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Previous Year Paper

Chemistry - 2014



Multiple Choice Questions

1. The statement that is not correct is

- A. A furnace filled with haemalite is used to convert cast iron to wrought iron
- B. Collectors enhance the wettability of mineral particles during froth flotation
- C. In vapour phase refining, metal should form a volatile compound
- D. Copper from its low grade ores is extracted by hydrometallurgy

Answer

2. For $\text{Cr}_2\text{O}_7^{2-} + 14 \text{H}^+ + 6\text{e}^- \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$; $E^\circ = 1.33 \text{ V}$. At $[\text{Cr}_2\text{O}_7^{2-}] = 4.5 \text{ millimole}$, $[\text{Cr}^{3+}] = 15 \text{ millimole}$, E is 1.067 V . The pH of the solution is nearly equal to

- A. 2
- B. 3
- C. 5
- D. 4

Answer

3. 1.78 g of an optically active L-amino acid (A) is treated with NaNO_3/HCl at 0°C . 448 cm^3 of nitrogen was at STP is evolved. A sample of protein has 0.25% of this amino acid by mass. The molar mass of the protein is

- A. 36500 g mol^{-1}
- B. 34500 g mol^{-1}
- C. 35400 g mol^{-1}
- D. 35600 g mol^{-1}

Answer

4. 10 g of a mixture of BaO and CaO requires 100 cm^3 of 2.5 M HCl to react completely. The percentage of calcium oxide in the mixture is approximately (Given: molar mass of BaO = 158)

- A. 52.6
- B. 55.1
- C. 44.9
- D. 47.4

Answer

5. The ratio of heats liberated at 298 K from the combustion of one kg of coke and by burning water gas obtained from kg of coke is (Assume coke to be 100% carbon). (Given : enthalpies of combustion of CO , CO and H_2 as 393.5 kJ, 285 kJ, 285 kJ respectively all at 298 K)

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B. 0.69 : 1

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D. 0.96 : 1

Answer

6. Impure copper containing Fe, Au, Ag as impurities is electrolytically refined. A current of 140 A for 482.5 s decreased the mass of the anode by 22.26 g and increased the mass of cathode by 22.011 g. Percentage of iron in impure copper is (Given molar mass Fe = 55.5 g mol^{-1} , molar mass Cu = 63.54 g mol^{-1})
- A. 0.95
B. 0.85
C. 0.96=7
D. 0.90

Answer

7. 25 cm^3 of oxalic acid completely neutralised 0.064 g of sodium hydroxide. Molarity of the oxalic acid solution is
- A. 0.064
B. 0.045
C. 0.015
D. 0.032

Answer

8. The statement that is not correct is
- A. Angular quantum number signifies the shape of the orbital
B. Energies of stationary states in hydrogen like atoms is inversely proportional to the square of the principal quantum number
C. Total number of nodes for 3s-orbital is three
D. The radius of the first orbit of He is half that of the first orbit of hydrogen atom

Answer

9. For the equilibrium,
 $\text{CaCO}_3 (\text{s}) \rightleftharpoons \text{CaO} (\text{s}) + \text{CO}_2 (\text{g})$;
 $K_p = 1.64 \text{ atm}$ at 1000 K
50 g of CaCO_3 in a 10 L closed vessel is heated to 1000 K. Percentage of CaCO_3 that remains unreacted at equilibrium is (Given, $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$).
- A. 40
B. 50
C. 60
D. 20

Answer

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A. 2 atm and 600 K

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B. 0.5 atm and 273 K

C. 6 atm and 1092 K

D. 4 atm and 500 K

Answer

11. The acid strength of active methylene group in

I. $\text{CH}_3\text{COCH}_2\text{COOC}_2\text{H}_5$ II. $\text{CH}_3\text{COCH}_2\text{COCH}_3$ III. $\text{C}_2\text{H}_5\text{OOCCH}_2\text{COOC}_2\text{H}_5$

decreases as

A. $\text{I} > \text{III} > \text{II}$ B. $\text{I} > \text{II} > \text{III}$ C. $\text{II} > \text{I} > \text{III}$ D. $\text{III} > \text{I} > \text{II}$

Answer

12. A metallic oxide reacts with water to form its hydroxide, hydrogen peroxide and also liberates oxygen. The metallic oxide could be

A. CaO B. KO_2 C. Li_2O D. Na_2O_2

Answer

13. For an ideal binary liquid mixture.

A. $\Delta S_{\text{mix}} = 0$; $\Delta G_{\text{mix}} = 0$ B. $\Delta H_{\text{mix}} = 0$; $\Delta S_{\text{mix}} < 0$ C. $\Delta V_{\text{mix}} = 0$; $\Delta G_{\text{mix}} > 0$ D. $\Delta S_{\text{mix}} > 0$; $\Delta G_{\text{mix}} < 0$

Answer

14. Which one of these is not known?

A. CuCl_2 B. CuI_2 C. CuF_2 D. CuBr_2

Answer

15. A plot of $\ln T$ vs k for a reaction gives the slope $-1 \times 10^4 \text{ K}$. The energy of activation for the reaction is (Given, $R = 8.314 \text{ K}^{-1} \text{ mol}^{-1}$)Like. Share. Bookmark. Download. Make Notes. Print - Your Favourite Questions. Join www.zigya.com

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C. 12.02 J mol^{-1}

D. $83.14 \text{ kJ mol}^{-1}$

Answer

16. $\text{MnO}_2 + \text{HCl} \rightarrow \Delta \text{ A (g)}$

$\text{A (g)} + \text{F}_2 (\text{excess}) \rightarrow 573 \text{ K B (g)}$

$\text{B (l)} + \text{U (s)} \rightarrow \text{C (g)} + \text{D (g)}$

The gases A, B, C and D are respectively

A. Cl_2 , ClF , UF_6 , ClF_3

B. Cl_2 , ClF_3 , UF_6 , ClF

C. O_2 , OF_2 , U_2O_3 , O_2F_2

D. O_2 , O_2F_2 , U_2O_3 , OF_2

Answer

17. One mole of ammonia was completely absorbed in one litre solution each of

I. 1 M HCl

II. 1 M CH_3COOH

III. 1 M H_2SO_4 at 298 K

The decreasing order for the pH of the resulting solution is (Given $K_b (\text{NH}_3) = 4.74$)

A. $\text{II} > \text{III} > \text{I}$

B. $\text{I} > \text{II} > \text{III}$

C. $\text{II} > \text{I} > \text{III}$

D. $\text{III} > \text{II} > \text{I}$

Answer

18. 5.5 mg of nitrogen gas dissolves in 180 g of water at 273 K and 1 atm pressure due to nitrogen gas. The mole fraction of nitrogen in 180 g of water at 5 atm nitrogen pressure is approximately

A. 1×10^{-6}

B. 1×10^{-5}

C. 1×10^{-3}

D. 1×10^{-4}

Answer

19. 50 cm^3 of 0.04 M $\text{K}_2\text{Cr}_2\text{O}_7$ in acidic medium oxidises a sample of H_2S gas to sulphur. Volume of 0.03 M KMnO_4 required to oxidize the same amount of H_2S gas to sulphur, in acidic medium is

A. 60 cm^3

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D. 120 cm^3

Answer

20. The pair of compounds having identical shapes for their molecules is

- A. CH_4 , SF_4
- B. BCl_3 , ClF_3
- C. XeF_2 , ZnCl_2
- D. SO_2 , CO_2

Answer

21. Conductivity of a saturated solution of a sparingly soluble salt AB at 298 K is $1.85 \times 10^{-6} \text{ Sm}^{-1}$. Solubility product of the salt AB at 298 K is

(Given, $\Lambda^\circ \text{m}(\text{AB}) = 140 \text{ Sm}^2 \text{ mol}^{-1}$)

- A. 5.7×10^{-12}
- B. 1.32×10^{-12}
- C. 7.5×10^{-12}
- D. 1.74

Answer

22. Among the elements from atomic number 1 to 36, the number of elements which have an unpaired electron in their s subshell is

- A. 2
- B. 7
- C. 6
- D. 9

Answer

23. The statement that is not correct is

- A. Compressibility factor measures the deviation of real gas from ideal behaviour
- B. Van der Waals constant 'a' measures extent of intermolecular attractive forces for real gases
- C. Critical temperature is the lowest temperature at which liquefaction of a gas first occurs
- D. Boyle point depends on the nature of real gas

Answer

24. The correct arrangement for the ions in the increasing order of their radii is

- A. Na^+ , Cl^- , Ca^{2+}

B. Ca^{2+} , K^+ , S^{2-}

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D, Cl⁻, F⁻, S²⁻
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Answer

25. The correct arrangement of the species in the decreasing order of the bond length between carbon and oxygen in them is
- A. CO, CO₂, HCO₂⁻, CO₃²⁻
 - B. CO₂, CO, CO₃²⁻, HCHO₂⁻
 - C. CO₃²⁻, HCO₂⁻, CO₂, CO
 - D. CO, CO₃²⁻, CO₂, HCO₂⁻

Answer

26. The species that is not hydrolysed in water is
- A. P₄O₁₀
 - B. BaO₂
 - C. Mg₃N₂
 - D. CaC₂

Answer

27. For the properties mentioned, the correct trend for the different species is in
- A. strength as Lewis acid - BCl₃ > AlCl₃ > GaCl₃
 - B. inert pair effect - Al > Ga > In
 - C. oxidising property - Al³⁺ > In³⁺ > Ti³⁺
 - D. first ionization enthalpy - B > Al > Ti

Answer

28. A correct statement is
- A. [Co(NH₃)₆]²⁺ is paramagnetic
 - B. [MnBr₄]²⁻ is tetrahedral
 - C. [CoBr₂(en)₂]⁻ exhibits linkage isomerism
 - D. [Ni(NH₃)₆]²⁺ is an inner orbital complex

Answer

29. An aromatic compound 'A' (C₇H₉N) on reacting with NaNO₂/HCl at 0°C forms benzyl alcohol and nitrogen gas. The number of isomers possible for the compound 'A' is
- A. 5
 - B. 7
 - C. 3
 - D. 6

Answer

30. Conversion of oxygen into ozone is non-spontaneous at
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- B. high temperature
C. room temperature

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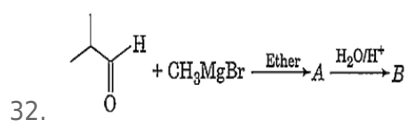
- D. low temperature

Answer

31. Carbocation as an intermediate is likely to be formed in the reaction

- A. Propene + $\text{Cl}_2 \xrightarrow{h\nu}$ 2-chloropropane
B. Acetone + $\text{HCN} \rightarrow$ OH acetonecyano hydrin
C. Ethylbromide + aq.KOH $\rightarrow \Delta$ ethyl alcohol
D. Hexane $\rightarrow$ anhy. AlCl_3/HCl 2-methyl pentane

Answer



The IUPAC name of 'B' is

- A. 3-methylbutan-2-ol
B. 2-methylbutan-3-ol
C. 2-methylbutan-2-ol
D. pentan-2-ol

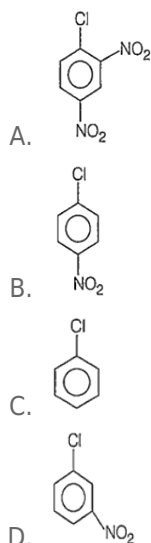
Answer

33. The correct sequence of reactions to be performed to convert benzene into m-bromoaniline is

- A. nitration, reduction, bromination
B. bromination, nitration, reduction
C. nitration, bromination, reduction
D. reduction, nitration, bromination

Answer

34. The compound that reacts the fastest with sodium methoxide is



Answer

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A. Cyclohexadiene and cyclohexene cannot be isolated with ease during controlled hydrogenation of benzene

- B. One mole each of benzene and hydrogen when reacted gives 1/3 mole of cyclohexane and 2/3 mole unreacted hydrogen
- C. Hydrogenation of benzene to cyclohexane is an endothermic process
- D. It is easier to hydrogenate benzene when compared to cyclohexene

Answer

36. The statement that is not correct is

- A. Hypophosphorous acid reduces silver nitrate to silver
- B. In solid state PCl_5 exists as $[\text{PCl}_4]^+ [\text{PCl}_6]^-$
- C. Pure phosphine is non-inflammable
- D. Phosphorous acid on heating disproportionates to give metaphosphonic acid and phosphine

Answer

37. In which one of the pairs of ion given, there is an ion that forms a coordination compound with both aqueous sodium hydroxide and ammonia and an other ion that forms a coordination compound only with aqueous sodium hydroxide?

- A. Pb^{2+} , Cu^{2+}
- B. Zn^{2+} , Al^{3+}
- C. Cu^{2+} , Zn^{2+}
- D. Al^{3+} , Cu^{2+}

Answer

38. A crystalline solid X reacts with dil. HCl to liberate a gas Y. Y decolourises acidified KMnO_4 . When a gas 'Z' is slowly passed into an aqueous solution of Y, colloidal sulphur is obtained X and Z could be respectively

- A. Na_2S , SO_3
- B. Na_2SO_4 , H_2S
- C. Na_2SO_3 , H_2S
- D. Na_2SO_4 , SO_2

Answer

39. A solution of 1.25 of 'P' in 50 g of water lowers freezing point by 0.3°C . Molar mass of 'P' is 94.

$K_f(\text{water}) = 1.86 \text{ K kg mol}^{-1}$. The degree of association of 'P' in water is

- A. 80%
- B. 60%
- C. 65%
- D. 75%

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40. Volume occupied by single CsCl ion pair in a crystal is $7.014 \times 10^{-23} \text{ cm}^3$. The smallest Cs-Cs internuclear distance is equal to length of the side of the cube corresponding to volume of one

CsCl ion pair. The smallest Cs to Cs internuclear distance is nearly

- A. 4.4 Å
- B. 4.3 Å
- C. 4 Å
- D. 4.5 Å

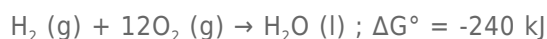
Answer

41. Gold sol is not

- A. a macromolecular colloid
- B. a lyophobic colloid
- C. a multimolecular colloid
- D. negatively charged colloid

Answer

42. For hydrogen-oxygen fuel cell at 1 atm and 298 K



E° for the cell is approximately, (Given $F = 96500 \text{ C}$)

- A. 2.48 V
- B. 1.25 V
- C. 2.5 V
- D. 1.26 V

Answer

43. The correct statement is

- A. The earlier members of lanthanoid series resemble calcium in their chemical properties.
- B. The extent of actinoid contraction is almost the same as lanthanoid contraction.
- C. In general, lanthanoid and actinoids do not show variable oxidation states.
- D. Ce^{4+} in aqueous solution is not known.

Answer

44. For Freundlich isotherm a graph of $\log x/m$ is plotted against $\log p$. The slope of the line and its y-axis intercept, respectively corresponds to

- A. $1/n$, k
- B. $\log 1/n$, k
- C. $1/n$, $\log k$
- D. $\log 1/n$, $\log k$

Answer

45. The IUPAC name of the complex ion formed when gold dissolves in aqua-regia is

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- A. tetrachloridoaurate (II)
B. tetrachloridoaurate (I)
C. tetrachloridoaurate (III)

D. dichloridoaurate (III)

Answer

46. $A(g) \rightarrow \Delta P(g) + Q(g) + R(g)$, follows first order kinetics with a half-life of 69.3 s at 500°C. Starting from the gas 'A' enclosed in a container at 500°C and at a pressure of 0.4 atm, the total pressure of the system after 230 s will be
- A. 1.15 atm
B. 1.32 atm
C. 1.22 atm
D. 1.12 atm

Answer

47. A crystalline solid XY_3 has *ccp* arrangement for its element Y. X occupies
- A. 66% of tetrahedral voids
B. 33% of tetrahedral voids
C. 66% of octahedral voids
D. 33% of octahedral voids

Answer

48. Match the reactant in Column I with the reaction in Column II.

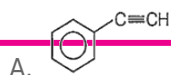
Column I	Column II
A. Acetic acid	i. Stephen
B. Sodium phenate	ii. Friedel Crafts
C. Methyl cyanide	iii. HVZ
D. Toulene	iv. Kolbe's

- A. A - iii; B - i; C - iv; D - ii
B. A - iv; B - ii; C - iii; D - i
C. A - ii; B - iii; C - i; D - iv
D. A - iii; B - iv; C - i; D - ii

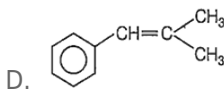
Answer

49. $X \rightarrow (\text{Reductive})\text{Ozonolysis } Y + Z$

Y can be obtained by Etard's reaction, Z undergoes disproportionation reaction with concentrated alkali. X could be



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Answer

50. P $\rightarrow$ (ii) H_3O^+ (i) CH_3MgBr R $\rightarrow$ Δ (i) dil. NaOH

4-methylpent-3-en-2-one P is

- A. propanone
- B. ethanamine
- C. ethanenitrile
- D. ethanal

Answer

51. When $\text{CH}_2=\text{CH}-\text{O}-\text{CH}_2-\text{CH}_3$ reacts with one mole of HI , one of the products formed is

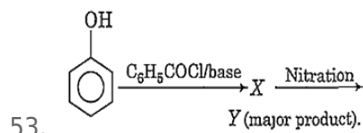
- A. ethane
- B. ethanol
- C. iodoethene
- D. ethanal

Answer

52. 0.44 g of a monohydric alcohol when added to methylmagnesium iodide in ether liberates at STP, 112 cm^3 of methane. With PCC the same alcohol forms a carbonyl compound that answers silver mirror test. The monohydric alcohol is

- A. $\text{H}_3\text{C}-\text{CH}(\text{OH})-\text{CH}_2-\text{CH}_3$
- B. $(\text{CH}_3)_3\text{C}-\text{CH}_2\text{OH}$
- C. $\text{H}_3\text{C}-\text{CH}(\text{OH})-\text{CH}_2-\text{CH}_2-\text{CH}_3$
- D. $(\text{CH}_3)_2\text{CH}-\text{CH}_2\text{OH}$

Answer



Y is

- A.
- B.
- C.

Answer

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54. ~~Acetophenone cannot be prepared easily starting from~~

- A. $C_6H_5CH(OH)CH_3$
- B. $C_6H_5CH_3$
- C. $C_6H_5C\equiv CH$
- D. C_6H_6

Answer

55. An incorrect statement with respect to S_N1 and S_N2 mechanisms for alkyl halide is

- A. A strong nucleophile in an aprotic solvent increases the rate or favours S_N2 reaction.
- B. Competing reaction for an S_N2 reaction is rearrangement.
- C. S_N1 reactions can be catalysed by some Lewis acids.
- D. A weak nucleophile and a protic solvent increases the rate or favours S_N1 reaction.

Answer

56. Butylated hydroxyl toluene as a food additive acts as

- A. antioxidant
- B. flavouring agent
- C. colouring agent
- D. emulsifier

Answer

57. 'Terylene is not a

- A. copolymer
- B. polyester fibre
- C. chain growth polymer
- D. step growth polymer

Answer

58. Iodoform reaction is answered by all, except

- A. $CH_3-CH(OH)-CH_2-COOH$
- B. CH_3CHO
- C. CH_3-CH_2-OH
- D. $CH_3-CH_2-CH_2OH$

Answer

59. $C_6H_5COOH \rightarrow (ii) \Delta (i) NH_3$ P $\rightarrow NaOBr$ Q $\rightarrow (ii)$ Heat at 460 K (i) Conc. H_2SO_4 R

R is

- A. o-bromo sulphanilic acid
- B. sulphanilamide

C. sulphanilic acid

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Answer

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60. The statement that is not correct is

- A. Aldose or ketose sugars in alkailne medium do not isomerise
- B. Carbohydrates are optically active
- C. Pentaacetate of glucose does not react with hydroxylamine
- D. Lactose has glycosidc linkage between C₄ of glucose and C₁ of galactose unit.

Answer