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Previous Year Paper

Chemistry - 2014



Multiple Choice Questions

1. The solubility of AgI in NaI solution is less than that in pure water because

- A. AgI forms complex with NaI
- B. of common ion effect
- C. solubility product of AgI less
- D. the temperature of the solution decreases

Answer

2. Hydrogen ion concentration in mol/L in a solution of pH = 5.4 will be

- A. 3.98×10^8
- B. 3.88×10^6
- C. 3.68×10^{-6}
- D. 3.98×10^{-6}

Answer

3. XY_2 dissociated as $XY_2(g) \rightleftharpoons XY(g) + Y(g)$ When the initial pressure of XY_2 is 600 mm Hg, the total equilibrium pressure is 800 mm Hg. Calculate K for the reaction assuming that the volume of the system remains unchanged.

- A. 50
- B. 100
- C. 166.6
- D. 400.0

Answer

4. For the following equilibrium, $N_2O_4 \rightleftharpoons 2NO_2$ in the gaseous phase, NO_2 is 50% of the total volume when equilibrium is set up. Hence, per cent of dissociation of N_2O_4 is

- A. 50%
- B. 25%
- C. 66.66%
- D. 33.33%

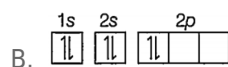
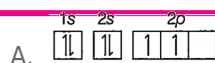
Answer

5. Of the given anions, the strongest Bronsted base is

- A. ClO^-
- B. ClO_3^-
- C. ClO_2^-

Answer

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6. Which of the following will violate Pauli's exclusion principle?



- C. Both (a) and (b)
D. None of the above

Answer

7. The bond order of H_2^- ion is 12. If it has 2 bonding electron, how many antibonding electrons it will have?
- A. 4
B. 3
C. 2
D. 1

Answer

8. Ni^{2+} ion ($Z = 28$) contains unpaired electrons
- A. 1
B. 2
C. 3
D. 5

Answer

Iodide	PI_3	AsI_3	SbI_3
Bond angle	102	$100^\circ 2'$	99°

- A. due to small size of P
B. due to more bp-bp repulsion in PI_3
C. due to less electronegativity of P
D. None of the above

Answer

10. The radius of H-atom in its ground state is $0.58 \text{ \AA}$. The radius of, ${}_3Li^{2+}$ in the similar state is
- A. $0.1777 \text{ \AA}$
B. $0.706 \text{ \AA}$
C. $1.06 \text{ \AA}$
D. $0.058 \text{ \AA}$

Answer

11. Which pair of elements has same chemical properties?

A. 13, 22

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Answer

12. Heat formation of H_2O is -188 kJ/mol and H_2O_2 is 286 kJ/mol . The enthalpy change for the reaction; $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$ is

- A. 196 kJ
- B. -196 kJ
- C. 984 kJ
- D. -984 kJ

Answer

13. When 1 mole of a gas is heated at constant volume, temperature is raised from 298 K to 308 K . Heat supplied to the gas is 500 J . Then, which statement is correct?

- A. $q = -W = 500 \text{ J}$; $\Delta E = 0$
- B. $q = W = 500 \text{ J}$; $\Delta E = 0$
- C. $q = \Delta E = 500 \text{ J}$, $W = 0$
- D. $\Delta E = 0$; $q = W = -500 \text{ J}$

Answer

14. The reaction, $10\text{FeSO}_4 + 2\text{KMnO}_4 + 8\text{H}_2\text{SO}_4 \rightarrow 2\text{MnSO}_4 + 5\text{Fe}(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + 8\text{H}_2\text{O}$ is an example of reaction of

- A. disproportionation
- B. intermolecular redox
- C. intramolecular redox
- D. None of these

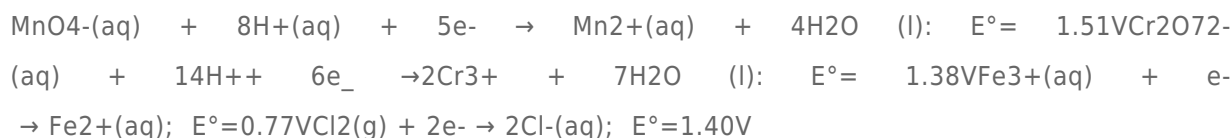
Answer

15. The compound that can work both as an oxidising as well as reducing agent is

- A. KMnO_2
- B. H_2O_2
- C. $\text{Fe}_2(\text{SO}_4)_3$
- D. $\text{K}_2\text{Cr}_2\text{O}_7$

Answer

16. Standard electrode potential data are useful for understanding the suitability of an oxidant in a redox titration. Some half cell reactions and their standard potentials are given below



Identify the incorrect statement regarding the quantitative estimation of gaseous $\text{Fe}(\text{NO}_3)_2$.

- A. MnO_4^- can be used in aqueous HCl

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C. MnO_4^- can be used in aqueous H_2SO_4

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D. $\text{Cr}_2\text{O}_7^{2-}$ can be used in aqueous H_2SO_4

Answer

17. In Zeigler Natta polymerisation of ethylene, the active species is

- A. AlCl_3
- B. Et_3Al
- C. CH_2CH_2
- D. Ti^{3+}

Answer

18. The number of possible alkynes with molecular formula C_5H_8 is

- A. 1
- B. 3
- C. 5
- D. 8

Answer

19. Which of the following orders is not correct regarding the -I effect of the substituents?

- A. $-\text{SR} < -\text{OR} < -\text{O}^+\text{R}_2$
- B. $-\text{N}^+\text{R}_2 < -\text{OR} < -\text{F}$
- C. $-\text{I} < -\text{Cl} < -\text{Br} < -\text{F}$
- D. $-\text{N}^+\text{R}_3 < -\text{O}^+\text{R}_2 < -\text{OR}$

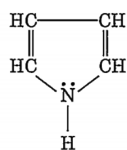
Answer

20. Which of the following types of reaction occurs when a substituent has got a double bond with evenly distributed π -electron cloud?

- A. Electrophilic addition
- B. Nucleophilic addition
- C. Electrophilic substitution
- D. Nucleophilic substitution

Answer

21. How many delocalised π -electrons are there in the following compound?



- A. 1
- B. 2
- C. 3

22. Which of the following is an anti-knocking compound?

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A. TEL

B. LTC

C. Freon

D. Gasoline

Answer

23. A compound contains two dissimilar asymmetric C-atoms. The number of optical isomers is

A. 1

B. 2

C. 4

D. 8

Answer

24. Which of the following is the strongest nucleophile?

A. OH^-

B. CH_3O^-

C. CH_3S^-

D. $\text{C}_2\text{H}_5\text{O}^-$

Answer

25. The incorrect statements among the following is

A. the first ionisation potential of Al is less than the first ionisation potential of Mg

B. the second ionisation potential of Mg is lower than the second ionisation potential of Na

C. the first ionisation potential of Na is less than the first ionisation potential of Mg

D. the third ionisation potential of Mg is greater than the third ionisation potential of Al

Answer

26. When the sample of copper with zinc impurity is to be purified by electrolysis, the appropriate electrodes are

Anode	Cathode
Pure zinc	pure copper

Anode	Cathode
impure zinc	pure copper

Anode	Cathode
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impure zinc	impure sample	

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Anode	Cathode
impure sample	pure copper

Answer

27. Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species?

- A. $\text{Cl} < \text{F} < \text{S} < \text{CO}$
- B. $\text{O} < \text{S} < \text{F} < \text{Cl}$
- C. $\text{S} < \text{O} < \text{Cl} < \text{F}$
- D. $\text{F} < \text{Cl} < \text{O} < \text{S}$

Answer

28. Acidified solution of chromic acid on treatment with H_2O_2 yields

- A. $\text{CrO}_3 + \text{H}_2\text{O} + \text{O}_2$
- B. $\text{Cr}_2\text{O}_3 + \text{H}_2\text{O} + \text{O}_2$
- C. $\text{CrO}_5 + \text{H}_2\text{O}$
- D. $\text{H}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{O} + \text{O}_2$

Answer

29. Bleaching action of bleaching powder is due to

- A. Cl
- B. O
- C. Ca
- D. Cl_2

Answer

30. Which of the following is an alum?

- A. $\text{Na} \cdot \text{AlO}_2$
- B. $\text{Na}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$
- C. $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
- D. $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$

Answer

31. Sodium thiosulphate is used in photography

- A. as AgBr grain is reduced to non-metallic silver
- B. to convert metallic silver into silver salt
- C. to remove reduced silver
- D. to remove undecomposed AgBr in the form of $\text{Na}_3[\text{Ag}(\text{S}_2\text{O}_3)_2]$ (a complex salt)

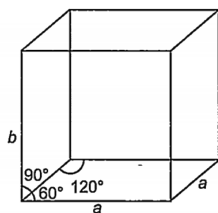
Answer

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32. Ice crystallises in a hexagonal lattice. At the low temperature, the lattice constants were $a =$

$4.53 \text{ \AA}$ and $b = 7.41 \text{ \AA}$. How many H_2O molecules are contained in a unit cell? [$d(\text{ice}) = 0.92 \text{ g/cm}^3$]

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- A. 4
- B. 3
- C. 2
- D. 1

Answer

33. A 0.001 molal solution of $[\text{Pt}(\text{NH}_3)_4\text{Cl}_4]$ in water had a freezing point depression of 0.0054°C . If K_f for water is 1.80, the correct formulation of the above molecules is

- A. $[\text{Pt}(\text{NH}_3)_4\text{Cl}_3]\text{Cl}$
- B. $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}_2$
- C. $[\text{Pt}(\text{NH}_3)_4\text{Cl}]\text{Cl}_2$
- D. $[\text{Pt}(\text{NH}_3)_4\text{Cl}_4]$

Answer

34. If M is molecular weight of solvent, K_b is molal elevation constant, T_b is its boiling point p° is its vapour pressure at temperature T and p_s is vapour pressure of its solution having a non-volatile solute at $T \text{ K}$, then

- A. $p^\circ - p_s = \Delta T_b K_b \times M$
- B. $p^\circ - p_s = K_b \Delta T_b \times M$
- C. $p^\circ - p_s = K_b \Delta T_b \times M 1000$
- D. $p^\circ - p_s = \Delta T_b K_b \times M 1000$

Answer

35. Which of the following statements is correct for Tyndall effect?

- A. Scattering and polarising of light by small suspended particles is called Tyndall effect
- B. Tyndall effect of colloidal particles is due to dispersion of light
- C. Tyndall effect is due to refraction of light
- D. Tyndall effect is zig-zag motion of suspended particles.

Answer

36. Calculate the ionic radius of a Cs^+ ion, assuming that the cell edge length for CsCl is 0.4123 nm and that the ionic radius of a Cl^- ion is 0.181 nm

A. 0.176 nm

B. 0.231 nm

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D. 0.166 nm

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Answer

37. The pair of molecules forming strongest hydrogen bonds are

- A. HCOOH and CH_3COOH
- B. CH_3COOH and CHCl_3
- C. H_2O and H_2
- D. SiF_6 and SiH_4

Answer

38. Which of the following reasoning structures is not correct for

- A. $\text{:}\ddot{\text{O}}=\text{C}=\ddot{\text{O}}\text{:}$
- B. $\text{:}\ddot{\text{O}}-\text{C}\equiv\text{O}^+\text{:}$
- C. $\text{:}\text{O}^+=\text{C}-\ddot{\text{O}}^-\text{:}$
- D. $\text{:}\text{O}^+=\text{C}\equiv\text{O}^-\text{:}$

Answer

39. Which of the following represents the correct order of the acidity in the given compound?

- A. $\text{ClCH}_2\text{COOH} < \text{BrCH}_2\text{COOH} < \text{CH}_3\text{COOH} < \text{FCH}_2\text{COOH}$
- B. $\text{CH}_3\text{COOH} < \text{BrCH}_2\text{COOH} < \text{ClCH}_2\text{COOH} < \text{FCH}_2\text{COOH}$
- C. $\text{FCH}_2\text{COOH} < \text{ClCH}_2\text{COOH} < \text{BrCH}_2\text{COOH} < \text{CH}_3\text{COOH}$
- D. $\text{CH}_3\text{COOH} < \text{ClCH}_2\text{COOH} < \text{BrCH}_2\text{COOH} < \text{CH}_3\text{COOH}$

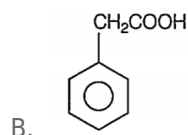
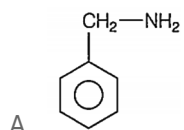
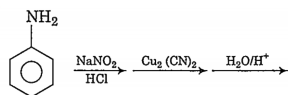
Answer

40. What will be the major product when 2-amino propane is treated with nitrous acid?

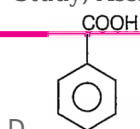
- A. Propane-2-ol
- B. Cyclopropene
- C. Propanol
- D. 2-nitropropane

Answer

41. What will be the final product of following reaction sequence?



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Answer

42. Three of the following four reactions are due to one similar feature of carbonyl compounds, while the fourth one is different. Which one is fourth?

- A. Haloform reaction
- B. Aldol condensation
- C. Knoevenagel reaction
- D. Wittig reaction

Answer

43. The two forms of D-glucopyranose obtained from the solution of D-glucose are called

- A. enantiomer
- B. epimer
- C. anomer
- D. isomer

Answer

44. Which type of polymer is the Buna-S-rubber?

- A. Addition polymer
- B. Condensation polymer
- C. Copolymer
- D. None of the above

Answer

45. The IUPAC name of the following compound is



- A. 2-methyl-5-hydroxy-3-pentane
- B. 4-methyl-3-oxo-1-pentanol
- C. 1-hydroxy-4-methyl-3-pentanone
- D. 3-keto-hexan-1-ol

Answer

46. Which one of the following will most readily be dehydrated in acidic medium?

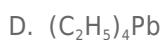
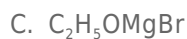
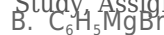
- A. $\text{CH}_3\text{—CO—CH}_2\text{—CH(OH)—CH}_3$
- B. $\text{CH}_3\text{—CHOH—CH}_2\text{—CH}_2\text{—CH}_3$
- C. $\text{CH}_3\text{—COCHOH—CH}_2\text{—CH}_3$
- D. $\text{CH}_3\text{—CO—CH}_2\text{—CH}_2\text{—CHOH—CH}_3$

Answer

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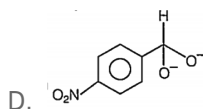
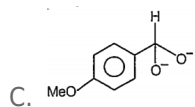
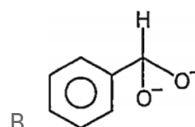
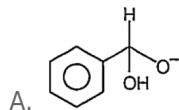


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Answer

48. In a Cannizzaro reaction, the intermediate that will be least hydride donor is



Answer

49. In the reaction, $\text{CHCl}_3 + 4\text{OH}^- \rightarrow \text{HCOO}^- + 3\text{Cl}^- + 2\text{H}_2\text{O}$ the intermediate species formed is/ are

C. Both (a) and (b)

D. None of the above

Answer

50. When Lunar caustic reacts with acetylene gas, it yields



Answer