CHEMISTRY

BOOKS - KVPY PREVIOUS YEAR

MOCK TEST 8

Exercise

1. Low spin complex of d^6-cation in an octahedral field will have the following energy:

A. $\frac{-12}{5}\Delta_0 + P$

B. $\frac{-12}{5}\Delta_0 + 3P$

C. $\frac{-2}{5}\Delta_0 + 2P$

D. $\frac{-2}{5}\Delta_0 + P$

Answer:

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2. The enthalpy change of the reaction $C_3H_8(g) + H_2(g) \rightarrow C_2H_6(g) + CH_4(g)$, at 25°, will be Given that: heat of combustion values under standard condition

Compound	$H_2(g)$	$CH_4(g)$	$C_2H_6(g)$	C(graphite)
ΔH° (kJ/mol)	–285.8	–890.0	–1560.0	–393.5

(The standard heat of formation of $C_3H_8(g)$ is -103.8kJ/mol)

A. 55.7kJ.mol

B. 5.57kJ/mol

C. -55.7 kJ/mol

D. -5.57kJ.mol

Answer:

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3. The pH of blood stream is maintained by a proper balance of H_2CO_3 and $NaHCO_3$ concentrations. What volume of 5 M $NaHCO_3$ solution, shnould be mixed with 10 mL sample of blood, which is 2 M in H_2CO_3 in order to maintain a pH of $7.4(K_af \text{ or } H_2CO_3$in blood $=7.8 \times 10^{-7})$

A. 75.0

B. 84.5

C. 78.36

D. 70.4

Answer:

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4. The number of β-particles emitted during the change ${}_aX^c \rightarrow {}_dY^b + m_2He^4 + n_{-1}e^0$ is

A. $\frac{a-b}{4}$

B. $d + \left[\frac{c-b}{2}\right] - a$

C. $d + \left[\frac{a-b}{2}\right] - a$

D. $d + \left[\frac{a-b}{2}\right] - c$

Answer: B

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5. An element is placed in second group and third group ofthe periodic table, bums in presence of oxygen to form a basic oxide. The electronic configuration of the element is

A. $1s^2 2s^2 2p^6 3s^2$

B. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

C. $1s^2 2s^2 2p^6 3s^2 3p^6$

D. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$

Answer:

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6. A freshly obtained of SnO_2 is peptized by little of KOH to give a sol. Particles may be represented as

A. $[SnO_2]K^+$

B. $[SnO_2]OH^-$

C. $[SnO_2]Sn^{4+}$

D. $[SnO_2]\ SnO_3^{2-}$

Answer:

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7. To prepare 3-ethylpentan-3-ol, the reactants needed are

A. $CH_3CH_2MgBr + CH_3COCH_2CH_3$

B. $CH_3MgBr + CH_3CH_2CH_2COCH_2CH_3$

C. $CH_3CH_2MgBr + CH_3CH_2COCH_2CH_3$

D. $CH_3CH_2CH_2MgBr + CH_3COCH_2CH_3$

Answer:

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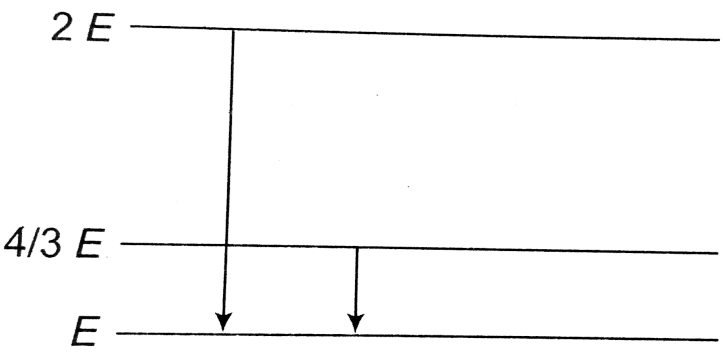
8. The follwing diagram indicates the energy levels of a certain atom when the system moves from $2E$ level to E, a photon of wavelength λ is emitted. The wavelength of photon produced during its transition from $\frac{4E}{3}$ level to E is



A. $\frac{\lambda}{3}$

B. $\frac{3\lambda}{3}$

C. $\frac{4}{3}\lambda$

D. 3λ

Answer:

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9. KCl crystallises in the same type of lattice as does NaCl Given that $r_{Na^+}/r_{Cl^-} = 0.55$ and $r_{K^+}/r_{Cl^-} = 0.74$, the ratio of the side of unit cell for KCl to that of NaCl is

A. 1123

B. 0.891

C. 1414

D. 0.414

Answer:

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10. When phosphine is bubbled through a solution of nitrate ___ is precipitated.

A. Silver

B. Silver phosphide

C. Silver oxide

D. None of these

Answer:

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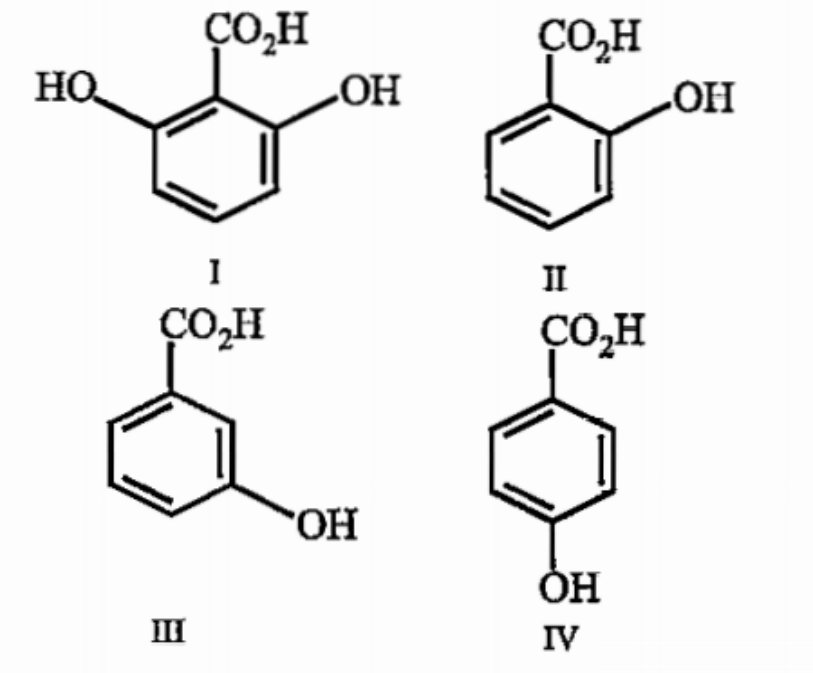
11. The correct order of acidity for the following compounds is



A. $I > II > III > IV$

B. $III > I > II > IV$

C. $III > IV > II > I$

D. $I > III > IV > II$

Answer:

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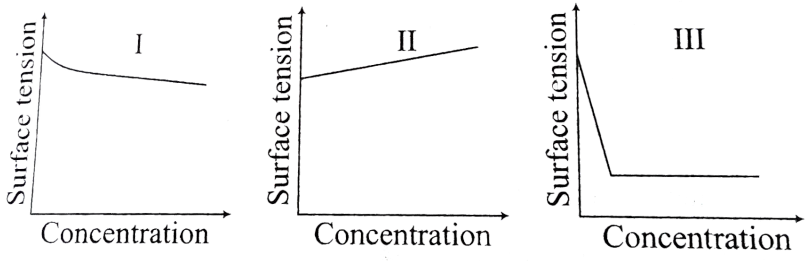
12. The equalitative sketches I, II and III given below show the variation of surface tension with molar concentration of three diferent aqueous solutions of KCl, CH_3OH and $CH_3(CH_2)_{11}OSO_3^-Na^+$ at room temperature.



The correct assignment of the sketches is

A. I:KCl II: CH_3OH III: $CH_3(CH_2)_{11}OSO_3^-Na^+$

B. I: $CH_3(CH_2)_{11}OSO_3^-Na^+$ II:CH_3,OH III:KCl

C. I:KCl II: $CH_3(CH_2)_{11}OSO_3^-Na^+$ III: CH_3,OH

D. I: CH_3,OH II :KCl III: $CH_3(CH_2)_{11}OSO_3^-Na^+$

Answer:

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13. Which of the following statements is not true?

A. $[MnCl_4]^{2-}$ ion has tetrahedral geometry and is paramagnetic

B. $[Mn(CN)_6]^{4-}$ ion has octahedral geometry and is diamagnetic

C. $[CuCl_4]^{2-}$ has square planar geometry and is paramagnetic

D. $[Ni(Ph_3P)_2Br_3]$ has trigonal bipyramidal geometry and one unpaired electron.

Answer:

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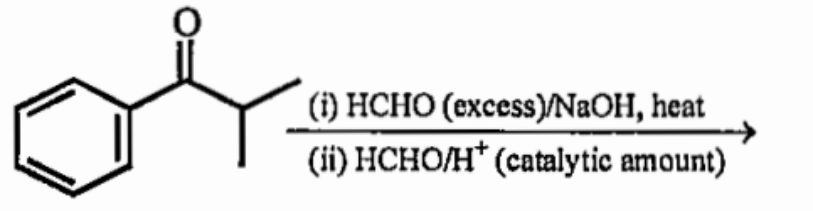
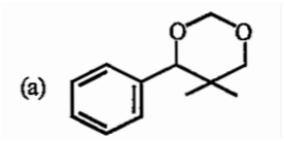
14. The major product of the following reaction sequence is



A.



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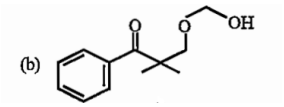
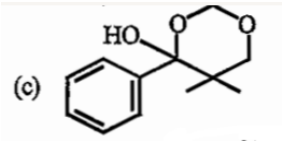
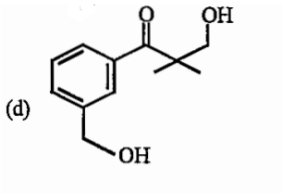


C.



D.



Answer:

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15. Experimentally it was found that a metal oxide in formula $M_{0.98}O$. Metal M is present as M^{2+} and M^{3+} in its oxide ,Fraction of the metal which exists as M^{3+} would be

A. 7.01%

B. 4.08%

C. 6.05%

D. 5.08%

Answer:

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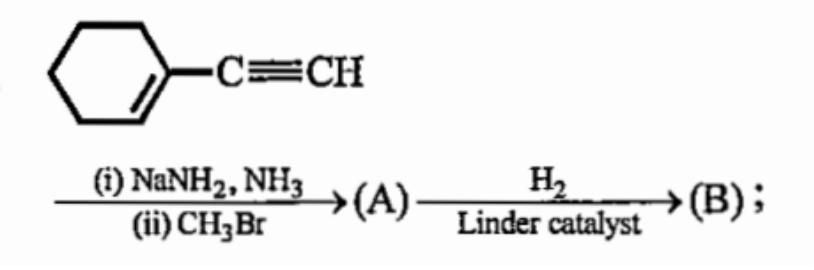
16.

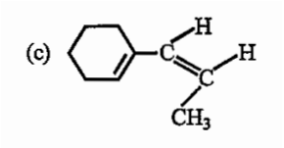


Product (B) is:

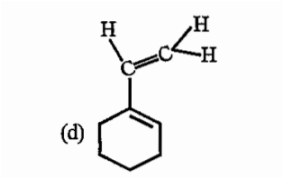
A.

B.

C.



D.



Answer:

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17. Two grams of benzoic acid (C_6H_5COOH) dissolved in $25.0g$ of benzene shows a depression in freezing point equal to $1.62K$. Molal

depression constant for benzene is $4.9Kkg^{-1}mol^{-1}$. What is the percentage association of acid if it forms dimer in solution?

A. 98

B. 100

C. 99.8

D. 99.2

Answer:

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18. Among the complex ions,

$[Co(NH_2-CH_2-CH_2-NH_2-)_2Cl_2)+$, $[CrCl_2(C_2O_4)_2]^{3-}$, $[Fe(H_2O)_4($

$[Co(NH_2-CH_2-CH_2-NH_2)_2(NH_3)Cl]^{2+}$ and $[Co(NH_3)4(H_2O)Cl]^{2+}$

, the number of complex ion(s) that show(s) cis-trans isomerism is

A. 3

B. 4

C. 6

D. 1

Answer:

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19. An organic compound 'A' on treatment with ethyl alcohol gives a carboxylic acid 'B' and compound 'C'. Hydrolysis of 'C' under acidic conditions gives 'B' and 'D'. Oxidation of 'D' with $KMnO_4$ also gives 'B'. 'B' on heating with $Ca(OH)_2$ gives 'E' (molecular formula, C_3H_6O). 'E' does not give Tollent's test and does not reduce Fehling's solution but forms a 2,4- dinitrophenylhydrazone. The compound 'E' is:

A. $C_6H_5COCH_3$

B. CH_3COCH_3

C. $C_6H_5COC_6H_5$

D. CH_3CHO

Answer:

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20. $N_2 + 3H_2 \rightarrow 2NH_3$

Molecular weight of NH_3 and N_2 are x_1 and x_2, respectively. Their equivalent weights are y_1 and y_2, respectively. Then $(y_1 - y_2)$

A. $\frac{2X_1 - X_2}{6}$

B. $(X_1 - X_2)$

C. $(3X_1 - X_2)$

D. $(X_1 - 3X_2)$

Answer:

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21. Calcium crystallises in a face-centered cubic unit cell with a 0.556 nm and density $1.4848 g / cm^3$. Percentage of Schottky defects in the crystal is:

A. 0.03

B. 0.02

C. 3.8%

D. 0.04

Answer:

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22. The conductivity of 0.001M Na_2SO_4 solution is $2.6 \times 10^{-4} Scm^{-1}$ and increases to $7.0 \times 10^{-4} Scm^{-1}$, When the solution is saturated with $CaSO_4$. The molar conductivities of Na^+ and Ca^{2+} are 50 and 120 $Scm^2 mol^{-1}$, respectively. Neglect conductivity of used water. What is the solubility product fo $CaSO_4$?

A. 4×10^{-6}

B. 1.57×10^{-3}

C. 4×10^{-4}

D. 2.46×10^{-6}

Answer:

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23. For a dilute solution containing 2.5g of a non-volatile non-electrolyte solute in 100g of water, the elevation in boiling point at 1 atm pressure is $2^{\circ}\mathrm{C}$. Assuming concentration of solute is much lower than the concentration of solvent, the vapour pressure (mm of Hg) of the solution is (take K_b=0.76 K kg mol^{-1})

A. 724

B. 740

C. 736

D. 718

Answer:

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24. 19 g of molten $SnCl_2$ is electrolysed for sometime using inert electrodes. 0.119g of Sn is deposited at the cathode. No substance is lost during the electrolysis. The ratio of the weights of $SnCl_2$: $SnCl_4$ after electrolysis [Atomic weight of $Sn = 119$]

A. 71.34:1

B. 75.84:1

C. 1:75.84

D. $70:1$

Answer:

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