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Previous Year Paper

Chemistry - 2011



Multiple Choice Questions

1. Consider the formal charges on N and B in $\text{H}_3\text{N}-\text{BF}_3$ and indicate which of the following is true?
- A. N is +ve and B is -ve
 - B. N is --ve and B is +ve
 - C. both N and B carry similar +ve or -ve charges
 - D. charge discrimination is difficult to make

Answer

2. Consider (i) CO_2 (ii) CCl_4 (iii) C_6Cl_6 and (iv) CO and tell which of the following statements is correct?
- A. (i), (ii) and (iii) only have zero dipole moment
 - B. (i), (ii) and (iv) only have zero dipole moment
 - C. only (iv) has zero dipole moment
 - D. All have zero dipole moment

Answer

3. There is a general understanding of ionic radius based on the nuclear charges and the number of electrons surrounding the nucleus which generally works very well. Which one of the following represents the correct decreasing order of ionic radius for C^{4-} , N^{3-} , O^{2-} and F^- ?
- A. $\text{C}^{4-} > \text{N}^{3-} > \text{O}^{2-} > \text{F}^-$
 - B. $\text{F}^- > \text{O}^{2-} > \text{N}^{3-} > \text{C}^{4-}$
 - C. $\text{O}^{2-} > \text{N}^{3-} > \text{C}^{4-} > \text{F}^-$
 - D. $\text{F}^- > \text{N}^{3-} > \text{C}^{4-} > \text{O}^{2-}$

Answer

4. 'No two electrons in an atom can have the same set of quantum numbers.' This principle is known by which one of the following?
- A. Zeeman's exclusion principle
 - B. Stark's exclusion principle
 - C. Pauli's exclusion principle
 - D. Hersbach's exclusion principle

Answer

5. The unit of equilibrium constant for the following reaction is
- $$2\text{NO}_2(\text{g}) \rightleftharpoons \text{N}_2\text{O}_4(\text{g})$$

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~~D. equilibrium constant is unitless~~

Answer

6. Which one of the following represents the correct state of hybridisation of P in PCl_5 ?

- A. $s^0 p^3$
- B. $sp^3 d$
- C. $s^2 p^3$
- D. $sp^2 d^2$

Answer

7. Where of the O_2^- , O_2^{2-} , BN and NN is/are paramagnetic ?

- A. NN
- B. O_2^{2-}
- C. BN
- D. O_2^-

Answer

8. What is the wavelength associated with a tennis ball of mass 10^3 g and travelling at a velocity of 6.626 ms^{-1} ? [$h = 6.626 \times 10^{-34} \text{ Js}^{-1}$].

- A. 10^{-34} m
- B. 10^{-31} m
- C. 6.626 m
- D. $6.626 \times 10^{-31} \text{ m}$

Answer

9. What is the energy required to move the electron from ground state of H atom to the first excited state? Given that the ground state energy of H atom is 13.6 eV and that the energy E_n of an electron in n th orbital of an atom or ion of atomic number Z is given by the equation $E_n = - (13.6Z^2 / n^2)$.

- A. 13.6 eV
- B. 3.4 eV
- C. 10.2 eV
- D. -10.2 eV

Answer

10. Which electron orbitals are designated by

- (i) $n = 2, l = 1, m = 0$;
- (ii) $n = 3, l = 2, m = 0$;

(iii) $n = 4, l = 2, m = 1$ and

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A. 2p, 3d, 4d and 5f, respectively

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B. 2p, 3d, 4d and 5d, respectively

C. 2p, 3d, 4f and 5f, respectively

D. 2p, 3p, 4d and 5f, respectively

Answer

11. Which of the following represents the smallest quantity?

A. 1230g

B. 1.230×10^{-4} g

C. 1.230×10^{-6} kg

D. 1.230×10^4 μ g

Answer

12. How is 0.0120 written as a scientific notation?

A. 120×10^{-4}

B. 1.2×10^{-2}

C. 12×10^{-3}

D. 12.0×10^{-3}

Answer

13. Which one of the following represents the correct ratio of the energy of electron in ground state of H atom to that of the electron in the first excited state of Li^+ ?

A. 4 : 9

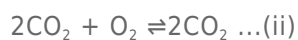
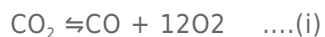
B. 9 : 4

C. 1 : 4

D. 4 : 1

Answer

14. If the equilibrium constant for reaction (i) is 2, what is the equilibrium constant for reaction (ii)?



A. 1/4

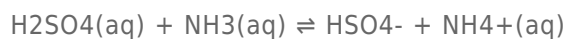
B. 1/2

C. 1

D. 2

Answer

15. Which of the following comments about the following equilibrium reaction is the most correct?



A. The equilibrium lies mostly to the right

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C. The equilibrium is exactly in between where the concentration of each of the reactants is exactly equal to the concentration of each of the products

D. The equilibrium depends on the temperature of the equilibrium reaction

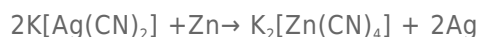
Answer

16. Which of the following represents the correct pH of a 10^{-7} M HCl in doubly distilled air-free water?

- A. 6.6990
- B. 7.0000
- C. 7.3010
- D. 6.3980

Answer

17. Silver metal is recovered industrially by using the chemistry shown below. Which of the following statements is/are not true?



- A. only Ag has been oxidised and Zn reduced
- B. (a), (c), (d)
- C. Both Ag and Zn have been oxidised
- D. Both Ag and Zn have been reduced

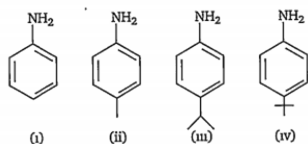
Answer

18. An alkyl bromide is formed as the major product on reaction of 3-methyl-2-butene with hydrobromic acid under thermodynamic conditions. Which of the following is the correct IUPAC name of this product?

- A. 2-bromo-3-methylbutane
- B. 1-bromo-3-methylbutane
- C. 2-bromo-2-methylbutane
- D. 1-bromo-3-methyl-2-butene

Answer

19. Which of the following represents the correct increasing order of electron pair availability on nitrogen based on hyperconjugation and + I and -I effects arising from alkyl groups?



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

Answer

20. Which one of the following represents the major product of the reaction of benzene with 2, 2-

A. 2, 2-dimethylpropylbenzene

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B. 1, 1-dimethylpropylbenzene

C. 1, 2-dimethylpropylbenzene

D. 1, 2-dimethyl-1-propenylbenzene

Answer

21. Octane number of petrol can be improved by admixing it with which of the following chemicals?

A. Et_4Pb B. $\text{CH}_3\text{OC}(\text{CH}_3)_3$

C. Both (a) and (b)

D. Pyrene

Answer

22. Cyclohexane, methylcyclopentane, 1, 3-dimethyl cyclobutane and 1, 2, 3-trimethyl cyclopropane are examples of which one of the following?

A. Constitutional isomers

B. Structural isomers

C. Both (a) and (b)

D. Structural as well as positional isomers

Answer

23. How many structural isomers are possible for a molecule of C_6H_{12} , composition but having at least-one carbocyclic ring?

A. Seven

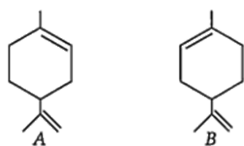
B. Six

C. Five

D. None of these

Answer

24. The configurations of the chiral centres in A and B are, respectively, as



A. R and S

B. S and R

C. R and R

D. S and S

Answer

25. Arrange Na^+ , Mg^+ and Al^{3+} in increasing order of energy of hydration.Like. Share. Bookmark. Download. Make Notes. Print - Your Favourite Questions. Join www.zigya.com

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D. $\text{Mg}^{2+} < \text{Al}^{3+} < \text{Na}^{+}$

Answer

26. Which one of K, I, Cl and Li will display the highest first ionisation energy?

- A. K
- B. I
- C. Cl
- D. Li

Answer

27. You may have noticed that chicken-egg is very strong along its long axis so much so that it does not break even when pressed very hard. Which of the following is the main constituent of egg-shell?

- A. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- B. $\text{CaSO}_4 \cdot 1/2\text{H}_2\text{O}$
- C. CaSiO_3
- D. CaCO_3

Answer

28. Nuclear attraction is often the deciding control factor for the association of neutral molecules to a given metal ion. Which one of the following represents the correct order of stability of the ions?

$[\text{Be}(\text{H}_2\text{O})_4]^{2+}$, $[\text{Mg}(\text{H}_2\text{O})_4]^{2+}$, $[\text{Ca}(\text{H}_2\text{O})_4]^{2+}$ and $[\text{Sr}(\text{H}_2\text{O})_4]^{2+}$?

- A. $[\text{Be}(\text{H}_2\text{O})_4]^{2+} > [\text{Sr}(\text{H}_2\text{O})_4]^{2+} > [\text{Mg}(\text{H}_2\text{O})_4]^{2+} > [\text{Ca}(\text{H}_2\text{O})_4]^{2+}$
- B. $[\text{Ca}(\text{H}_2\text{O})_4]^{2+} > [\text{Mg}(\text{H}_2\text{O})_4]^{2+} > [\text{Be}(\text{H}_2\text{O})_4]^{2+} > [\text{Sr}(\text{H}_2\text{O})_4]^{2+}$
- C. $[\text{Sr}(\text{H}_2\text{O})_4]^{2+} > [\text{Ca}(\text{H}_2\text{O})_4]^{2+} > [\text{Mg}(\text{H}_2\text{O})_4]^{2+} > [\text{Be}(\text{H}_2\text{O})_4]^{2+}$
- D. $[\text{Be}(\text{H}_2\text{O})_4]^{2+} > [\text{Mg}(\text{H}_2\text{O})_4]^{2+} > [\text{Ca}(\text{H}_2\text{O})_4]^{2+} > [\text{Sr}(\text{H}_2\text{O})_4]^{2+}$

Answer

29. Which of the following represents correct acidity order Li_2O , BeO and B_2O_3 ?

- A. $\text{Li}_2\text{O} < \text{BeO} < \text{B}_2\text{O}_3$
- B. $\text{B}_2\text{O}_3 < \text{BeO} < \text{Li}_2\text{O}$
- C. $\text{BeO} < \text{Li}_2\text{O} < \text{B}_2\text{O}_3$
- D. $\text{BeO} < \text{B}_2\text{O}_3 < \text{Li}_2\text{O}$

Answer

30. Which of the following does not/do not represent the correct equivalent mass of $\text{Cr}_2\text{O}_7^{2-}$ in the

reaction $\text{Cr}_2\text{O}_7^{2-} + 14 \text{H}^+ + 6\text{e}^- \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$.

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B. One third of the molar mass of dichromate

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C. One half of the molar mass of dichromate

D. all of the above

Answer

31. Detection of sulphur in sodium extract (Lassaigne test) is not done by which of the following reagents?

A. $\text{Pb}(\text{OAc})_2$

B. Sodium nitroprusside

C. Both $\text{Pb}(\text{OAc})_2$ and Sodium nitroprusside

D. Silver nitrate

Answer

32. Which of the following is/are incorrect representation(s) of bleaching powder?

A. $\text{Ca}^{2+}(\text{Cl}_2\text{O})^{2+}$

B. $\text{Ca}^{2+}(\text{ClO}_2)\text{Cl}^{2-}$

C. $\text{Ca}^{2+}(\text{ClO}^+)\text{Cl}^-$

D. All of these

Answer

33. The electrolyte in lead storage battery is dilute sulphuric acid. The concentration of sulphuric acid in a lead-storage battery must be between 4.8 M and 5.3 M for most efficient functioning. A 5 mL sulphuric acid sample of a particular battery requires 50 mL of 1.0 M NaOH for complete neutralisation. Which of the following statements about the functioning of battery is the most appropriate?

A. The acid concentration in the battery is not in the most effective range

B. The acid concentration in the battery is in the most effective range

C. The acid concentration in the battery is hardly in the most effective range

D. Only a good mechanic can tell whether or not the acid concentration in the battery is in the most effective range

Answer

34. Which of the following statements is/are true about the P-Cl bonds in PCl_5 ?

A. Three bonds are of one type and two of another type

B. Two bonds are of one type and three of another type

C. All the bonds are of the same type

D. both (a) and (b)

Answer

35. In the following Haber synthesis of NH_3 , the equilibrium constant for NH_3 formation, on increase in temperature, is



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B. increased

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C. first decreased and then increased

D. not altered

Answer

36. Which one of the following represents the correct number of types of P-O bonds in P_4O_{10} ?

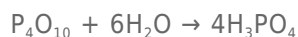
A. 1

B. 2

C. 3

D. 4

Answer

37. One mole of P_4O_{10} is allowed to react fully with dust and salt-free doubly distilled water and the volume is made up to 1L. What is the normality of the so-generated orthophosphoric acid?

A. 1.0 N

B. 8.0 N

C. 12.0 N

D. 4.0 N

Answer

38. Which of the following statements about the monomer and dimer of NO_2 is/are not true?

A. Both are diamagnetic

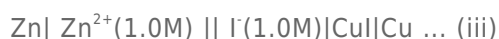
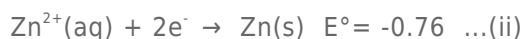
B. Both are paramagnetic

C. The dimer is paramagnetic and the monomer is not

D. all of these

Answer

39. Given the following in Eq. (i) and (ii), calculate the EMF of the cell given in Eq. (iii)



A. 1.08V

B. 0.44V

C. 0.92V

D. 0.60V

Answer

40. Which of the following classes of compounds do glucose and fructose represent?

A. Aldoses and ketoses, respectively

B. Polyols

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D. All of these

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41. Which one of the pairs C_6H_5COOMe and $2,6-(Me)_2C_6H_3COOMe$, C_6H_5COOMe and $C_6H_5CH_2COOMe$, CH_3COCH_3 , and CF_3COCH_3 , $p-NO_2C_6H_4COOMe$ and $p-MeOC_6H_4COOMe$ in that order, will react faster than the other with a nucleophile at the carbonyl carbon?
- A. $C_6H_5COOMe, C_6H_5CH_2COOMe, CF_3COCH_3, p-NO_2C_6H_4COOMe$
- B. $2,6-(Me)_2C_6H_3COOMe, C_6H_5CH_2COOMe, CH_3COCH_3, p-NO_2C_6H_4COOMe$
- C. $2,6-(Me)_2C_6H_3COOMe, C_6H_5CH_2COOMe, CH_3COCH_3, p-MeOC_6H_4COOMe$
- D. $C_6H_5COOMe, C_6H_5CH_2COOMe, CF_3COCH_3, p-MeOC_6H_4COOMe$

Answer

42. Which of the following chemicals does/do not generate shiny deposits on add mixture with ammoniacal silver nitrate?
- A. Acetaldoxime
- B. Cyclohexanone
- C. Butyraldehyde
- D. both (a) or (b)

Answer

43. Wacker process is an industrial process for the oxidation of terminal alkenes. Which of the following represents a true statement about the product?
- A. The product is an aldehyde with same number of carbon atoms as in the alkene
- B. The product is a ketone with same number of carbon atoms as in the alkene
- C. The product is an oxirane with same number of carbon atoms as in the alkene
- D. Both (a) and (b)

Answer

44. Which of the following is/are formed on reaction of benzaldehyde with aqueous NaOH followed by acidification with dilute hydrochloric acid?
- A. Benzoic acid
- B. Benzyl alcohol
- C. Benzoic acid and benzyl alcohol
- D. *p*-hydroxybenzaldehyde

Answer

45. Which of the following is the correct IUPAC name of $CH_3CHBrCCCHO$?
- A. 4-bromo-2-pentynal
- B. 2-bromo-3-pentynal
- C. 1-bromo-1-methyl-2-butynal
- D. 4-bromo-4-methyl-butynal

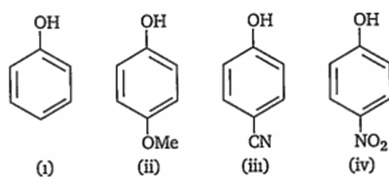
Answer

46. Which one is the correct IUPAC name of the following compound?
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- A. 1-chloro-5-hydroxycyclohexane
B. 2-chloro-4-hydroxycyclohexane
C. 3-chloro-3-cyclohexenol
D. 5-hydroxycyclohexenyl chloride

Answer

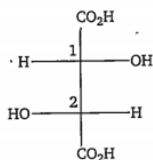
47. Which of the following represents the correct decreasing order of acidity of the following compounds?



- A. $ii > i > iii > iv$
B. $iv > iii > ii > i$
C. $iii > iv > i > ii$
D. $iv > iii > i > ii$

Answer

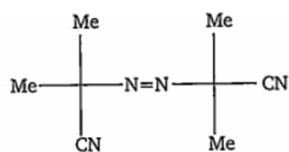
48. The configurations at C_1 and C_2 in the following compound are, respectively



- A. R and R
B. R and S
C. S and R
D. S and S

Answer

49. The following species generates a highly stable radical on exposure to 100 W bulb light. Which one of the following represents this stable radical?



- A. $Me_2C^\bullet(CN)$
B. $C^\bullet H_3$
C. $C^\bullet N$

Answer

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50. Which of the following compounds will give red colour on Lassaigne test?

- A. NaCNS
- B. NH_2CSNH_2 (thiourea)
- C. $p\text{-NH}_2\text{C}_6\text{H}_4\text{SO}_3\text{H}$ (p - aminobenzene sulphonic acid)
- D. all of the above

Answer