PREVIOUS YEAR PAPER

UP PGT 2016 — Chemistry (Series A)

UP PGT · 1 or 2 February 2019

125 questions · +3.4 for a correct answer, −0 for a wrong one · 120 minutes

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Questions from the U.P. Secondary Education Services Selection Board's paper of 1 or 2 February 2019. Each question is followed by its answer, and the answer key is repeated on the last page.

Take it as a timed practice test: exambharo.com/up-pgt/previous-year-papers/up-pgt-2016-chemistry-series-a/

Chemistry

1. The cation that initiates blood clotting and is also known to trigger muscle contraction is

(a) Na+

(b) K+

(c) $Ca^{2}+$

(d) $Fe^{2}+$

Answer: (c)

2. Among the metal chlorides given below, this will give the lowest melting point as per Fajan's rules

(a) CaCl2

(b) BaCl2

(c) MgCl2

(d) SrCl2

Answer: (c)

3. Select the correct statement from the following.

(a) Adsorption decreases surface energy.

(b) Adsorption is an irreversible process

(c) Adsorption increases with rise in temperature.

(d) Adsorption is always monolayer.

Answer: (a)

4. The molar conductance λm of 0.1 M HCl solution is 412.0 $sm^{2}\ mol^{-1}$ and transport number of H+ is 0.825. Which of the following will be the molar ionic conductance ($sm^{2}\ mol^{-1}$) of Cl− ?

(a) 69.3

(b) 72.1

(c) 73.4

(d) 74.1

Answer: (b)

5. Among the following both the members of which pair are paramagnetic ?

(a) N_2^+, B_2

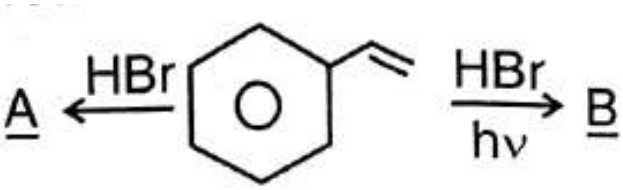
(b) N_2, O_2^{2-}

(c) N_2^+, O_2^{2-}

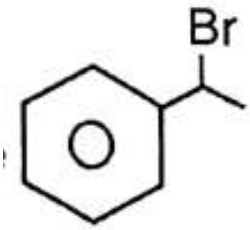
(d) N_2, O_2^-

Answer: (a)

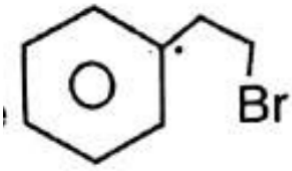
6. Identify A and B in the following reactions.



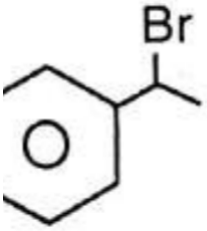
(a) A and B both are



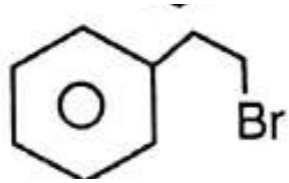
(b) A and B both are



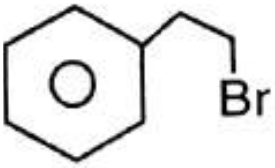
(c) A is



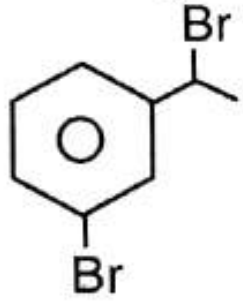
and B is



(d) A is



and B is



Answer: (c)

7. Which one of the following has the highest coagulating power for As2S3 colloid ?

(a) $PO4^{3-}$

(b) Al^{3+}

(c) $SO4^{2-}$

(d) Na+

Answer: (b)

8. Identify the product A of the reaction.
C6H5CHO + CH2(COOH)2 —(NH3/C2H5OH, Δ)→ A

(a) C6H5CH = CHCOOH

(b) C6H5CH(OH)CH2COOH

(c) C6H5COCH2COOH

(d) C6H5 CH2COOH

Answer: (a)

9. The oxidation state of Fe in the complex Na[Fe (CO)4H] is

(a) + 2

(b) – 2

(c) + 3

(d) + 4

Answer: —

10. What is the product P in the reaction ?
CH ≡ CH(g) + EtMgBr —(either)→ P

(a) CH ≡ CMgBr

(b) BrMge ≡ CMgBr

(c) Brc ≡ C Br

(d) CH ≡ C Br

Answer: —

11. If the gold number for the colloidal solutions A, B and C are 0.1, 2.5 and 20 respectively, the order of protective powers of these colloids will be

(a) C > B > A

(b) A > B > C

(c) A = B = C

(d) B > A > C

Answer: (b)

12. The vapour pressure of a pure liquid A is 40 mm Hg and a solution B prepared in A at the same temperature has vapour pressure of 20 mm Hg, then what will be the mole fraction of A in the solution ?

(a) 0.5
(b) 0.25
(c) 0.125
(d) 0.75

Answer: (a)

13. Among the given statements regarding the structures of NH3 and H3O+, which one is incorrect ?

(a) All N – H bonds in NH3 are equal in length and strength
(b) All O – H bonds in H3O+ are equal in length and strength
(c) N in NH3 and O in H3O+, both the atoms involve sp^3 hybridization
(d) Number of lone pairs of electrons on N atom (NH3) is only one but two on O atom (H3O+)

Answer: (d)

14. Which of the following statements is true for cyclohexane ?

(a) Both chair and boat conformations posses angle strain.
(b) Only chair conformation is free from angle strain.
(c) Only boat conformation is free from angle strain.
(d) Both chair and boat conformations are free from angle strain.

Answer: (d)

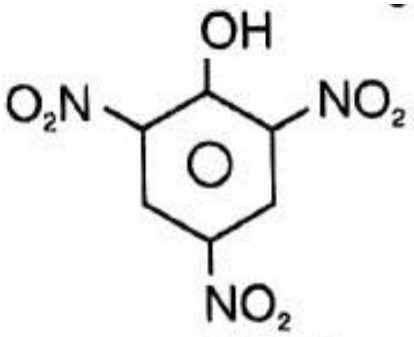
15. The values of van der Waals constant 'a' for gas[illegible]N2, O2, NH3 and CH4 are 1.39, 1.36, 4.00 and 2.253 dm6 atm mol^{-2} respectively. The ga[illegible]hich[illegible]n be most easily liquified is

(a) N2
(b) O2
(c) NH3
(d) CH4

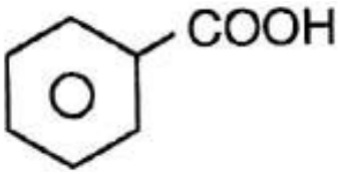
Answer: (c)

16. Which of the following compound does not react with NaHCO3 ?

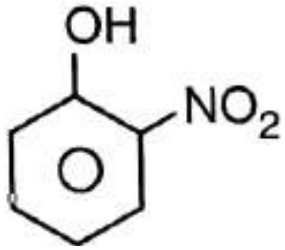
(a)



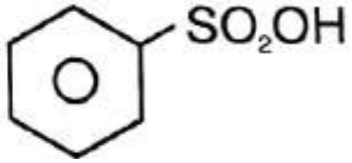
(b)



(c)



(d)



Answer: (c)

17. The ground state electronic configuration of the central metal atom in some octahedral complexes are given below. In which case the electronic transition is forbidden as per the spin selection rule ?

(a) t2g6 eg¹

(b) t2g³ eg°

(c) t2g6 eg²

(d) t2g6 eg³

Answer: (a)

18. The isoelectronic pair among the following is

(a) Cl2O, ICl2−

(b) Cl2O, ClO2

(c) I3−, IF2−

(d) ClO2−, ClF2+

Answer: —

19. What is alizarin in the following ?

(a) 1, 3-dihydroxy anthraquinone

(b) 1, 2-dihydroxy anthraquinone

(c) 1, 4-dihydroxy anthraquinone

(d) 1-hydroxy anthraquinone

Answer: (b)

20. The ΔH for a reaction is independent of which of the following ?

(a) T

(b) The path followed

(c) Initial and final states

(d) ΔV

Answer: (b)

21. What will be the pH of an aqueous solution of 1×10^{-8} M HCl ?

(a) 5

(b) slightly less than 7

(c) slightly more than 7

(d) 8

Answer: (b)

22. The effective atomic number (EAN) of the central tal ion in $[Ni(NH3)6]^{2+}$ is

(a) 38

(b) 36

(c) 37

(d) 40

Answer: (a)

23. What is the approximate equilibrium concentration of the open-chain form of D-glucose in an aqueous solution ?

(a) 2%

(b) 20%

(c) 90%

(d) 0.02%

Answer: (d)

24. On the basis of ionic sizes, which of the salts given below will have maximum solubility in water ?
Given – ionic size (pm)
Mg^{2+}(65), Ba^{2+}(135), OH^{-}(140), $CO3^{2-}$ (185)

(a) Mg (OH)2

(b) Ba (OH)2

(c) MgCO3

(d) BaCO3

Answer: —

25. The Van't Hoff factor for a very dilute solution of HCN is 1.00002. What will be the percentage degree of dissociation in the following ?

(a) 2×10^{-2}

(b) 2×10^{-3}

(c) $2 \times 10-4$

(d) $2 \times 10-6$

Answer: (b)

26. With respect to the position of elements in the periodic table, which one is the odd pair ?

(a) Mg, Ga

(b) Na, Ar

(c) Ca, Br

(d) In, Te

Answer: (a)

27. Which of the following is an extensive property ?

(a) Enthalpy

(b) Viscosity

(c) Concentration

(d) Density

Answer: (a)

28. The surface tension of a liquid vanishes roughly , above the critical temperature. The value of x is

(a) 4°

(b) 2°

(c) 6°

(d) 3°

Answer: (c)

29. The correct order of decreasing lattice energy of alkali metal fluorides is

(a) LiF > NaF > RbF > CsF > KF

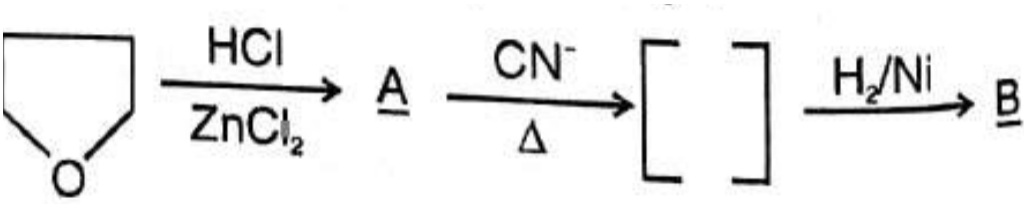
(b) LiF > KF > NaF > CsF > RbF

(c) LiF > NaF > KF > RbF > CsF

(d) CsF > RbF > KF > NaF > LiF

Answer: (c)

30. In the following reaction sequence A and B are respectively :



(a) 1, 4-dichlorobutane, hexanoic acid
(b) 1, 4-dichlorobutane, hexamethylenediamine
(c) 2-chlorobutane, hexylamine
(d) 2-chlorobutane, adiponitrile

Answer: (b)

31. An acidic buffer solution can be prepared by mixing which of the following pair of solutions ?
(a) (NH4)2 SO4 and H2SO4
(b) CH3COONa and CH3COOH
(c) NH4Cl and NH4OH
(d) NaCl and HCl

Answer: (b)

32. $\Delta Hf°$ of SO2 is – 297.5 $kJmol^{-1}$. The energy required for decomposition of 32g of SO2 is
(a) 148.75 kJ
(b) – 148.75 kJ
(c) – 297.5 kJ
(d) 297.5 kJ

Answer: (a)

33. On the basis of trans-directing capabilities of the ligands, in which of the following complexes do you expect the substitution of NH3 in place of a Cl– ligand will be fastest ?
(a) $[Pt(H_2O)Cl_3]^-$
(b) $[Pt(CN)Cl_3]^{2-}$
(c) $[Pt(I)Cl_3]^{2-}$
(d) $[PtCl_4]^{2-}$

Answer: (b)

34. A catalyst increases the rate of a chemical reaction by
(a) Increasing the activation energy
(b) Decreasing the activation energy
(c) Reacting with reactants
(d) Reacting with products

Answer: (b)

35. When a mixture of vapours of acetic acid and formic acid is heated over manganous oxide at 300°C

(a) HCHO is formed

(b) Both CH_3CHO and HCHO are formed

(c) CH_3CHO is formed

(d) CH_4 is formed

Answer: (c)

36. As per molecular orbital theory of bonding for diatomic molecules, the smallest value of ionization energy is expected for

(a) C_2

(b) N_2

(c) CO

(d) NO

Answer: (d)

37. Which of the following is a semi synthetic polymer ?

(a) Silk

(b) Wood

(c) Rayon

(d) Natural rubber

Answer: (c)

38. Which of the following 0.1 M solutions will show highest boiling point ?

(a) Potassium sulphate

(b) Potassium nitrate

(c) Potassium chloride

(d) Urea

Answer: (a)

39. Both the members of which of the following pairs have almost the same size ?

(a) Ti^{4+}, Zr^{4+}

(b) Ti^{4+}, Th^{4+}

(c) Zr^{4+}, Hf^{4+}

(d) Zn^{2+}, Zr^{4+}

Answer: (c)

40. The correct order of Lewis acid strength of the following boron halides is

(a) $BF_3 > BCl_3 > BBr_3$

(b) $BF_3 > BBr_3 > BCl_3$

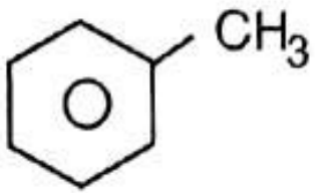
(c) $BBr_3 > BCl_3 > BF_3$

(d) $BCl_3 > BBr_3 > BF_3$

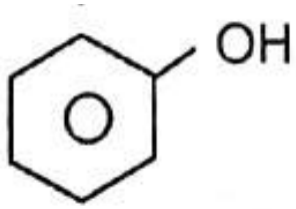
Answer: (c)

41. Which of the following reagents undergo Reimer-Tiemann reaction ?

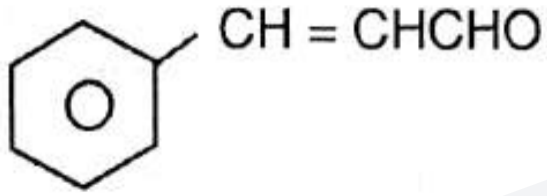
(a)



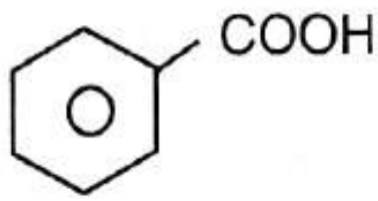
(b)



(c)



(d)



Answer: (b)

42. If the heat of vapourization of water at 100°C is 540calg^{-1} then entropy change for evaporation of 1 mole of water will be

(a) 5.40 cal K^{-1}g^{-1}

(b) 5.40 cal K^{-1}mol^{-1}

(c) 22.04 cal K^{-1}mol^{-1}

(d) 26.06 cal K^{-1}mol^{-1}

Answer: (d)

43. If 3.0 g urea is dissolved in 45 g of water, what will be the relative lowering of vapour pressure ?

(a) 0.02

(b) 0.01

(c) 0.04

(d) 0.05

Answer: (a)

44. If a steam engine operates between 400 K and 300 K under high pressure, what will be the efficiency of the engine in the following ?

(a) 0.50
(b) 0.55
(c) 0.25
(d) 1.00

Answer: (c)

45. Dacron is an example of which of the following ?

(a) Polyamide
(b) Polypropene
(c) Polyacrylonitrile
(d) Polyester

Answer: (d)

46. Which among the following compounds when heated with K2Cr2O7 and H2SO4 gives a reaction other than its oxidation ?

(a) KCl
(b) CH3CH2OH
(c) H2C2O4.2H2O
(d) (NH4)2 Fe(SO4)2.6H2O

Answer: (a)

47. What does the reaction $ArN_2^{\oplus} + CuCN \rightarrow ArCN$ the following is known as ?

(a) Sandmeyer reaction
(b) Gattermann reaction
(c) Balzschiemann reaction
(d) Heck reaction

Answer: (a)

48. In which of the given pairs, both the molecular orbitals have 'gerade' symmetry ?

(a) σ and σ*
(b) π and π*
(c) σ and π*
(d) σ* and π*

Answer: (c)

49. An atom of $^{23}_{92}U$ after absorption of a slow neutron, undergoes nuclear fission to form two fragments $^{13}_{54}Xe$ and 9438Sr. The other released particle in this reaction in the following is

(a) α – particle
(b) β – particle
(c) neutron
(d) positron

Answer: (c)

50. The correct increasing order of the stability of the tri halide ions is

(a) I_3^- < IBr_2^- < ICl_2^- < Br_3^-

(b) Br_3^-< ICl_2^-< IBr_2^-< I_3^-

(c) ICl_2^-< IBr_2^- < Br_3^- < I_3^-

(d) Br_3^- < IBr_2^- < ICl_2^- < I_3^-

Answer: (b)

51. Schottky crystal defect is actually a

(a) line defect

(b) valence defect

(c) vacancy defect

(d) none of these

Answer: (c)

52. Number of possible isomers for the complex $[Co(en)_2Cl_2]^+$ is
(en = ethylenediamine)

(a) 2

(b) 4

(c) 3

(d) 5

Answer: (c)

53. Which of the following compounds in contact wi water sets like cement within 30 minutes to a hard plaster ?

(a) $CaCO_3$

(b) $CaSO_4$

(c) $Ca_3(PO_4)_2$

(d) $(CaSO_4)_2H_2O$

Answer: (d)

54. Which of the following dyes is used as spot test reagent for detecting sulphurous acid and cerium and also used as antiseptic ?

(a) Malachite green

(b) Alizarine

(c) Crystal violet

(d) Indigo

Answer: (a)

55. In a galvanic cell the following reaction takes place at 298 K :
$Cr_2O_7^{2-} + 14H^+ + 6Fe^{2+} \rightarrow 2Cr^{3+} + 6Fe^{3+} + 7H_2O$
If E° ($Cr_2O_7^{2-}$, H^+, Cr^{3+} | Pt) = 1.33 V and E° (Fe^{3+}, Fe^{2+} | Pt) = 0.77 V, then which of the following will be the standard e.m.f. of the cell ?

(a) 2.10 V

(b) 0.56 V

(c) – 2.10 V

(d) – 0.56 V

Answer: (b)

56. Molar conductance at 25°C and infinite dilution of HCl, CH_3COONa and NaCl are 426.1, 91.0 and 126.5 sm^2mol^{-1} respectively. The molar conductance of CH_3COOH at infinite dilution and 25°C is

(a) 208.6 sm^2mol^{-1}

(b) 390.6 sm^2mol^{-1}

(c) 441.6 sm^2mol^{-1}

(d) 217.6 sm^2mol^{-1}

Answer: (b)

57. In the reaction
Aniline + glycerol $\xrightarrow{(PhNO_2 / H_2SO_4,\ >100^\circ C)}$ P
the product P is

(a) Anilinamide

(b) Pyridine

(c) Indole

(d) Quinoline

Answer: (d)

58. Which of the following metal hydroxides is the strongest base ?

(a) $Mg(OH)_2$

(b) $Be(OH)_2$

(c) $Ba(OH)_2$

(d) $Ca(OH)_2$

Answer: (c)

59. Which of the following Vitamins plays a vital role in the coagulating property of blood ?

(a) Vitamin A

(b) Vitamin D

(c) Vitamin E

(d) Vitamin K

Answer: (d)

60. Among the following which one of the following reacts with CO_2 to produce O_2 in closed systems such as submarines ?

(a) K_2O

(b) KOH

(c) KO_2

(d) K_2O_2

Answer: (c)

61. In the following, which is the correct decreasing order of stability of the free radicals ?

(a) $CH_2 = CH - \dot{C}H_2 > (C_6H_5)\dot{C}H_2 > (C_6H_5)_2\dot{C}H > (C_6H_5)_3\dot{C}$

(b) $(C_6H_5)_2\dot{C}H > (C_6H_5)\dot{C}H_2 > (C_6H_5)_3\dot{C} > CH_2 = CH - \dot{C}H_2$

(c) $(C_6H_5)_3\dot{C} > (C_6H_5)_2\dot{C}H > (C_6H_5)\dot{C}H_2 > CH_2 = CH - \dot{C}H_2$

(d) $CH_2 = CH - \dot{C}H_2 > (C_6H_5)_3\dot{C} > (C_6H_5)_2\dot{C}H > (C_6H_5)\dot{C}H_2$

Answer: (c)

62. Which of the following materials is derived from an organometallic compound ?

(a) Teflon

(b) Silicones

(c) Freons

(d) Nylon

Answer: (b)

63. Which among the following 3d- series elements does not show properties that are characteristic of transition metals ?

(a) Ti

(b) Mn

(c) V

(d) Zn

Answer: (d)

64. Which of the following is not an electrophile ?

(a) H^+

(b) Br^+

(c) NH_3

(d) BF_3

Answer: (c)

65. Heat change at constant volume (Δq_v) is equal to which of these ?

(a) ΔU

(b) ΔH

(c) ΔG

(d) ΔS

Answer: (a)

66. Basicity of orthophosphoric acid is

(a) 2
(b) 3
(c) 4
(d) 1

Answer: (b)

67. Which of the following is synthesised by sun-rays ?

(a) Vitamin A
(b) Vitamin K
(c) Vitamin D
(d) Vitamin C

Answer: (c)

68. For a first order reaction the time (t75 %) required to complete 75% is related to half life period (t½) by the expression

(a) t(75%) = t½
(b) t(75%) = 3/2 t½
(c) t(75%) = 3t½
(d) t(75%) = 2t½

Answer: (d)

69. Elements of which of the following pairs do not b ng to the same Periodic Block ?

(a) Ti, Te
(b) Si, S
(c) Li, Ba
(d) La, Lu

Answer: (a)

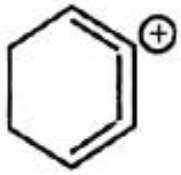
70. Salicylic acid reacts with acetic anhydride to form which of the following ?

(a) oil of winter green
(b) aspirin
(c) salol
(d) mustard oil

Answer: (b)

71. The most stable carbonium ion in the following is

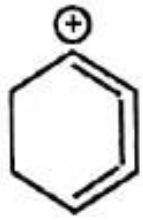
(a)



(b)



(c)



(d)



Answer: —

72. The anodic oxidation in the electrolysis of ice-cold H_2SO_4 (50%) between Pt electrodes at high current density, gives

(a) $H_2S_2O_7$

(b) $H_2S_2O_6$

(c) $H_2S_2O_8$

(d) H_2SO_5

Answer: (c)

73. Which of the following is the IUPAC name of the compound



?

(a) Spiro [1. 1. 0] butane
(b) Spiro [0. 1. 1] butane
(c) Bicyclo [1. 0. 1] butane
(d) Bicyclo [1. 1. 0] butane

Answer: (d)

74. Which of the following has maximum dipole moment in gas phase ?

(a) C6H5C(CH3)3
(b) C6H5CH3
(c) C6H5CH(CH3)2
(d) C6H5 CH2CH3

Answer: (a)

75. Identify the powerful oxidizing agent used by Neil Bartlett to prepare the first true chemical compound of an inert gas element.

(a) SbF5
(b) PtF6
(c) O2F2
(d) K2Cr2O7

Answer: (b)

76. The correct order of C – H bond length is

(a) $Csp^3 - H > Csp^2 - H < Csp - H$
(b) $Csp - H > Csp^2 - H > Csp^3 - H$
(c) $Csp^2 - H > Csp^3 - H > Csp - H$
(d) $Csp - H < Csp^2 - H < Csp^3 - H$

Answer: (d)

77. Which of the following facts about Nitric Oxide (NO) is incorrect ?

(a) It is paramagnetic
(b) It dimerises readily at room temperature
(c) It is present in exhausts from cars
(d) It loses an electron to form NO+ ion

Answer: (b)

78. The number of degree of freedom of vibrational motion for CO_2 is which of the following ?

(a) 3

(b) 4

(c) 6

(d) 7

Answer: (b)

79. The value of Kc for the reaction
$cis - C_2H_2Cl_2 \rightleftharpoons trans - C_2H_2Cl_2$
is 0.608. What will be the value of Kc for the reaction ?
$trans - C_2H_2Cl_2 \rightleftharpoons cis - C_2H_2Cl_2$

(a) 0.608

(b) 1.645

(c) 1.00

(d) 1.216

Answer: (b)

80. The maximum number of electrons in an atom for which the sum of their principal and azimuthal quantum number equals to 3, can be

(a) 8

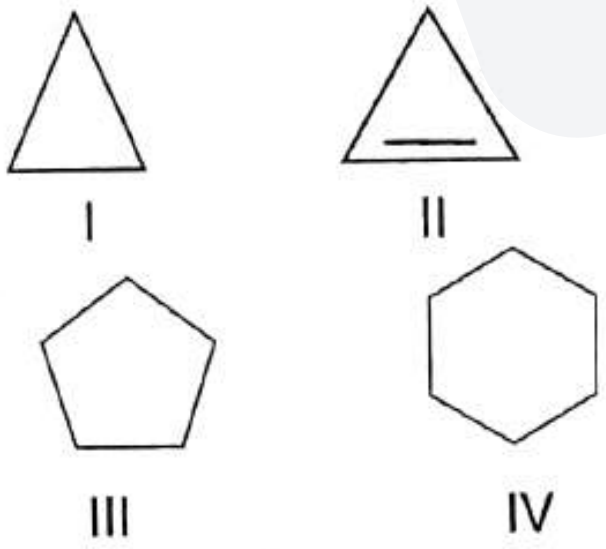
(b) 6

(c) 4

(d) 2

Answer: (a)

81. Which is the correct decreasing order of [illegible] for the following ?



(a) I > II > III > IV

(b) II > I > III > IV

(c) IV > III > I > II

(d) III > IV > II > I

Answer: (c)

82. Among the organometallic compounds given below, identify the one which differs from the rest three in bonding.

(a) CH3Li
(b) (CH3)2Be
(c) (CH3)3 Al
(d) (CH3)4Sn

Answer: (d)

83. How many stereochemical isomers of dimethylcyclohexane are possible ?

(a) 5
(b) 9
(c) 11
(d) 7

Answer: (b)

84. In which of the following neutralization reactions, the value of heat of neutralization will be highest ?

(a) NaOH + HCl
(b) NaOH + CH3COOH
(c) NH4OH + CH3COOH
(d) NH4OH + HCl

Answer: (a)

85. ^2D represents the ground state spectroscopic te for the free ion

(a) $Cr^{3}+$
(b) $Mn^{2}+$
(c) $Ni^{2}+$
(d) $Cu^{2}+$

Answer: (d)

86. Average life of a radioactive element is 216 days. What will be its half life period ?

(a) 144 days
(b) 150 days
(c) 156 days
(d) 162 days

Answer: (b)

87. Which of the following has the strongest acid strength ?

(a) HClO
(b) HClO2
(c) HClO3
(d) HClO4

Answer: (d)

88. An alkene having the molecular formula C9H18 on ozonolysis gives 2, 2-dimethylpropanal and 2-butanone. This alkene is

(a) 2, 2, 4-trimethyl-3-hexene

(b) 2, 2, 3-trimethyl-4-hexene

(c) 2, 3, 4-trimethyl-2-hexene

(d) 2, 2, 4-trimethyl-2-hexene

Answer: (a)

89. Which of the facts about oxy-acids of phosphorous given below is not true ?

(a) At least one P = O linkage is present in all the oxy-acids

(b) At least one P – H linkage is present in all the oxy-acids

(c) At least one P – OH linkage is present in all the oxy-acids

(d) P atom in all the oxy-acids is four coordinate

Answer: (b)

90. Which of the following can be used to distinguish between acetophenone and benzophenone ?

(a) Tollens' reagent

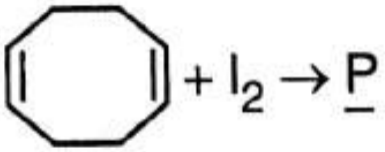
(b) Iodine + base

(c) Fehling solution

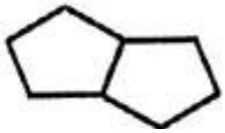
(d) Hydrazine

Answer: (b)

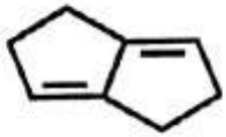
91. What is the product P of the reaction ?



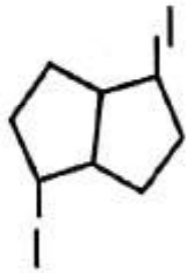
(a)



(b)



(c)



(d) Both (A) and (B)

Answer: (c)

92. If Δ0 represents the crystal field splitting parameter in an octahedral field, the crystal field stabilization energy for $[Cr(H2O)6]^{3}+$ will be

(a) 0.4 Δ0

(b) 0.6 Δ0

(c) 0.8 Δ0

(d) 1.2 Δ0

Answer: (d)

93. Using urotropine, which of the following compounds gives benzaldehyde ?

(a) Toluene

(b) Benzyl chloride

(c) Benzal chloride

(d) Chlorobenzene

Answer: (b)

94. Which among the following inorganic polymeric materials find use in making cosmetic/medical implants ?

(a) Sulphur nitride

(b) Pyroxenes

(c) Silicones

(d) Phosphazenes

Answer: (c)

95. For the half cell reaction
$O_2(g) + 2H_2O(l) + 4e^{-1} \rightarrow 4OH^-(aq)$,
what will be the value of $-\Delta G°/FE°$ in the following ?

(a) 1.0

(b) 2.5

(c) 3.2

(d) 4.0

Answer: (d)

96. When alumina is heated with carbon in nitrogen atmosphere the products are

(a) Al + CO

(b) Al + CO_2

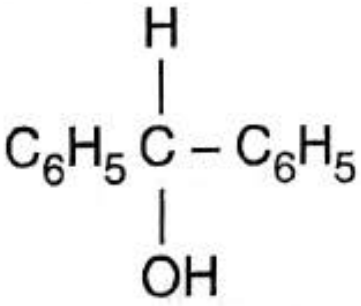
(c) AlN + CO

(d) Al_2O_3 + CH_2N_2

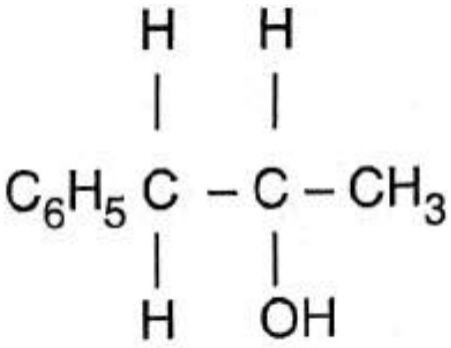
Answer: (c)

97. Which of the following compounds will give the iodoform test ?

(a)

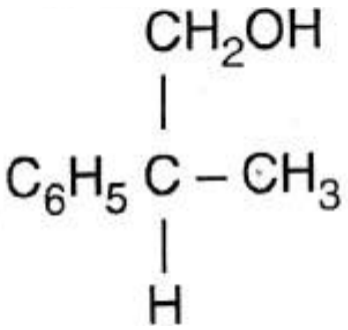


(b)



(c) C6H5 CH2 CH2 CH2OH

(d)



Answer: (b)

98. Colloidal particles of soap sal in water are

(a) negatively charged

(b) neutral

(c) positively charged

(d) amphoteric

Answer: (a)

99. The value of the resonance energy of any resonance hybrid is

(a) an absolute value

(b) a relative value

(c) unpredictable

(d) always at lower side

Answer: (b)

100. Which of the following names for the Zeise's salt, K[Pt (C2H4)Cl3] is correct as per the IUPAC system ?

(a) Potassium ethylenetrichloroplatinum (O)

(b) Potassium trichloroethyleneplatinum (II)

(c) Potassium trichloroethyleneplatinate (II)

(d) Potassium trichloroethyleneplatinate (IV)

Answer: (c)

101. If for the homogeneous reaction : $xA + yB \rightarrow lY + mZ$, the value of $\Delta H = -30$ kJ mol^{-1} and $\Delta S = -100$ $JK^{-1}mol^{-1}$, then what will be the value of equilibrium temperature ?

(a) 50°C

(b) 100°C

(c) 250°C

(d) 27°C

Answer: (d)

102. The reaction $A(g) + B(s) \rightleftharpoons 2C(g)$ is carried out in a half litre vessel. The number of moles present at equilibrium are one mole of A, 2 moles of B and 3 moles of C. The value of Kc is

(a) 4.5

(b) 6.0

(c) 9.0

(d) 18.0

Answer: (d)

103. Identify the product P in the following reaction
3, 4, 5-tribromoaniline —((i) diazotization, (ii) . . .)→ P

(a) 2, 4, 6 – tribromobenzene

(b) 3, 4, 5 – tribromobenzene

(c) 1, 2, 3 – tribromobenzene

(d) 3 ,4, 5 – tribromonitrobenzene

Answer: (c)

104. Which is the basic structural unit of orthosilicates ?

(a) $SiO^{2}+$

(b) $SiO2$

(c) $SiO3^{2-}$

(d) $SiO44-$

Answer: (d)

105. Which of the following groups gives Wolff-Kishner reaction ?

(a) nitro

(b) C = C

(c) cyano

(d) carbonyl

Answer: (d)

106. Which of the following relation holds true for the reaction ?
$CO(g) + ½\ O2(g) \rightarrow CO2(g)$

(a) $\Delta H = \Delta E$

(b) $\Delta H = \Delta E + RT$

(c) $\Delta H = \Delta E + ½\ RT$

(d) $\Delta H = \Delta E - ½\ RT$

Answer: (d)

107. Which of the following species can not exist ?

(a) $[SiCl6]^{2-}$

(b) $[GeF6]^{2-}$

(c) $[CCl6]^{2-}$

(d) $[SnCl6]^{2-}$

Answer: (c)

108. Coramine is a

(a) Pyridine derivative

(b) Pyrrole derivative

(c) Thiophene derivative

(d) Piperidine derivative

Answer: (a)

109. Which of the following gases will have the highe[illegible]ate of diffusion ?

(a) O2

(b) CO2

(c) NH3

(d) N2

Answer: (c)

110. Which of the following is formed by acetylene when it reacts with liquid bromine in absence of a solvent ?

(a) acetylene tetrabromide

(b) acetylene dibromide

(c) acetylene monobromide

(d) no reaction takes place

Answer: (a)

111. Crystal field splitting strength is maximum for which of the following ligands ?

(a) F^-

(b) OH^-

(c) NH3

(d) CN^-

Answer: (d)

112. In the following which molecule is IR inactive but Raman active ?

(a) HCl

(b) N2

(c) SO2

(d) Protein

Answer: (b)

113. The aqueous solution of a salt of one of the given lanthanide ions is used as a volumetric standard in redox reactions. Identify the lanthanide ion.

(a) Ce4+

(b) Pr4+

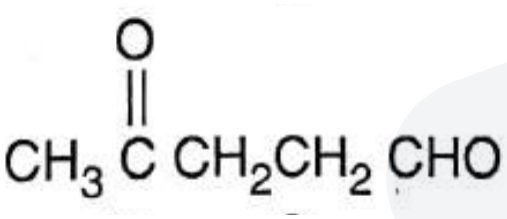
(c) Tb4+

(d) Dy4+

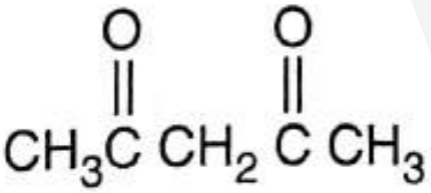
Answer: (a)

114. Compound A (C5H8O2) is reduced to pentane. With NH2OH A forms dioxime and also gives positive iodoform and tollen's tests. Which of the following is the structure of A ?

(a)

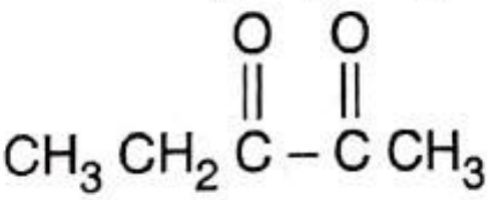


(b)



(c) OHC CH2CH2 CH2CHO

(d)



Answer: (a)

115. Which of the following is the conjugate acid of NH3 ?

(a) NH2−

(b) NH2OH

(c) NH4+

(d) N2H4

Answer: (c)

116. Among the pairs of metallic oxides members of which pair dissolve both in HCl and NaOH ?

(a) Li2O, BeO

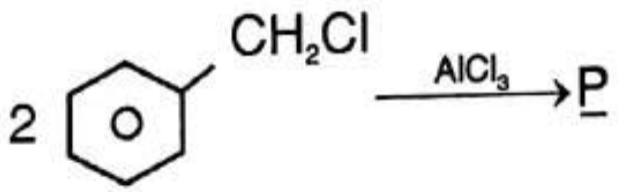
(b) BeO, Al2O3

(c) Li2O, MgO

(d) BaO, MgO

Answer: (b)

117. Identify the product P of the following reaction.



(a) 1 – methylnaphthalene

(b) Anthracene

(c) Phenanthrene

(d) 1,4 – Dimethylnaphthalene

Answer: (b)

118. For the reaction
NH4HS(s) ⇌ NH3(g) + H2S(g)
the equilibrium pressure is 6 atm. What will be the val of Kp for this reaction ?

(a) 3 atm^{-2}

(b) 6 atm

(c) 9 atm^2

(d) 24 atm^2

Answer: (c)

119. With which of the following Friedel-Crafts reaction does not go very well ?

(a) pyrole

(b) thiophene

(c) pyridine

(d) furan

Answer: (c)

120. Which of the following pairs of solutions is isotonic pair at the same temperature ?

(a) 0.1 M glucose and 0.1 M KCl

(b) 0.1 M glucose and 0.1 M MgCl2

(c) 0.1 M KCl and 0.1 M K2SO4

(d) 0.1 M K2SO4 and 0.1 M Cd (NO3)2

Answer: (d)

121. Which of the following pairs is iso structural ?

(a) XeF_4, $[Ni(CN)_4]^{2-}$

(b) XeF_4, $[Ni(CO)_4]$

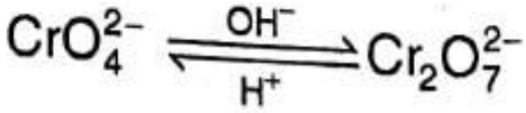
(c) XeO_3, ClF_3

(d) BF_3, ClF_3

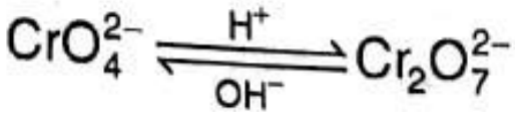
Answer: (a)

122. In the context of yellow chromate ion and orange dichromate ion which of the following observation is correct ?

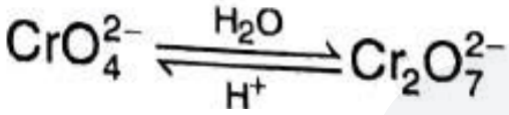
(a)



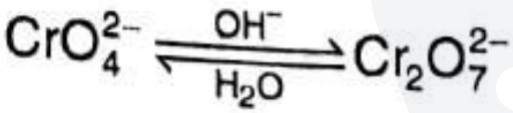
(b)



(c)

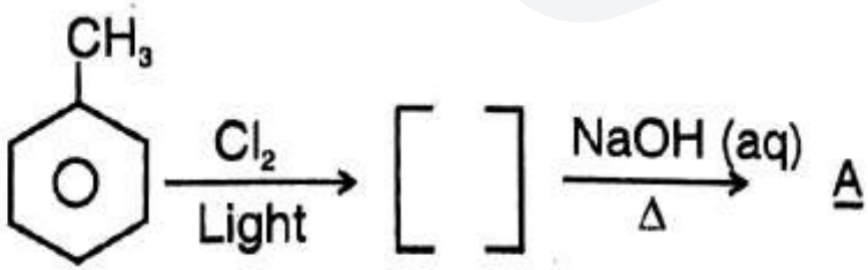


(d)



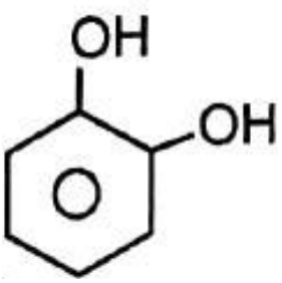
Answer: (b)

123. In the reaction

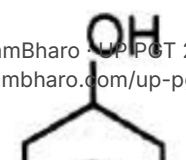


Which of the following is the product A ?

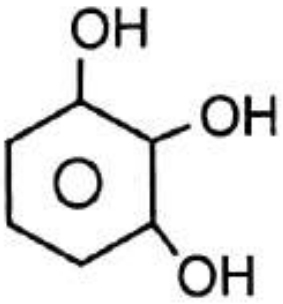
(a)



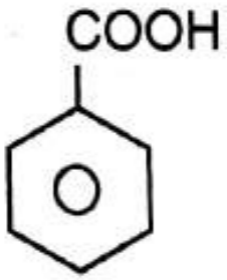
(b)



(c)



(d)



Answer: (d)

124. No Bragg-reflection of x-rays from a crystal will be observed if dnkl is smaller than

(a) λ

(b) λ/2

(c) λ/3

(d) λ/4

Answer: (b)

125. Which one of the following is responsible for lesser pressure of a real gas in comparison to an ideal gas ?

(a) Finite size of molecules

(b) Enhancement of kinetic energy of molecules

(c) Viscosity

(d) Intermolecular forces

Answer: (d)

Answer key

Answer key from the U.P. Secondary Education Services Selection Board's official answer key for this sitting. "—" means the key gave none.

Chemistry

1	**(c)**	2	**(c)**	3	**(a)**	4	**(b)**	5	**(a)**	6	**(c)**	7	**(b)**	8	**(a)**
9	**—**	10	**—**	11	**(b)**	12	**(a)**	13	**(d)**	14	**(d)**	15	**(c)**	16	**(c)**
17	**(a)**	18	**—**	19	**(b)**	20	**(b)**	21	**(b)**	22	**(a)**	23	**(d)**	24	**—**
25	**(b)**	26	**(a)**	27	**(a)**	28	**(c)**	29	**(c)**	30	**(b)**	31	**(b)**	32	**(a)**
33	**(b)**	34	**(b)**	35	**(c)**	36	**(d)**	37	**(c)**	38	**(a)**	39	**(c)**	40	**(c)**
41	**(b)**	42	**(d)**	43	**(a)**	44	**(c)**	45	**(d)**	46	**(a)**	47	**(a)**	48	**(c)**
49	**(c)**	50	**(b)**	51	**(c)**	52	**(c)**	53	**(d)**	54	**(a)**	55	**(b)**	56	**(b)**
57	**(d)**	58	**(c)**	59	**(d)**	60	**(c)**	61	**(c)**	62	**(b)**	63	**(d)**	64	**(c)**
65	**(a)**	66	**(b)**	67	**(c)**	68	**(d)**	69	**(a)**	70	**(b)**	71	**—**	72	**(c)**
73	**(d)**	74	**(a)**	75	**(b)**	76	**(d)**	77	**(b)**	78	**(b)**	79	**(b)**	80	**(a)**
81	**(c)**	82	**(d)**	83	**(b)**	84	**(a)**	85	**(d)**	86	**(b)**	87	**(d)**	88	**(a)**
89	**(b)**	90	**(b)**	91	**(c)**	92	**(d)**	93	**(b)**	94	**(c)**	95	**(d)**	96	**(c)**
97	**(b)**	98	**(a)**	99	**(b)**	100	**(c)**	101	**(d)**	102	**(d)**	103	**(c)**	104	**(d)**
105	**(d)**	106	**(d)**	107	**(c)**	108	**(a)**	109	**(c)**	110	**(a)**	111	**(d)**	112	**(b)**
113	**(a)**	114	**(a)**	115	**(c)**	116	**(b)**	117	**(b)**	118	**(c)**	119	**(c)**	120	**(d)**
121	**(a)**	122	**(b)**	123	**(d)**	124	**(b)**	12	**(d)**						