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Previous Year Paper

Chemistry - 2014

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Multiple Choice Questions

1. The correct increasing order of the acid strength of benzoic acid (I), 4-nitrobenzoic acid (II), 3,4-dinitrobenzoic acid (III) and 4-methoxybenzoic acid (IV) is
- A. $I < II < III < IV$
B. $II < I < IV < III$
C. $IV < I < II < III$
D. $IV < II < I < III$

Answer

2. Choose the correct order of decreasing basic strength of the following compounds in aqueous solution
- (i) $C_6H_5NH_2$
(ii) $C_2H_5NH_2$
(iii) NH_3
(iv) $(CH_3)_2NH$
- A. (i) > (ii) > (iii) > (iv)
B. (iv) > (ii) > (iii) > (i)
C. (ii) > (i) > (iii) > (iv)
D. (iv) > (iii) > (ii) > (i)

Answer

3. The shortest wavelength of the line in hydrogen atomic spectrum of Lyman series when $R_H = 109678 \text{ cm}^{-1}$ is
- A. $1002.7 \text{ \AA}$
B. $1215.67 \text{ \AA}$
C. $1127.30 \text{ \AA}$
D. $911.7 \text{ \AA}$

Answer

4. Arrange the following species in the correct order of their stability
 C_2 , Li_2 , O_2^+ , He_2^+
- A. $Li_2 < He_2^+ < O_2^+ < C_2$
B. $C_2 < O_2^+ < Li_2 < He_2^+$
C. $He_2^+ < Li_2 < C_2 < O_2^+$

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Answer

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5. Molecular formulae and shapes of some molecules are given below. Choose the incorrect match.

- A. NH_3 - Trigonal pyramidal
- B. SF_4 - Tetrahedral
- C. ClF_3 - T-shaped
- D. PCl_5 - Trigonal bipyramidal

Answer

6. If two moles of an ideal gas at 500 K occupies a volume of 41 L, the pressure of the gas is ($R =$

$0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$)

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

Answer

7. At 273 K, the density of a certain gaseous oxide at 2 atm is same as that of dioxygen at 5 atm.

The molecular mass of the oxide (in g mol^{-1}) is

- A. 80
- B. 64
- C. 32
- D. 160

Answer

8. Which of the following are isoelectronic species?

- (i) NH_3
- (ii) CH_3^+
- (iii) NH_2^-
- (iv) NH_4^+

Choose the correct answer from the codes given below.

- A. (i), (ii), (iii)
- B. (ii), (iii), (iv)
- C. (i), (ii), (iv)
- D. (i), (iii), (iv)

Answer

9. The salt of an alkali metal gives violet colour in the flame test. Its aqueous solution gives a white precipitate with barium chloride in hydrochloric acid medium. The salt is

- A. K_2SO_4
- B. KCl

D. K_2CO_3

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Answer

10. In which one of the following the central atom is sp^3 hybridised?

- A. NH_4^+
- B. BF_3
- C. SF_6
- D. PCl_5

Answer

11. The correct descending order of oxidising power of the following is

- A. $CrO_4^{2-} > MnO_4^- > VO_2^+$
- B. $MnO_4^- > CrO_4^{2-} > VO_2^+$
- C. $VO_2^+ > MnO_4^- > CrO_4^{2-}$
- D. $MnO_4^- > VO_2^+ > CrO_4^{2-}$

Answer

12. The number of electrons that are involved in the reduction of permanganate to manganese (II) salt, manganate and manganese dioxide respectively are

- A. 5, 1, 3
- B. 5, 3, 1
- C. 2, 7, 1
- D. 5, 2, 3

Answer

13. The calculated magnetic moment of a divalent ion of an atom with atomic number 24 in aqueous solution is

- A. 4.90 BM
- B. 5.92 BM
- C. 3.87 BM
- D. 2.84 BM

Answer

14. The entropy of vaporisation of a liquid is $58 \text{ J K}^{-1} \text{ mol}^{-1}$. If 100 g of its vapour condenses at its boiling point of 123°C , the value of entropy change for the process is

- A. -100 J K^{-1}
- B. 100 J K^{-1}
- C. -123 J K^{-1}
- D. 123 J K^{-1}

Answer

15. The values of limiting ionic conductance of H^+ and $HCOO^-$ ions are respectively 347 and 53 S cm^2 . Like. Share. Bookmark. Download. Make Notes. Print - Your Favourite Questions. Join www.zigya.com

A. 2.5×10^{-4}
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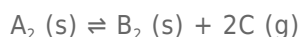
B. 2×10^{-5}

C. 2.5×10^{-5}

D. 1.5×10^{-4}

Answer

16. In a closed cylinder of capacity 24.6 L, the following reaction occurs at 27°C.



At equilibrium, 1 gm of $B_2 (s)$ (molar mass = 50 g mol⁻¹) is present. The equilibrium constant K_p for the equilibrium in atm² unit is

($R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$)

A. 1.6×10^{-2}

B. 1.6×10^{-5}

C. 1.6×10^{-3}

D. 1.6×10^{-4}

Answer

17. The pH of a saturated solution of a metal hydroxide of formula $X(OH)_2$ is 12.0 at 298 K. What is the solubility product of a metal hydroxide at 298 K (in mol³ L⁻³)?

A. 5×10^{-7}

B. 2×10^{-6}

C. 1×10^{-7}

D. 5×10^{-5}

Answer

18. The IUPAC name of the complex $[Co(NH_3)_2(H_2O)_4]Cl_3$ is

A. diaminetetraaquacobalt (III) trichloride

B. diaminetetraaquacobalt (II) chloride

C. diaminetetraaquacobalt (III) chloride

D. tetraaquadiaminecobalt (III) trichloride

Answer

19. The products obtained by the ozonolysis of 2-ethylbut-1-ene are

A. propanone and ethanal

B. methanal and 3-pentanone

C. ethanal and 3-pentanone

D. butanal and ethanal

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20. When but-2-yne is treated with Na in liquid ammonia

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- A. *cis*-2-butene is obtained
- B. *trans*-2-butene is formed
- C. *n*-butane is the major product
- D. it rearranges to but-1-yne

Answer

21. When *n*-hexane is heated with anhydrous AlCl_3 and HCl gas, the major product obtained is

- A. 1-chlorohexane
- B. 2-chlorohexane
- C. 3-chlorohexane
- D. mixture of 2-methylpentane and 3-methylpentane

Answer

22. How many monochloro structural isomers are expected in free radical monochlorination of 2-methylbutane?

- A. 3
- B. 4
- C. 5
- D. 6

Answer

23. Green chemistry deals with

- A. study of plant physiology
- B. study of extraction of natural products from plants
- C. detailed study of reactions involved in the synthesis of chlorophyll
- D. utilization of existing knowledge base for reducing the chemical hazards along with developmental activities

Answer

24. Potassium dichromate belongs to which crystal system?

- A. Tetragonal
- B. Orthorhombic
- C. Triclinic
- D. Hexagonal

Answer

25. The reaction of H_2 is given below



$-\text{CH}_2-\text{CHO}$ is specifically called as

- A. hydrogenation
- B. reduction

Answer

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26. Which one of the following is an incorrect statement?

- A. O_3 oxidises PbS to $PbSO_4$
- B. O_3 oxidises nitric oxide to nitrogen dioxide
- C. O_3 oxidises aqueous KI at $pH = 9.2$
- D. The two oxygen-oxygen bond lengths in O_3 are different

Answer

27. A sample of sea water contains 5×10^{-3} g of dissolved oxygen in 1 kg of the sample. The concentration of O_2 in that sea water sample in ppm is

- A. 5
- B. 5×10^{-3}
- C. 5×10^{-2}
- D. 5×10^{-1}

Answer

28. In a reaction, $2A + B \rightarrow 3C$, the concentration of A decreases from 0.5 mol L^{-1} to 0.3 mol L^{-1} in 10 minutes. The rate of production of 'C' during this period is

- A. $0.01 \text{ mol L}^{-1} \text{ min}^{-1}$
- B. $0.04 \text{ mol L}^{-1} \text{ min}^{-1}$
- C. $0.05 \text{ mol L}^{-1} \text{ min}^{-1}$
- D. $0.03 \text{ mol L}^{-1} \text{ min}^{-1}$

Answer

29. Ammonium ion (NH_4^+) reacts with nitrite ion (NO_2^-) in aqueous solution according to the equation

The following initial rates of reaction have been measured for the given reactant concentrations.

Expt. No.	$[NH_4^+], (M)$	$[NO_2^-], (M)$	Rate (M/hr)
1	0.010	0.020	0.020
2	0.015	0.020	0.030
3	0.010	0.010	0.005

Which of the following is the rate law for this reaction?

- A. $\text{Rate} = k[NH_4^+][NO_2^-]^4$

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C. Rate = $k [\text{NH}_4^+][\text{NO}_2^-]^2$

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D. Rate = $k[\text{NH}_4^+]^2[\text{NO}_2^-]$

Answer

30. Gold sol can be prepared by

- A. reduction of gold (III) chloride with formalin solution
- B. hydrolysis of gold (III) chloride
- C. oxidation of gold by aqua-regia
- D. peptization

Answer

31. A 250 W electric bulb of 80% efficiency emits a light of 6626 Å wavelength. The number of photons emitted per second by the lamp is ($h = 6.636 \times 10^{-34}$ Js)

- A. 1.42×10^{17}
- B. 2.18×10^{16}
- C. 6.66×10^{20}
- D. 2.83×10^{16}

Answer

32. The work function of a metal is 5 eV. What is the kinetic energy of the photoelectron ejected from the metal surface if the energy of the incident radiation is 6.2 eV? ($1 \text{ eV} = 1.6 \times 10^{-19}$)

- A. $1.92 \times 10^{-19} \text{ J}$
- B. $6.626 \times 10^{-19} \text{ J}$
- C. $8.10 \times 10^{-19} \text{ J}$
- D. $1.92 \times 10^{-18} \text{ J}$

Answer

33. The lattice energy of NaCl is 788 kJ mol^{-1} . This means that 788 kJ of energy is required

- A. to separate one mole of solid NaCl into one mole of Na (g) and one mole of Cl (g) to infinite distance
- B. to separate one mole of solid NaCl into one mole of Na^+ (g) and one mole of Cl^- (g) to infinite distance
- C. to convert one mole of solid NaCl into one mole of gaseous NaCl
- D. to convert one mole of gaseous NaCl into one mole of solid NaCl

Answer

34. Which one of the following statements is not true in respect of properties of interhalogen compounds?

A. They are all covalent compounds

B. They are volatile solids or liquids except ClF_3

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D. They are all paramagnetic in nature

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Answer

35. An aqueous solution containing 3 g of a solute of molar mass 111.6 g mol^{-1} in a certain mass of water freezes at -0.125°C . The mass of water in grams present in the solution is ($K_f = 1.86 \text{ K kg mol}^{-1}$)
- 300
 - 600
 - 500
 - 400

Answer

36. The change in potential of the half-cell $\text{Cu}^{2+}|\text{Cu}$ when aqueous Cu^{2+} solution is diluted 100 times at 298 K? $2.303 \text{ RTF} = 0.06$
- increases by 120 mV
 - decreases by 120 mV
 - increases by 60 mV
 - decreases by 60 mV

Answer

37. Consider the following electrolytic cells

(i) $\text{M (s)} | \text{M}^{2+} (\text{aq}), 0.1 \text{ M} || \text{X}^{2+} (\text{aq}), 0.01 \text{ M} | \text{X (s)}$

(ii) $\text{M (s)} | \text{M}^{2+} (\text{aq}), 0.1 \text{ M} || \text{X}^2 (\text{aq}), 0.01 \text{ M} | \text{X (s)}$

(iii) $\text{M (s)} | \text{M}^{2+} (\text{aq}), 0.1 \text{ M} || \text{X}^2 (\text{aq}), 0.01 \text{ M} | \text{X (s)}$

The cell EMF of the above cells are E_1 , E_2 and E_3 respectively. Which one of the following is true?

- $E_3 > E_2 > E_1$
- $E_1 > E_2 > E_3$
- $E_2 > E_3 > E_1$
- $E_1 > E_3 > E_2$

Answer

38. The correct decreasing order of reactivity for a given alkyl (R) group in both $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reaction mechanisms is
- $\text{R - I} > \text{R - Br} > \text{R - Cl} > \text{R - F}$
 - $\text{R - I} > \text{R - Cl} > \text{R - Br} > \text{R - F}$
 - $\text{R - F} > \text{R - Cl} > \text{R - Br} > \text{R - I}$
 - $\text{R - F} > \text{R - I} > \text{R - Cl} > \text{R - Br}$

Answer

39. The compound of molecular formula $\text{C}_5\text{H}_{10}\text{O}$ (A) reacts with Tollen's reagent to give silver mirror
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A. 3-pentanone

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B. 2, 2-dimethylpropanal

C. 3-hydroxy-2-pentene

D. 3-methylbutanal

Answer

40. Chloroform reacts with oxygen in the presence of light to give

A. carbon tetrachloride

B. carbonyl chloride

C. methyl chloride

D. acetaldehyde

Answer

41. Which one of the following is not expected to undergo iodoform reaction?

A. Propan-2-ol

B. Diphenyl methanol

C. 1-phenylethanol

D. 2-butanol

Answer

42. Identify the combination of compounds that undergo aldol condensation followed by dehydration to produce but-2-enal

A. methanal and ethanal

B. two moles of ethanal

C. methanal and propanone

D. ethanal and propanone

Answer43. An organic compound with the molecular formula C_8H_8O forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1, 2-benzenedicarboxylic acid. The organic compound is

A. 2-ethylbenzaldehyde

B. 2-methylbenzaldehyde

C. acetophenone

D. 3-methylbenzaldehyde

Answer

44. Phenyl isocyanide is prepared from aniline by

A. Carbylamine reaction

B. Rosenmund's reaction

C. Koble's reaction

D. Reimer-Tiemann reaction

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A. ethanamine

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B. N-methylmethanamine

C. benzene amine

D. N, N-dimethylmethanamine

Answer

46. The sugar moiety present in RNA molecule is

A. β -D-2-deoxyriboseB. β -D-galactoseC. β -D-fructofuranoseD. β -D-ribose

Answer

47. Novlac, the linear polymer used in paints is

A. copolymer of 1,3-butadiene and styrene

B. obtained by the polymerization of methyl methacrylate

C. initial product obtained in the condensation of phenol and formaldehyde in the presence of acid catalyst

D. obtained by the polymerisation of caprolactam

Answer

48. The carbohydrate used as storage molecule in animal is

A. sucrose

B. glycogen

C. maltose

D. glucose

Answer