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Previous Year Paper

Chemistry - 2007



Multiple Choice Questions

1. Which one of the following compounds has the smallest bond angle in its molecule ?

- A. SO_2
- B. OH_2
- C. SH_2
- D. NH_3

Answer

2. The solubility in water of a sparingly soluble salt AB_2 is $1.0 \times 10^{-5} \text{ mol L}^{-1}$. Its solubility product number will be

- A. 4×10^{-15}
- B. 4×10^{-10}
- C. 1×10^{-15}
- D. 1×10^{-10}

Answer

3. If at 298 K the bond energies of C-H, C-C, C=C and H-H bonds are respectively 414, 347, 615 and 435 kJ mol^{-1} , the value of enthalpy change for the reaction $\text{H}_2\text{C}=\text{CH}_2 (\text{g}) + \text{H}_2 (\text{g}) \rightarrow \text{H}_3\text{C}-\text{CH}_3 (\text{g})$ at 298 K will be

- A. +250 kJ
- B. -250 kJ
- C. +125 kJ
- D. -125 kJ

Answer

4. The correct order of increasing basic nature for the bases NH_3 , CH_3NH_2 and $(\text{CH}_3)_2\text{NH}$ is

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

Answer

5. The solubilities of carbonates decrease down the magnesium group due to a decrease in

- A. lattice energies of solids

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D. entropy of solution formation

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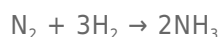
Answer

6. Due to the presence of an unpaired electron free radicals are

- A. cations
- B. anions
- C. chemically inactive
- D. chemically reactive

Answer

7. Consider the reaction,



carried out at constant temperature and pressure. If ΔH and ΔU are the enthalpy and internal energy changes for the reaction, which of the following expression is true?

- A. $\Delta H > \Delta U$
- B. $\Delta H < \Delta U$
- C. $\Delta H = \Delta U$
- D. $\Delta H = 0$

Answer

8. The molecular shapes of SF_4 , CF_4 and XeF_4 are

- A. different with 1, 0 and 2 lone pairs of electrons on the central atom, respectively
- B. different with 0, 1 and 2 lone pairs of electrons on the central atom, respectively
- C. the same with 1, 1 and 1 lone pair of electrons on the central atoms, respectively
- D. the same with 2, 0 and 1 lone pairs of electrons on the central atom, respectively

Answer

9. The wavelength of the radiation emitted, when in a hydrogen atom electron falls from infinity to stationary state 1, would be (Rydberg constant = $1.097 \times 10^7 \text{ m}^{-1}$)

- A. 91 nm
- B. 192 nm
- C. 406 nm
- D. $9.1 \times 10^{-8} \text{ nm}$

Answer

10. What is the equilibrium expression for the reaction



- A. $K_c = \text{P}_4\text{O}_{10}[\text{P}_4][\text{O}_2]^5$
- B. $K_c = \text{P}_4\text{O}_{10}^5[\text{P}_4][\text{O}_2]$
- C. $K_c = [\text{O}_2]^5$

D. $K_c = 1/[\text{O}_2]^5$

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11. The enthalpies of combustion of carbon and carbon monoxide are -393.5 and -283 kJ mol⁻¹ respectively. The enthalpy of formation of carbon monoxide per mole is

- A. 110.5 kJ
- B. 676.5 kJ
- C. -676.5 kJ
- D. -110.5 kJ

Answer

12. Which one of the following does not have sp^2 hybridised carbon ?

- A. Acetone
- B. Acetic acid
- C. Acetonitrile
- D. Acetamide

Answer

13. The temperature dependence of rate constant (k) of a chemical reaction is written in terms of Arrhenius equation, $k = Ae^{-E^*/RT}$. Activation energy (E^*) of the reaction can be calculated by plotting

- A. $\log k$ vs $1/T$
- B. $\log k$ vs $\log T$
- C. k vs T
- D. k vs $\log T$

Answer

14. Formation of a solution from two components can be considered as

- (1) pure solvent $\rightarrow$ separated solvent molecules, ΔH_1
- (2) pure solute $\rightarrow$ separated solute molecules, ΔH_2
- (3) separated solvent and solute molecules $\rightarrow$ solution, ΔH_3

Solution so formed will be ideal if

- A. $\Delta H_{soln} = \Delta H_1 - \Delta H_2 - \Delta H_3$
- B. $\Delta H_{soln} = \Delta H_3 - \Delta H_1 - \Delta H_2$
- C. $\Delta H_{soln} = \Delta H_1 + \Delta H_2 + \Delta H_3$
- D. $\Delta H_{soln} = \Delta H_1 + \Delta H_2 - \Delta H_3$

Answer

15. Among the following, the pair in which the two species are not isostructural, is

- A. SiF_4 and SF_4
- B. IO_3^- and XeO_3
- C. BH_4^- and NH_4^+
- D. PF_6^- and SF_6

A. 15 L of H_2 gas at STP

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B. 5 L of N_2 gas at STPC. 0.5 g of H_2 gasD. 10 g of O_2 gas

Answer

17. Ionic radii are

A. inversely proportional to effective nuclear charge

B. inversely proportional to square of effective nuclear charge

C. directly proportional to effective nuclear charge

D. directly proportional to square of effective nuclear charge

Answer

18. The helical structure of protein is stabilized by

A. dipeptide bond

B. hydrogen bonds

C. ether bonds

D. peptide bonds

Answer

19. The radioactive isotope Co^{2760} which is used in the treatment of cancer can be made by (n, p) reaction. For this reaction the target nucleus isA. Ni^{2859} B. Co^{2759} C. Ni^{2860} D. Co^{2760}

Answer

20. The work done during the expansion of a gas from a volume of 4 dm^3 to 6 dm^3 against a constant external pressure of 3 atm, is

A. -6 J

B. -608 J

C. +304 J

D. -304 J

Answer

21. The vapour pressure of two liquids P and Q are 80 and 60 torr, respectively. The total vapour pressure of solution obtained by mixing 3 moles of P and 2 moles of Q would be

A. 140 torr

B. 20 torr

C. 68 torr

D. 72 torr

Answer

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22. The energy of second Bohr orbit of the hydrogen atom is -328 kJ mol^{-1} ; hence the energy of

fourth Bohr orbit would be

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A. -41 kJ mol^{-1}

B. $-1312 \text{ kJ mol}^{-1}$

C. -164 kJ mol^{-1}

D. -82 kJ mol^{-1}

Answer

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

A. $\text{Cl} < \text{F} < \text{S} < \text{O}$

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

24. What amount of bromine will be required to convert 2 g of phenol into 2, 4, 6-bribromo phenol?

A. 20.44 gm

B. 6.00 gm

C. 4.00 gm

D. 10.22 gm

Answer

25. The concentration of H_2O_2 solution of 10 volume is

A. 30%

B. 3%

C. 1%

D. 10%

Answer

26. The dipole moment of HBr is $1.6 \times 10^{-30} \text{ cm}$ and inter-atomic spacing is $1 \text{ \AA}$. The % ionic character of HBr is

A. 7

B. 10

C. 15

D. 27

Answer

27. Graphite is a soft solid lubricant extremely difficult to melt. The reason for this anomalous behaviour is that, graphite

A. is a non-crystalline substance

B. is an allotropic form of diamond

C. has molecules of variable molecular masses, like polymers

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with weak interplate bonds

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Answer

28. Alkyl halides react with dialkyl copper reagents to give

- A. alkenyl halides
- B. alkanes
- C. alkyl copper halides
- D. alkenes

Answer

29. The structure of diborane (B_2H_6) contains

- A. four $2C-2e^-$ bonds and four $3C-2e^-$ bonds
- B. two $2C-2e^-$ bonds and two $3C-3e^-$ bonds
- C. two $2C-2e^-$ bonds and four $3C-2e^-$ bonds
- D. four $2C-2e^-$ bonds and two $3C-2e^-$ bonds

Answer

30. An organic compound having molecular mass 60 is found to contain C = 20%, H = 6.67% and N = 46.67% while rest is oxygen. On heating it gives NH_3 alongwith a solid residue. The solid residue give violet colour with alkaline copper sulphate solution. The compound is

- A. $CH_3CH_2CONH_2$
- B. $(NH_2)_2CO$
- C. CH_3CONH_2
- D. CH_3NCO

Answer

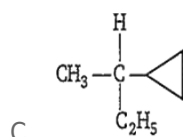
31. In a hydrogen-oxygen fuel cell, combustion of hydrogen occurs to

- A. generate heat
- B. create potential difference between the two electrodes
- C. produce high purity water
- D. remove adsorbed oxygen from electrode surfaces

Answer

32. Amongst the following compounds, the optically active alkane having lowest molecular mass is

- A. $CH_3-CH_2-CH_2-CH_3$
- B. $CH_3-CH_2-CH(CH_3)-CH_3$



- D. $CH_3-CH_2-C\equiv CH$

Answer

33. Which of the following will not be a chiral molecule? www.zigya.com

B. 2,3-dichlorobutane

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C. 2,3-dichloropentane

D. 2-hydroxypropanoic acid

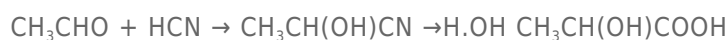
Answer

34. The smog is essentially caused by the presence of

- A. O_2 and O_3
- B. O_2 and N_2
- C. oxides of sulphur and nitrogen
- D. O_3 and N_2

Answer

35. In this reaction



an asymmetric centre is generated. The acid obtained would be

- A. 50% D + 50% L-isomer
- B. 20% D + 80% L-isomer
- C. D-isomer
- D. L-isomer

Answer

36. Which one of the following octahedral complexes will not show geometrical isomerism? (A and B are monodentate ligands)

- A. $[MA_4B_2]$
- B. $[MA_5B]$
- C. $[MA_2B_4]$
- D. $[MA_3B_3]$

Answer

37. According to IUPAC nomenclature sodium nitroprusside is named as

- A. sodium pentacyanonitrosyl ferrate (II)
- B. sodium pentacyanonitrosyl ferrate (III)
- C. sodium nitroferricyanide
- D. sodium nitroferrocyanide

Answer

38. Which of the following is responsible for depletion of the ozone layer in the upper strata of the atmosphere ?

- A. Polyhalogens
- B. Ferrocenes
- C. Fullerenes

D. Freons

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39. $\text{CaC}_2 + \text{N}_2 \rightarrow \text{A}$, product A is

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A. CaCN_2

B. CaCN_2 and C

C. $\text{CaCN}_2 + \text{N}_2$

D. None of these

Answer

40. How many unit cells are present in a cube shaped ideal crystal of NaCl of mass 1.00 gm? [Atomic masses : Na = 23; Cl = 35.5]

A. 2.57×10^{21}

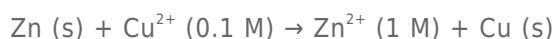
B. 5.14×10^{21}

C. 1.28×10^{21}

D. 1.71×10^{21}

Answer

41. For the redox reaction



taking place in a cell, E_{cell}° is 1.10 V. E_{cell} for the cell will be $2.303 \text{ RTF} = 0.0591$

A. 2.14 V

B. 1.80 V

C. 1.07 V

D. 0.82 V

Answer

42. The rate law for a reaction between the substances A and B is given by $\text{rate} = k[\text{A}]^n[\text{B}]^m$. On doubling the concentration of A and halving the concentration of B, the ratio of the new rate to the earlier rate of the reaction will be as

A. 2^{2m+n}

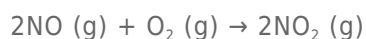
B. $(m+n)$

C. $(n-m)$

D. $2^{(n-m)}$

Answer

43. For the reaction system,



volume is suddenly reduced to half its value by increasing the pressure on it. If the reaction is of first order with respect to O_2 and second order with respect to NO; the rate of reaction will

A. diminish to one-fourth of its initial value

B. diminish to one-eighth of its initial value

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D. increase to four times of its initial value

Answer Study, Assignments, Solved Previous Year Papers . Questions and Answers. Free Forever.

44. Which one of the following characteristics is not correct for physical adsorption ?

- A. Adsorption on solids is reversible
- B. Adsorption increases with increase in temperature
- C. Adsorption is spontaneous
- D. Both enthalpy and entropy of adsorption are negative

Answer

45. The highest electrical conductivity of the following aqueous solutions is of

- A. 0.1 M difluoroacetic acid
- B. 0.1 M fluoroacetic acid
- C. 0.1 M chloroacetic acid
- D. 0.1 M acetic acid

Answer

46. Aluminium oxide may be electrolysed at 1000°C to furnish aluminium metal (atomic mass = 27 amu; 1 F = 96,500 C). The cathode reaction is



To prepare 5.12 kg of aluminium metal by this method would require

- A. 5.49×10^1 C of electricity
- B. 5.49×10^4 C of electricity
- C. 1.83×10^7 C of electricity
- D. 5.49×10^7 C of electricity

Answer

47. The lanthanide contraction is responsible for the fact that

- A. Zr and Zn have the same oxidation state
- B. Zr and Hf have about the same radius
- C. Zr and Nb have similar oxidation state
- D. Zr and Y have about the same radius

Answer

48. Calomel (Hg_2Cl_2) on reaction with ammonium hydroxide gives

- A. HgO
- B. Hg_2O
- C. $\text{NH}_2\text{-Hg-Hg-Cl}$
- D. HgNH_2Cl

Answer

49. Which one of the following aqueous solutions will exhibit highest boiling point ?

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B. 0.01 M KNO_3

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C. 0.015 M urea

D. 0.015 M glucose

Answer

50. Which among the following factors is the most important in making fluorine the strongest oxidizing agent ?

A. Electron affinity

B. Ionization enthalpy

C. Hydration enthalpy

D. Bond dissociation energy

Answer

51. Which one of the following ores is best concentrated by froth-floatation method ?

A. Magnetite

B. Cassiterite

C. Galena

D. Malachite

Answer

52. Excess of KI reacts with CuSO_4 solution and then $\text{Na}_2\text{S}_2\text{O}_3$ solution is added to it. Which of the statements is incorrect for this reaction ?

A. Cu_2I_2 is formed

B. CuI_2 is formed

C. $\text{Na}_2\text{S}_2\text{O}_3$ is oxidised

D. Evolved I_2 is reduced

Answer

53. The radioisotope, tritium (^3H) has a half-life of 12.3 yr. If the initial amount of tritium is 32 mg, how many milligrams of it would remain after 49.2 yr ?

A. 4 mg

B. 8 mg

C. 1 mg

D. 2 mg

Answer

54. The method of zone refining of metals is based on the principle of

A. greater noble character of the solid metal than that of the impurity

B. greater solubility of the impurity in the molten state than in the solid

C. greater mobility of the pure metal than that of impurity

D. higher melting point of the impurity than that of the pure metal

Answer

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- B. $\text{La}^{3+} < \text{Eu}^{3+} < \text{Lu}^{3+} < \text{Y}^{3+}$
- C. $\text{Y}^{3+} < \text{La}^{3+} < \text{Eu}^{3+} < \text{Lu}^{3+}$
- D. $\text{Y}^{3+} < \text{Lu}^{3+} < \text{Eu}^{3+} < \text{La}^{3+}$

Answer

56. Which one of the following compounds, is not a protonic acid ?

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

Answer

57. The mass of carbon anode consumed (giving only carbon dioxide) in the production of 270 kg of aluminium metal from bauxite by the Hall process is (Atomic mass of Al = 27)

- A. 180 kg
- B. 270 kg
- C. 540 kg
- D. 90 kg

Answer

58. Which of the following is anhydride of perchloric acid ?

- A. Cl_2O_7
- B. Cl_2O_5
- C. Cl_2O_3
- D. HClO

Answer

59. When $\text{CH}_2=\text{CH}-\text{COOH}$ is reduced with LiAlH_4 , the compound obtained will be

- A. $\text{CH}_3-\text{CH}_2-\text{COOH}$
- B. $\text{CH}_2=\text{CH}-\text{CH}_2\text{OH}$
- C. $\text{CH}_3-\text{CH}_2-\text{CH}_2\text{OH}$
- D. $\text{CH}_3-\text{CH}_2-\text{CHO}$

Answer

60. Nylon threads are made of

- A. polyvinyl polymer
- B. polyester polymer
- C. polyamide polymer
- D. polyethylene polymer

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A. mixture of secondary and tertiary alcohols

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B. mixture of primary and secondary alcohols

C. secondary or tertiary alcohol

D. primary alcohol

Answer

62. Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound of water during the reaction is continuously removed. The compound formed is generally known as

A. an amine

B. an imine

C. an enamine

D. a Schiff's base

Answer

63. Consider the acidity of the carboxylic acids

(i) PhCOOH

(ii) $o\text{-NO}_2\text{C}_6\text{H}_4\text{COOH}$

(iii) $p\text{-NO}_2\text{C}_6\text{H}_4\text{COOH}$

(iv) $m\text{-NO}_2\text{C}_6\text{H}_4\text{COOH}$

Which of the following order is correct?

A. (i) > (ii) > (iii) > (iv)

B. (ii) > (iv) > (iii) > (i)

C. (ii) > (iv) > (i) > (iii)

D. (ii) > (iii) > (iv) > (i)

Answer

64. The compound formed on heating chlorobenzene with chloral in the presence of concentrated sulphuric acid is

A. gammexane

B. DDT

C. freon

D. hexachloroethane

Answer

65. Among the following compounds which can be dehydrated very easily ?

A. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

B. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$

C. $\text{CH}_3\text{CH}_2\text{C}(\text{OH})(\text{CH}_3)\text{CH}_2\text{CH}_3$

D. $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$

Answer

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A. one carboxylic acid residue and two phosphate groups

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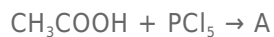
B. three phosphate groups

C. three carboxylic acid residues

D. two carboxylic acid residues and one phosphate groups

Answer

67. In a set of the given reactions, acetic acid yielded a product C.



A $\rightarrow$ anhy. $\text{AlCl}_3/\text{C}_6\text{H}_6$ B $\rightarrow$ ether $\text{C}_2\text{H}_5\text{MgBr}$ C

Product C would be

A. $\text{CH}_3\text{CH}(\text{OH})\text{C}_6\text{H}_5$

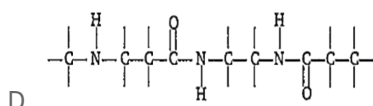
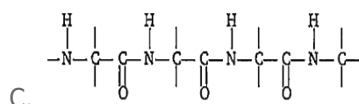
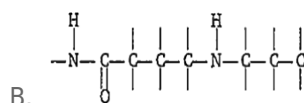
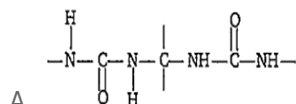
B. $\text{CH}_3\text{-C}(\text{C}_2\text{H}_5)(\text{OH})\text{C}_6\text{H}_5$

C. $\text{CH}_3\text{CH}(\text{OH})\text{C}_2\text{H}_5$

D. $\text{CH}_3\text{COC}_6\text{H}_5$

Answer

68. Which one of the following structures represents the peptide chain ?



Answer

69. A sequence of how many nucleotides in messenger RNA makes a codon for an amino acid?

A. Three

B. Four

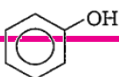
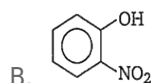
C. One

D. Two

Answer

70. Which one of the following compounds, is most acidic?

A. $\text{Cl-CH}_2\text{-CH}_2\text{-OH}$



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Answer

71. Which functional group participates in disulphide bond formation in proteins ?

- A. Thiolacetone
- B. Thiol
- C. Thioether
- D. Thioester

Answer

72. Isomers of propionic acid are

- A. HCOOC_2H_5 and $\text{CH}_3\text{COOCH}_3$
- B. HCOOC_2H_5 and $\text{C}_3\text{H}_7\text{COOH}$
- C. $\text{CH}_3\text{COOCH}_3$ and $\text{C}_3\text{H}_7\text{OH}$
- D. $\text{C}_3\text{H}_7\text{OH}$ and CH_3COCH_3

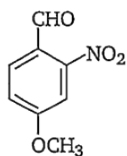
Answer

73. Metamers of ethyl propionate are

- A. $\text{C}_4\text{H}_9\text{COOH}$ and HCOOC_4H_9
- B. $\text{C}_4\text{H}_9\text{COOH}$ and $\text{CH}_3\text{COOC}_3\text{H}_7$
- C. $\text{CH}_3\text{COOCH}_3$ and $\text{CH}_3\text{COOC}_3\text{H}_7$
- D. $\text{CH}_3\text{COOC}_3\text{H}_7$ and $\text{C}_3\text{H}_7\text{COOCH}_3$

Answer

74. What is the correct IUPAC name of



- A. 4-methoxy-2-nitrobenzaldehyde
- B. 4-formyl-3-nitro anisole
- C. 4-methoxy-6-nitrobenzaldehyde
- D. 2-formyl-5-methoxy nitrobenzene

Answer

75. The safest and the most commone alternative of sugar is

- A. glucose
- B. aspartame
- C. saccharin
- D. cyclodextrin

Answer