CHEMISTRY

BOOKS - KVPY PREVIOUS YEAR

MOCK TEST 4

Exercise

1. An alloy of Pb-Ag weighing $1.08g$ was dissolved in dilute HNO_3 and the volume made to 100 mL.A ? Silver electrode was dipped in the solution and the emf of the cell dipped in the solution and the emf of the cell set-up as $Pt(s), H_2(g)|H^+(1M)||Ag^+(aq.)|Ag(s)$ was $0.62V$. If E°_{cell} is $0.80V$, what is the percentage of Ag in the alloy ? (At $25^\circ C, RT/F = 0.06$)

A. 99.97

B. 98.5

C. 0.033

D. 0.33

Answer:

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2. Which of the following octahedral complex does not show geometrical isomerism (A and B are monodentate ligands) ?

A. $[MA_5B]$

B. $[MA_2B_4]$

C. $[MA_3B_3]$

D. $[MA_4B_2]$

Answer:

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3. In nitroprusside ion, the iron and NO exist as $Fe(II)$ and NO^+ rather than Fe^{III} and NO. These forms can be differentiated by

A. estimating the concentration of iron

B. measuring the concentration of CN

C. measuring the solid state magnetic moment

D. thermally decomposing the compound

Answer:

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4. In which of the following molecular shape d_{z^2} orbital must not be involved in bonding ?

A. Pentagonal planar

B. Trigonal planar

C. Linear

D. Square planar

Answer:

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5. The heats of atomization of $PH_3(g)$ and $P_2H_4(g)$ are 954 kJ mol^{-1} and $1485kJ\mathrm{mol}^{-1}$ respectivel. The P-P bond energy in $kJ\mathrm{mol}^{-1}$ is

A. 213

B. 426

C. 318

D. 1272

Answer:

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6. The edge length of unit cell of a metal having molecular weight $75gmol^{-1}$ is 5Å which crystallizes in cubic lattice. If the density is $2g\ \hat{}\ (-1)$, then find the radius of metal atom $\left(N_A = 6 \times 10^{23}\right)$. Give the answer in pm.

A. 217 pm

B. 210 pm

C. 220 pm

D. 205 pm

Answer:

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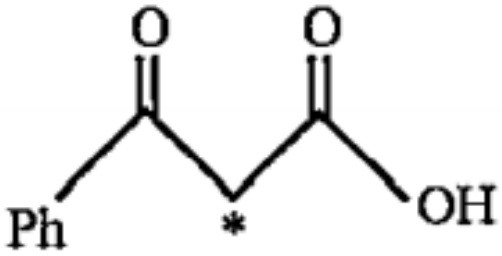
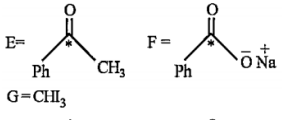
7. In the following reaction sequence, the correct structures of E, F and G are



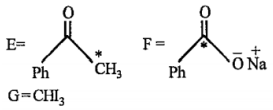
$$\xrightarrow{\text{Heat}} [E] \xrightarrow[\text{NaOH}]{I_2} [F] + [G]$$

[* implies ^{13}C labelled carbon)

A.

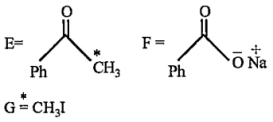


B.



C.

D.



Answer:

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8. Arrange the following in the order of increasing mass (atomic mass: O=16, Cu-63, N-14)

I. one atom of oxygen

II. one atom of nitrogen

III 1×10^{-10} mole of oxygen

IV. 1×10^{-10} mole of copper

A. $II < I < III < IV$

B. $I < II < III < IV$

C. $III < II < IV < I$

D. $IV < II < III < I$

Answer:

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9. The value of K_P for the equilibrium reaction $N_2O_2(g) \leftrightarrow 2NO_2(g)$ is 2. The percentage dissociation of $N_2O_2(g)$ at a pressure of 0.5 atm is

A. 25

B. 88

C. 50

D. 71

Answer:

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10. Resistance of a conductvity cell filled with a solution of an electrolyte of concentration 0.1 M is 100 Ω. The conductivity of this solution is 1.29

Sm^{-1}. Resistance of the same cell when filled with 0.02M of the same solution is 520Ω. the molar conductivity of 0.02M solution of the electrolyte will be:

A. $1.24 \times 10^{-4} Sm^2 mol^{-1}$

B. $12.4 \times 10^{-4} Sm^2 mol^{-1}$

C. $124 \times 10^{-4} Sm^2 mol^{-1}$

D. $1240 \times 10^{-4} Sm^2 mol^{-1}$

Answer:

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11. The ratio of the frequency corresponding to the third line in the lyman series of hydrogen atomic spectrum to that of the first line in Balmer series of Li^{2+} spectrum is

A. $\frac{4}{5}$

B. $\frac{5}{4}$

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

D. $\frac{3}{4}$

Answer:

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12. A complex cation is formed by Pt (in some oxidation state) with ligands (in proper number so that coordination number of Pt vecomes six). Which of the following can be its correct IUPAC name?

A. Diammineethylenediaminedithiocyanato-S-platinum(II)

B. Diammineethylenediaminedithiocyanato-S-platinate(IV)ion

C. Diammineethylenediaminedithiocyanato-S-platinum(III)ion

D. Diamminebis(ethylenediamine)dithiocyanato-S-platinum(IV)ion

Answer:

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13. The following redox reaction is balancedby which set of coefficients?

$$aZn + bNO_3^- + cH^+ \rightarrow dNH_4^+ + eH_2O + fZn^{2+}$$

A. 1 1 10 1 3 1

B. 2 2 10 2 3 2

C. 4 2 10 1 3 4

D. 4 1 10 1 3 4

Answer:

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14. Which of the following lanthanoids ions is diamagnetic?

A. Sm^{2+}

B. Eu^{2+}

C. Yb^{2+}

D. Ce^{2+}

Answer:

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15. Bond angle between two hybrid orbitals is 105° Percentage of s-orbital character of hybrid orbital is between

A. 50-55%

B. 9-12%

C. 21-23%

D. 11-12%

Answer:

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16. Methane can be chlorinated by

(i) treating with chlorine in presence of UV light

(ii) heating with chlorine in presence of tetraethyl lead

(iii) treating with tert-butyl hypochlorite in presence of UV light

A. Onle method (i)

B. By methods (i) and (ii)

C. By methods (i) and (iii)

D. By methods (i),(ii) and (iii)

Answer:

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17. A certain salt (X) gives the following tests :

(a) Its aqueous solution is alkaline to litmus.

(b) On strong heating. It sweels to give a glassy bead.

(c) When conc H_2SO_4 is added to a hot concentrated solution of (X),

white crystals of a weak acid separates out. Identify (X) and write down the chemical equations for reaction at steps a, b and c.

A. White

B. Blue

C. Brown

D. Violet

Answer:

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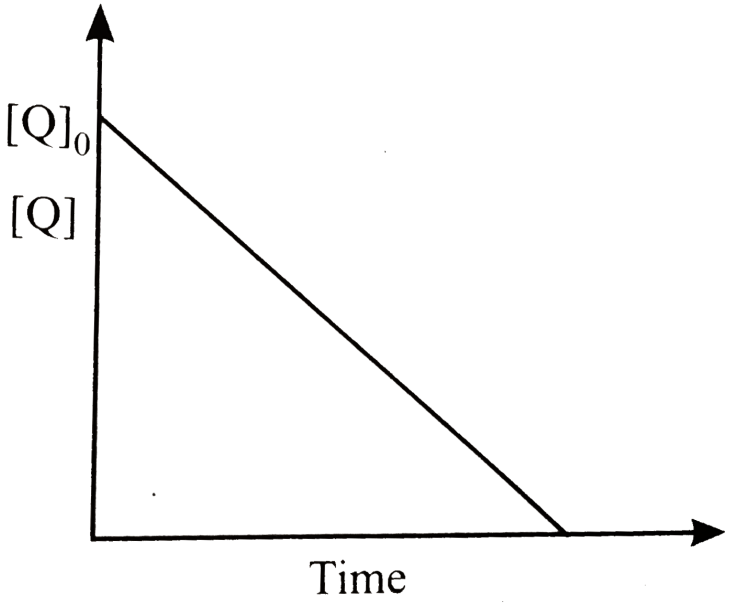
18. In the reaction, $P + Q \rightarrow R + S$

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:

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19. The reaction of zinc with dilute and concentrated nitric acid, respectively, produce

A. NO and N_2O

B. NO_2 and N_2O

C. N_2O and NO_2

D. NO_2 and NO

Answer:

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20. The degree of dissociation of HI at a particualr temperature is 0.8. Calculate the volume of $2MNa_2S_2O_3$ solution required to neutralise the iodine present in an equilibrium mixture of a reaction when 2 mol each of H_2 and I_2 are heated in a closed vessel of $2L$ capacity and the equilibrium mixture is freezed.

A. 1.6

B. 0.25

C. 0.4

D. 0.16

Answer:

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21. Among the following , the number of compounds that can react with PCl_5 to give $POCl_3$ is.

$O_2, CO_2, SO_2, H_2O, H_2SO_4, P_4O_{10}$.

A. 1

B. 5

C. 4

D. 2

Answer:

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22. Among the following complexes $(K-P), K_3\left[Fe(CN)_6\right](K), [Co(NH_3)6]Cl_3(L), Na_3\left[Co(\otimes alate)_3\right](M),$ the diamagnetic complexes are

A. K,L,M,N

B. K,M,O,P

C. L,M,O,P

D. L,M,N,O

Answer:

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23. An electron is continuously accelerated in a vacuum tube by applying potential differece. If the de-Broglie's wavelength is decreased by $10\,\%$, the change in the kinetic energy of the electron is nearly

A. a decrease of 11 %

B. an increase of 11.1%

C. an increase of 10%

D. an increase of 23.4%

Answer:

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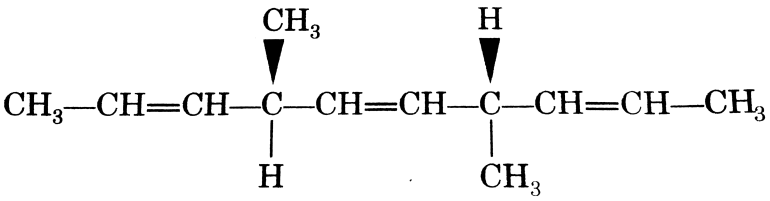
24. The number of optically active products obtained from the complete ozonolysis of the given compound



is :

A. 0

B. 1

C. 2

D. 4

Answer:

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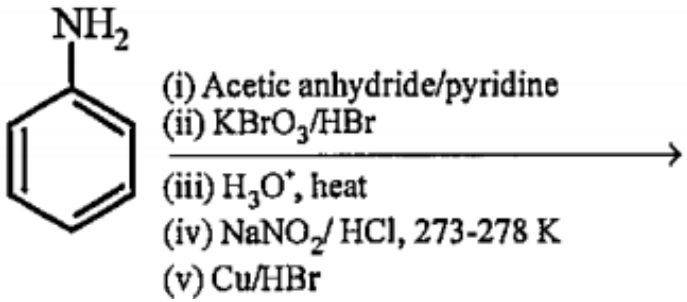
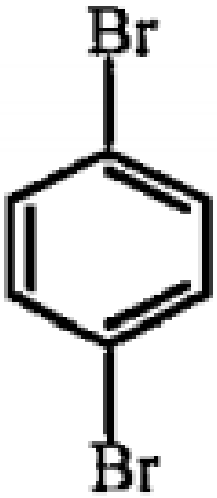
25. The product of the following reaction sequence is

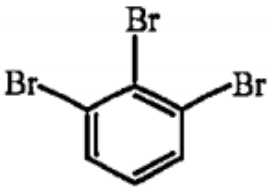


A.

B.



C.



D.

Answer:

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26. The standard enthalpies fo formation of $CO_2(g), H_2O(1)$, and glucose (s) at $25^\circ C$ are $-400kJmol^{-1}$, $-300kJmol^{-}$, and $-1300kJmol^{-1}$, respectively. The standard enthalply of combustion per gram of glucose at $25^\circ C$ is

A. $+2900kJ$

B. $-2900kJ$

C. $-16.11kJ$

D. $+16.11kJ$

Answer:

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27. Which of the following is not a redox reaction ?

A. Reaction of H_2SO_4 with NaOH

B. Production of ozone from oxygen in the atomsphere by lightening

C. Production of nitrogen oxides from nitrogen and oxygen in the atmosphere by lightening

D. Evaporation of water

Answer:

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