these

B. Only I

C. Only III

D. I and III

Answer: B

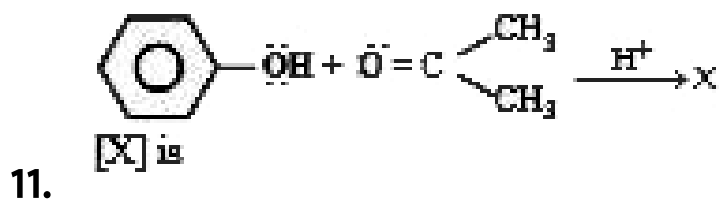▶ Watch Video Solution

11.

[X] is

A.

B.

C.

D.
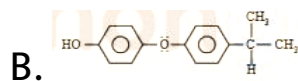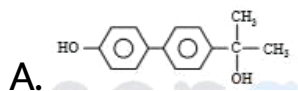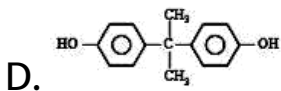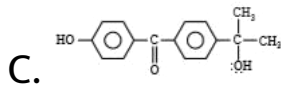
Answer: D

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12. $CH_3C \equiv CCH_3 \xrightarrow{H_2/Pt} A \xrightarrow{D_2/Pt} B$ The

compounds A and B, respectively are

A. cis-butene-2 and rac-2, 3-dideuterobutane

B. trans-butene-2 and rac-2, 3-dideuterobutane

C. cis-butene-2 and meso-2, 3-dideuterobutane

D. trans-butene-2 and meso-2, 3-dideuterobutane

Answer: C

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13. Give the possible structure of X in the following

reaction :

$$C_6H_6 + D_2SO_4 \xrightarrow{D_2O} X$$

S O₃D

A.

B.

C.

D.
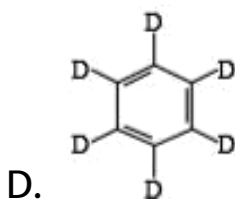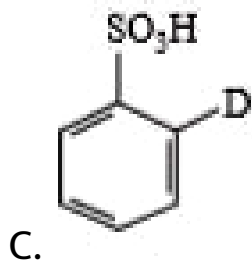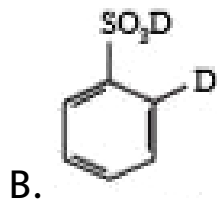
Answer: D

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14. An aromatic compound has molecular formula C_7H_7Br. Give the possible isomers and the appropriate method to distinguish them.

    A. 3 isomers, by heating with $AgNO_3$ solution

    B. 4 isomers, by treating with $AgNO_3$ solution

    C. 4 isomers, by oxidation

    D. 5 isomers, by oxidation

Answer: C

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15. Which of the following method gives better yield of p-nitrophenol?

A. Phenol $\xrightarrow[20°C]{dil.\,HNO_3}$ p-Nitrophenol

B. Phenol $\xrightarrow[(ii)\,NHO_3]{(i)\,NaNO_2+H_2SO_4\,,7-8°C}$ p-Nitrophenol

C. Phenol $\xrightarrow[(ii)\,Conc.HNO_3]{(i)\,NaOH}$
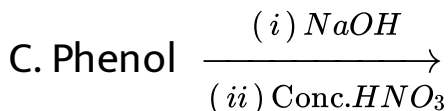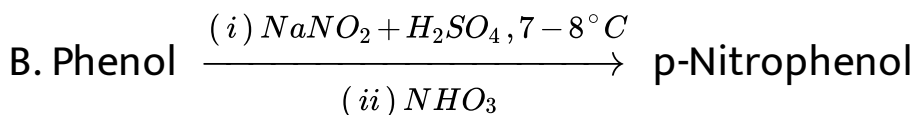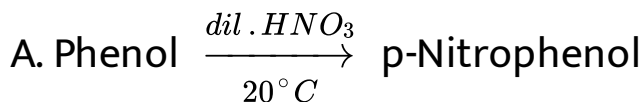
D. None of the three

Answer: B

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16. Formation of polyethylene from calcium carbide takes place as follows

$$CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$$

$$C_2H_2 + H_2 \rightarrow C_2H_2$$

$$N(C_2H_4) \rightarrow (- CH_2 - CH_2 -)_n$$
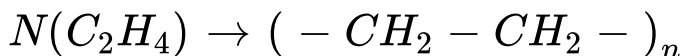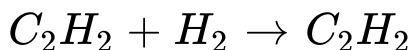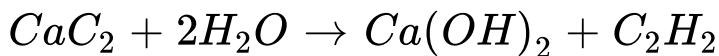
The amount of polyethylene obtained from $64.1 kg CaC_2$ is

   A. $7kg$

   B. 14 kg

   C. 21 kg

   D. 28 kg

Answer: D

17. The most likely acid-catalysed aldol condensation products of each of the two aldehydes I and II will respectively be

 CHO (I) and CHO (II)

A. CHO and CHO

B. CHO and CHO

C. CHO and CHO

D.
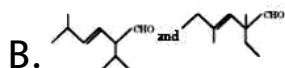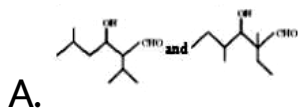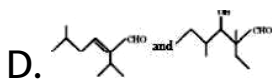
Answer: D

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18. Sometimes, the colour observed in Lassaigne's test for nitrogen is green. It is because

A. of green colour of ferrous sulphate

B. ferric ferrocyanide is also green

C. of green colour of copper sulphate

D. of excess of Fe^{3+} ions whose yellow colour makes the blue colour of ferric ferrocyanide to appear green.

Answer: D

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19. Fructose on reduction gives a mixture of two alcohols which are related as

A. diastereomers

B. epimers

C. both (a) and (b)

D. anomers

Answer: C

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20. What will happen when $D - (+) -$ glucose is treated with methanolic HCl followed by Tollen's reagent ?

A. A black ppt. will be formed

B. A red ppt. will be formed

C. A green colour will appear

D. No characteristic colour or ppt. will be formed.

Answer: D

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21. Which of the followings forms the base of talcum

powder?

A. Zine stearate

B. Sodium aluminium silicate

C. Magnesium hydrosilicate

D. Chalk

Answer: C

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22. ANTIOXIDANTS IN FOOD

A. BHT

B. BHC

C. BTX

D. All the three

Answer: A

23. The first emission line in the H-atom spectrum in the Balmer series appears at:

A. $\dfrac{9R}{400} cm^{-1}$

B. $\dfrac{7R}{144} cm^{-1}$

C. $\dfrac{3R}{4} cm^{-1}$

D. $\dfrac{5R}{36} cm^{-1}$

Answer: D

24. An e^- has magnetic quantum number as –3, what is its principal quantum number?

A. 1

B. 2

C. 3

D. 4

Answer: D

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25. At what temperature, the rate of effusion of N_2 would be 1.625 times that of SO_2 at $50°C$?

A. 110 K

B. 173 K

C. 373 K

D. 273 K

Answer: C

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26. The average kinetic energy of an ideal gas per molecule in SI units at $25°C$ will be

A. $6.17 \times 10^{-21} KJ$

B. $6.17 \times 10^{-21} J$

C. $6.17 \times 10^{-20} J$

D. $7.16 \times 10^{-20} J$

Answer: B

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27. The degree of dissociation of $PCl_5(\alpha)$ obeying the equilibrium, $PCl_5 \Leftrightarrow PCl_3 + Cl_2$ is related to the pressure at equilibrium by :

A. $\alpha \propto \dfrac{1}{P_4}$

B. $\alpha \propto \dfrac{1}{\sqrt{P}}$

C. $\alpha \propto \dfrac{1}{P^2}$

D. $\alpha \propto P$

Answer: B

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28. In a closed system : $A(s) \Leftrightarrow 2B(g) + 3C$, if the partial pressure of C is doubled, then partial pressure of B will be

A. $2\sqrt{2}$ times the original value

B. $\dfrac{1}{2}$ times the original value

C. 2 times the original value

D. $\dfrac{1}{2\sqrt{2}}$ times the original value

Answer: D

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29. For a particular reversible reaction at temperature T, ΔH and ΔS were found to be both +ve. If T_e is the temperature at equilibrium, the reaction would be spontaneous when

A. $T_e > T$

B. $T > T_e$

C. T_e is 5 time T

D. $T = T_e$

Answer: B

30. Given

Reaction	Energy Change (in kJ)
$Li(s) \longrightarrow Li(g)$	161
$Li(g) \longrightarrow Li^+(g)$	520
$\frac{1}{2} F_2(g) \longrightarrow F(g)$	77
$F(g) + e \longrightarrow F^-(g)$	(Electron gain enthalpy)
$Li^+(g) + F^-(g) \longrightarrow LiF(s)$	-1047
$Li(s) + \frac{1}{2} F_2(g) \longrightarrow Li\, F(s)$	-617

Based on data provided, the value of electron gain enthalpy of fluorine would be

A. $-300 kJmol^{-1}$

B. $-350 kJmol^{-1}$

C. $-328 kJmol^{-1}$

D. $-228 kJmol^{-1}$

Answer: C

31. The hydrolysis constang of $0.1M$ aqueous solution of sodium acetate if K_a of $CH_3COOH = 1.8 \times 10^{-5}$ is

A. 0.556

B. 4.72

C. 9.38

D. 5.56

Answer: A

32. For a sparingly soluble salt A_pB_q, the relationship of its solubility product (L_s) with its solubility (S) is

A. $Ls \rightarrow K_{sp} = S^{pq}(pq)^{P+q}$

B. $Ls = S^{p+q} . P^p q^q$
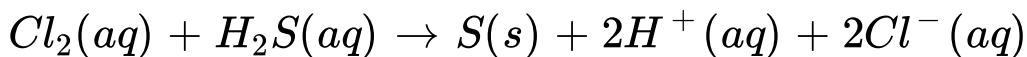
C. $Ls \rightarrow K_{sp} = S^{p+q} . P^q q^p$

D. $Ls \rightarrow K_{sp} = S^{pq} p^p q^q$

Answer: B

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33. Consider the reaction,

$$Cl_2(aq) + H_2S(aq) \rightarrow S(s) + 2H^+(aq) + 2Cl^-(aq)$$

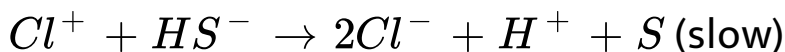The rate equation for this reaction is,

Rate $= k[Cl_2][H_2S]$

Which of these mechanisms is/are consistent with

this rate equation ?

(I) $Cl_2 + H_2S \rightarrow H^+ + Cl^- + Cl^+ + HS^-$

(slow)

$Cl^+ + HS^- \rightarrow H^+ + Cl^- + S$ (fast)

(II) $H_2S \Leftrightarrow H^+ + HS^-$ (fast equilibrium)
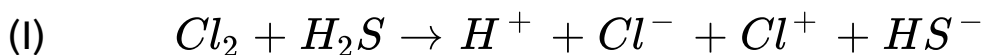
$Cl^+ + HS^- \rightarrow 2Cl^- + H^+ + S$ (slow)
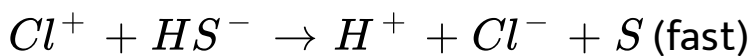
     A. B only

     B. Both A and B

C. Neither A nor B

D. A only

Answer: D

34. In the reaction, $P + Q \rightarrow R + S$

the time taken for $75\,\%$ reaction of P is twice the

time taken for $50\,\%$ reaction of P. The

concentration of Q varies with reaction time as

shown in the figure. The overall order of the reaction

is

A. 2

B. 3

C. 0

D. 1

Answer: D

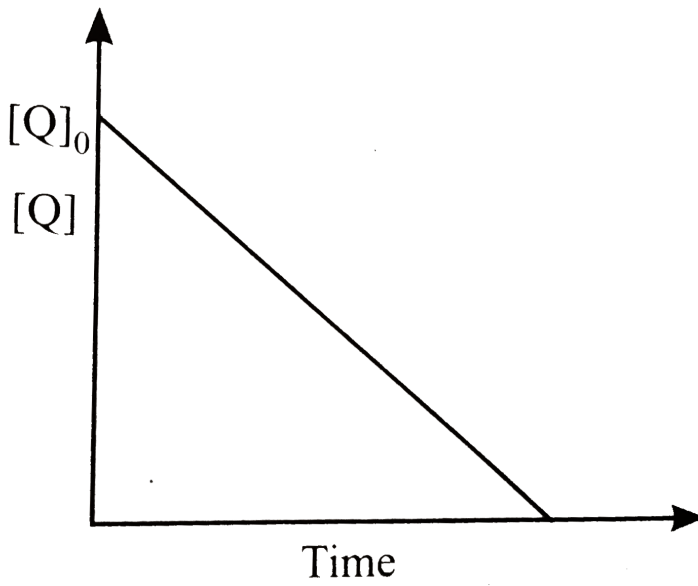**35.** The e.m.f. of the cell

$Ti|Ti^+(0.001M)||Cu^{2+}(0.01M)|Cu$ is 0.83V the

emf of this cell could b e increased by

    A. Increasing the concentration of Tl^+ ions.

    B. Increasing the concentration of Cu^{2+} ions.

    C. Increasing the concentration of Tl^+ and

       Cu^{2+} ions

    D. None of these

Answer: B

36. Electrolysis is carried out in three cells

(A) 1.0 M $CuSO_4$ Pt electrode

(B) 1.0 M $CuSO_4$ copper electrodes

(C) 1.0 M KCl Pt electrodes

If volume of electrolytic solution is maintained constant in each of the cell, which is correct set of pH changes in (A), (B) and (C) cell respectively?

    A. decrease in all the three

    B. increase in all the three

    C. decrease, constant, increase

D. increase, constant, increase

Answer: C

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37. Calculate equilibrium constant for tha

disproportionation reaction :

$$2Cu^+(aq) \rightarrow Cu(s) + Cu^{2+}(aq) \text{ at } 25°C$$

$$\left(\text{Given } E^°_{(Cu^+ / Cu)} = 0.52V, E^°_{(Cu^{2+} / Cu^+)} = 0.16V\right)$$

.

A. 6×10^4

B. 6×10^6

C. 1.2×10^6

D. 1.2×10^{-6}

Answer: C

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38. The non- stoichiometric compound $Fe_{0.94}O$ is formed when x % of Fe^{2+} ions are replaced by as many $2/3 Fe^{3+}$ ions The value of x is:

A. 18

B. 12

C. 15

D. 6

Answer: A

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39. Al (at . Wt . 26.98) crystallizes in the cubic d

system with $a \infty 4.05$ Å . Its density is 2.7 g per cm^3 .

Determine the cell type Calculate the radius of Al

atom .

A. fcc, 2.432 Å

B. bcc, 2.432 Å

C. bcc, 1.432 Å

D. fcc, 1.432 Å

Answer: D

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40. A compound of Xe and F is found to have 53.5%
Xe. What is the oxidation number of Xe in this
comound?

A. -4

B. 0

C. $+4$

D. $+6$

Answer: D

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