AP Chemistry

Sample Question Paper - 2023

Country: US | Duration: 3h 15m | Max Marks: 5-point scale | Language: English

Negative Marking: No | Total Questions: 60 | QuizVerse AI Tutor

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General Instructions:

1. This paper contains 60 questions across 1 section(s): Chemistry.
2. Duration: 3h 15m. Maximum marks: 5-point scale.
3. Negative marking: No.
4. Read each question carefully before answering.

Section 1: Chemistry (60 Questions)

Q1. Grignard reagents react with dry CO2 to give:

(A) Alcohols

(B) Esters

(C) Ketones

(D) Carboxylic acids

Q2. Gibbs free energy change for a spontaneous process is:

(A) Negative

(B) Undefined

(C) Positive

(D) Zero

Q3. The hybridization of C in acetylene is:

(A) sp

(B) sp3d

(C) sp3

(D) sp2

Q4. The van't Hoff factor for NaCl is approximately:

(A) 0.5

(B) 3

(C) 1

(D) 2

Q5. VSEPR theory predicts the shape of SF6 as:

(A) Octahedral

(B) Tetrahedral

(C) Square planar

(D) Trigonal bipyramidal

Q6. Lanthanide contraction is caused by:

(A) Nuclear fusion

(B) High ionization energy

(C) Electron capture

(D) Poor shielding by 4f electrons

Q7. The order of ionic radius: Na+ vs Mg2+ vs Al3+ is:

(A) Na+ > Mg2+ > Al3+

(B) All equal

(C) Mg2+ > Na+ > Al3+

(D) Al3+ > Mg2+ > Na+

Q8. The reagent for converting aldehyde to carboxylic acid is:

(A) Zn-Hg / HCl

(B) LiAlH4

(C) NaBH4

(D) KMnO4 / K2Cr2O7

Q9. Which reagent is used for Baeyer-Villiger oxidation?

(A) NaBH4

(B) KMnO4

(C) mCPBA / peracid

(D) LiAlH4

Q10. Which element has the highest electronegativity?

(A) Fluorine

(B) Chlorine

(C) Oxygen

(D) Nitrogen

Q11. Friedel-Crafts acylation uses which catalyst?

(A) CuCl2

(B) FeCl3

(C) AlCl3

(D) ZnCl2

Q12. The lightest noble gas is:

(A) Krypton

(B) Neon

(C) Argon

(D) Helium

Q13. Which test distinguishes aldehydes from ketones?

(A) Lucas test

(B) Tollens' test (silver mirror)

(C) Lassaigne test

(D) Beilstein test

Q14. The cell potential for Zn|Zn2+||Cu2+|Cu cell is:

(A) 1.10 V

(B) -0.76 V

(C) 0.34 V

(D) 0.76 V

Q15. The pH of a 0.1 M HCl solution is:

(A) 3

(B) 4

(C) 1

(D) 2

Q16. The IUPAC name of neopentane is:

(A) Pentane

(B) 2-Methylbutane

(C) 2,2-Dimethylpropane

(D) Cyclopentane

Q17. The hybridization of C in acetylene is:

(A) sp

(B) sp3d

(C) sp3

(D) sp2

Q18. Kolbe's electrolysis of sodium acetate gives:

(A) Propane

(B) Butane

(C) Methane

(D) Ethane

Q19. Wurtz reaction involves coupling of:

(A) Aldehydes with NaOH

(B) Alkyl halides with Na

(C) Acids with SOCl2

(D) Aryl halides with Cu

Q20. The product of dehydration of ethanol at 443 K is:

(A) Ethylene (C2H4)

(B) Acetic acid

(C) Diethyl ether

(D) Acetaldehyde

Q21. Which test distinguishes aldehydes from ketones?

(A) Lucas test

(B) Beilstein test

(C) Lassaigne test

(D) Tollens' test (silver mirror)

Q22. The shape of XeF4 is:

(A) Tetrahedral

(B) Octahedral

(C) See-saw

(D) Square planar

Q23. Which of the following has the highest lattice energy?

(A) NaCl

(B) NaI

(C) NaBr

(D) NaF

Q24. The pH of a 0.1 M HCl solution is:

(A) 4

(B) 1

(C) 2

(D) 3

Q25. According to Raoult's law, the vapour pressure of a solvent in solution is:

(A) p = p0 * x_solvent

(B) p = RT/V

(C) p = p0 / x_solvent

(D) p = p0 * x_solute

Q26. Grignard reagents react with dry CO2 to give:

(A) Esters

(B) Carboxylic acids

(C) Alcohols

(D) Ketones

Q27. Friedel-Crafts acylation uses which catalyst?

(A) CuCl2

(B) FeCl3

(C) ZnCl2

(D) AlCl3

Q28. The ore of aluminium is:

(A) Chalcopyrite

(B) Galena

(C) Haematite

(D) Bauxite

Q29. Hess's law states that:

(A) Entropy always increases

(B) Volume is constant

(C) Enthalpy change is path independent

(D) Rate depends on concentration

Q30. The IUPAC name of CH3CH(OH)CH3 is:

(A) Isopropyl ether

(B) Propan-1-ol

(C) 2-Methylethanol

(D) Propan-2-ol

Q31. Perkin reaction produces:

(A) Alcohols

(B) Ethers

(C) Alpha,beta-unsaturated acids

(D) Amines

Q32. Kolbe's electrolysis of sodium acetate gives:

(A) Methane

(B) Propane

(C) Butane

(D) Ethane

Q33. The equilibrium constant Kp and Kc are related by:

(A) Kp = Kc

(B) Kp = Kc(RT)^delta_n

(C) Kp = RT*Kc

(D) Kp = Kc/RT

Q34. Which reagent is used for Baeyer-Villiger oxidation?

(A) mCPBA / peracid

(B) KMnO4

(C) LiAlH4

(D) NaBH4

Q35. Markovnikov's rule applies to the addition of HBr to:

(A) Ethene

(B) Methane

(C) Benzene

(D) Propene

Q36. The colour of KMnO4 is due to:

(A) f-f transition

(B) Charge transfer transition

(C) d-d transition

(D) s-p transition

Q37. For an endothermic reaction, increasing temperature:

(A) Decreases rate

(B) No effect

(C) Increases equilibrium constant

(D) Decreases equilibrium constant

Q38. The van't Hoff factor for NaCl is approximately:

(A) 2

(B) 0.5

(C) 1

(D) 3

Q39. Which of the following has the highest lattice energy?

(A) NaBr

(B) NaF

(C) NaCl

(D) NaI

Q40. The product of dehydration of ethanol at 443 K is:

(A) Ethylene (C2H4)

(B) Acetaldehyde

(C) Acetic acid

(D) Diethyl ether

Q41. Which metal is extracted by thermite process?

(A) Chromium

(B) Iron

(C) Sodium

(D) Aluminium

Q42. Hess's law states that:

(A) Enthalpy change is path independent

(B) Rate depends on concentration

(C) Entropy always increases

(D) Volume is constant

Q43. d-block elements show variable oxidation states because:

(A) Filled d orbitals

(B) Close energy of (n-1)d and ns orbitals

(C) Large atomic size

(D) Low ionization energy

Q44. Grignard reagents react with dry CO2 to give:

(A) Esters

(B) Alcohols

(C) Ketones

(D) Carboxylic acids

Q45. The ore of aluminium is:

(A) Chalcopyrite

(B) Galena

(C) Haematite

(D) Bauxite

Q46. The rate of reaction doubles when temperature increases by:

(A) 20 K

(B) 50 K

(C) 5 K

(D) 10 K

Q47. Which metal is extracted by thermite process?

(A) Chromium

(B) Iron

(C) Aluminium

(D) Sodium

Q48. Markovnikov's rule applies to the addition of HBr to:

(A) Methane

(B) Propene

(C) Benzene

(D) Ethene

Q49. The crystal field splitting energy in octahedral complex is:

(A) Delta_sq

(B) 10Dq_tet

(C) Delta_tet

(D) Delta_oct

Q50. The molar conductivity at infinite dilution can be obtained by:

(A) Ohm's law

(B) Faraday's law

(C) Hess's law

(D) Kohlrausch's law

Q51. The magnetic moment of Fe2+ (d6) in weak field is:

(A) 0 BM

(B) 4.9 BM (4 unpaired)

(C) 5.9 BM

(D) 2.83 BM

Q52. The hybridization of Ni in [Ni(CN)4]2- is:

(A) dsp2

(B) sp3

(C) sp3d

(D) d2sp3

Q53. The cell potential for Zn|Zn2+||Cu2+|Cu cell is:

(A) 0.34 V

(B) 0.76 V

(C) 1.10 V

(D) -0.76 V

Q54. The hybridization of Ni in [Ni(CN)4]2- is:

(A) d2sp3

(B) dsp2

(C) sp3

(D) sp3d

Q55. The shape of XeF4 is:

(A) Octahedral

(B) Tetrahedral

(C) See-saw

(D) Square planar

Q56. The cell potential for Zn|Zn2+||Cu2+|Cu cell is:

(A) 0.76 V

(B) 0.34 V

(C) -0.76 V

(D) 1.10 V

Q57. Which reagent is used for Baeyer-Villiger oxidation?

(A) LiAlH4

(B) NaBH4

(C) KMnO4

(D) mCPBA / peracid

Q58. Colligative properties depend on:

(A) Nature of solvent

(B) Number of solute particles

(C) Molar mass of solute

(D) Nature of solute

Q59. According to Raoult's law, the vapour pressure of a solvent in solution is:

(A) p = p0 * x_solute

(B) p = RT/V

(C) p = p0 / x_solvent

(D) p = p0 * x_solvent

Q60. Which element has the highest electronegativity?

(A) Nitrogen

(B) Fluorine

(C) Chlorine

(D) Oxygen

Answer Key

Q1: (D)	Q2: (A)	Q3: (A)	Q4: (D)	Q5: (A)
Q6: (D)	Q7: (A)	Q8: (D)	Q9: (C)	Q10: (A)
Q11: (C)	Q12: (D)	Q13: (B)	Q14: (A)	Q15: (A)
Q16: (C)	Q17: (A)	Q18: (D)	Q19: (B)	Q20: (A)
Q21: (D)	Q22: (D)	Q23: (D)	Q24: (D)	Q25: (A)
Q26: (B)	Q27: (D)	Q28: (D)	Q29: (C)	Q30: (D)
Q31: (C)	Q32: (D)	Q33: (B)	Q34: (A)	Q35: (D)
Q36: (B)	Q37: (C)	Q38: (A)	Q39: (B)	Q40: (A)
Q41: (A)	Q42: (A)	Q43: (B)	Q44: (D)	Q45: (D)
Q46: (D)	Q47: (A)	Q48: (B)	Q49: (D)	Q50: (D)
Q51: (B)	Q52: (A)	Q53: (C)	Q54: (B)	Q55: (D)
Q56: (D)	Q57: (D)	Q58: (B)	Q59: (D)	Q60: (B)