NOTE : DO NOT BREAK THE SEAL UNTIL YOU GO THROUGH THE FOLLOWING INSTRUCTIONS

COMMON ENTRANCE TEST - 2012

Question Booklet CHEMISTRY

Booklet No.

Roll No. | | | | | | |

Series A 216645

(Enter your Roll Number in the above space)

Time Allowed : 1.30 Hours **Max. Marks : 75**

SEAL

INSTRUCTIONS :

1. Use only BLACK or BLUE Ball Pen.
2. All questions are COMPULSORY.
3. Check the BOOKLET thoroughly.

   IN CASE OF ANY DEFECT - MISPRINTS, MISSING QUESTION/S OR DUPLICATION OF QUESTION/S, GET THE BOOKLET CHANGED WITH THE BOOKLET OF THE SAME SERIES. NO COMPLAINT SHALL BE ENTERTAINED AFTER THE ENTRANCE TEST.
4. Before you mark the answer, fill in the particulars in the ANSWER SHEET carefully and correctly. Incomplete and incorrect particulars may result in the non-evaluation of your answer sheet by the technology.
5. Write the SERIES and BOOKLET NO. given at the TOP RIGHT HAND SIDE of the question booklet in the space provided in the answer sheet by darkening the corresponding circles.
6. Do not use any **eraser, fluid pens, blades** etc., otherwise your answer sheet is likely to be rejected whenever detected.
7. After completing the test, candidates are advised to hand over the OMR ANSWER SHEET to the Invigilator and take the candidate's copy with yourself.

1. Avogadro No. $\left(6.023 \times 10^{+23}\right)$ of Carbon atoms are present in :
   (1) 12 grams of $^{12}CO_2$
   (2) 22.4 lit $^{12}CO_2$ in room temperature
   (3) 44 grams of $^{12}CO_2$
   (4) 12 moles of $^{12}CO_2$

2. The volume of 0.1 M $Ca(OH)_2$ required to neutralize 10 ml of 0.1 N HCl :
   (1) 10 ml (2) 20 ml (3) 5 ml (4) 15 ml

3. Which of the following statement is correct?
   (1) The equivalent mass of $KMnO_4$ in alkaline medium is molar mass divided by five.
   (2) The equivalent mass of $KMnO_4$ in strongly alkaline medium is molar mass divided by three.
   (3) The equivalent mass of $KMnO_4$ in neutral medium is molar mass divided by three.
   (4) The equivalent mass of $KMnO_4$ in weakly acidic medium is molar mass divided by three.

4. Isotones have :
   (1) Same neutron number but different proton number
   (2) Same proton number but different neutron number
   (3) Same proton and neutron number
   (4) Same proton but different electron number

5. Maximum number of electrons in a shell with principle quantum number 'n' is given by :
   (1) n (2) 2n (3) n^2 (4) $2n^2$

6. Bohr model of Hydrogen atom was unable to explain :
   (1) Rydberg's formula of atomic spectra
   (2) Heisenberg's uncertainty principle
   (3) Planck's law of energy quantization
   (4) Rutherford's model of atomic structure

7. The de Broglie wave length of a particle is :
   (1) Proportional to its mass
   (2) Proportional to its velocity
   (3) Inversely proportional to its momentum
   (4) Proportional to its total energy

8. At room temperature, for the reaction $NH_4SH\ (s) \leftrightarrow NH_3(g) + H_2S\ (g)$:

(1) $K_p = K_c$ (2) $K_p > K_c$

(3) $K_p < K_c$ (4) K_p and K_c do not relate

9. According to Le-Chatelier's principle, the equilibrium constant of a reversible reaction will NOT shift by :

(1) Increasing the temperature of an exothermic reaction

(2) Increasing the temperature of an endothermic reaction

(3) Changing the concentrations of the reactants

(4) The effect of a catalyst

10. pH of 0.0002 M formic acid [$K_a = 2 \times 10^{-4}$] approximately is :

(1) 1.35 (2) 0.5 (3) 3.7 (4) 1.85

11. The buffer present in blood plasma is :

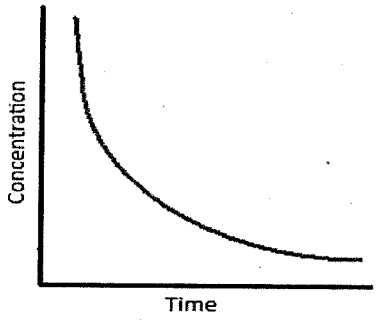
(1) borax, sodium hydroxide

(2) carbonic acid, bicarbonate ion

(3) acetic acid, sodium acetate

(4) citric acid, potassium dihydrogen phosphate

12. Certain reactions follow the relation between concentrations of the reactant vs. time as :



What is the expected order for such reactions?

(1) 0 (2) 1 (3) 2 (4) Infinity

13. A first order reaction has a rate constant $k = 3.01 \times 10^{-3}$ /s . How long it will take to decompose half of the reaction?

(1) 2.303 s (2) 23.03 s (3) 230.3 s (4) 2303. s

14. The rate of reactions exhibiting negative activation energy :

(1) decreases with increasing temperature

(2) increases with increasing temperature

(3) does not depend of temperature

(4) depends on the height of the potential barrier

15. Normal human blood sugar range is 65 – 105 mg/dL. Considering density of human blood 1.06 kg/lit, if a patient sugar level reads 720 ppm, his/her blood sugar at that time is :

(1) normal (2) high (3) low (4) cannot say

16. Addition of a non-volatile solute in an volatile ideal solvent :

(1) increases the vapour pressure of the solvent

(2) decreases the vapour pressure of the solvent

(3) decreases the boiling point of the solvent

(4) increases the freezing point of the solvent

17. The dissolution of a gas in a liquid is governed by :

(1) Raoult's law (2) Henry's law

(3) Dalton's law of partial pressure (4) Van't Hoff factor

18. Desalination of sea water can be done by :

(1) osmosis (2) reverse osmosis

(3) filtration (4) diffusion

19. Entropy of a perfectly crystalline solid at 0°K is :

(1) positive (2) negative

(3) zero (4) either positive or negative

20. Enthalpy of combustion of carbon to CO_2 is –393.52 kJ/mol. The heat released upon formation of 11 g of CO_2 from carbon and dioxygen is :

(1) 35.77 kJ (2) 98.38 kJ (3) 1574.08 kJ (4) 393.52 kJ

21. Entropy change in a process where 1 Lit. of liq. He is poured into ice cold water is :

(1) Finite and positive (2) Finite and negative
(3) Zero (4) Infinity

22. For an ideal system at thermal equilibrium, the velocity distribution of the constituting particles will be governed by :

(1) Gaussian distribution
(2) Maxwell-Boltzmann distribution
(3) Lorentzian distribution
(4) Log-normal distribution

23. During spontaneous discharge of an electrochemical cell Gibb's free energy will :

(1) increase (2) decrease (3) not change (4) be infinity

24. Standard electrode potential of half cell reactions are given below :

$Cu^{2+} + 2e^- \rightarrow Cu$; $E^0 = 0.34$ V

$Zn^{2+} + 2e^- \rightarrow Zn$; $E^0 = -0.76$ V

What is the EMF of the cell?

(1) +1.10 V (2) –1.10 V (3) –0.42 V (4) +0.42 V

25. Anode reaction of a fuel cell is :

(1) $Zn(Hg) + 2OH^- \rightarrow ZnO\,(s) + H_2O + 2e^-$
(2) $Pb(s) + SO_4^{2-}\,(aq) \rightarrow PbSO_4\,(s) + 2e^-$
(3) $2H_2\,(g) + 4OH^-\,(aq) \rightarrow 4H_2O\,(l) + 4e^-$
(4) $2Fe\,(s) \rightarrow 2Fe^{2+} + 4e^-$

26. Molar conductivity decreases with decrease in concentration :

(1) for strong electrolytes
(2) for weak electrolytes
(3) both for strong and weak electrolytes
(4) for non electrolytes

27. Dimension of universal gas constant (R) is :

(1) $[VPT^{-1}n^{-1}]$ (2) $[VP^{-1}Tn^{-1}]$ (3) $[VPTn^{-1}]$ (4) $[VPT^{-1}n]$

28. Total no. of metal atoms per unit cell in a face-centered cubic lattice is :

(1) 14 (2) 8 (3) 6 (4) 4

29. Conduction in a p-type semiconductor is increased by :

(1) increasing the band gap

(2) decreasing the temperature

(3) adding appropriate electron deficit impurities

(4) adding appropriate electron rich impurities

30. Chromatographic analysis is done based on the property of :

(1) Diffusion (2) Absorption

(3) Adsorption (4) Condensation

31. Glucose can be converted into ethyl alcohol using :

(1) Invertase (2) Zymase

(3) Maltase (4) Diastase

32. Bakelite is formed by polymerization between :

(1) Acrylonitrile molecules

(2) Tetrafluoroethene molecules

(3) Urea and formaldehyde molecules

(4) Phenol and formaldehyde molecules

33. The correct order of electron gain enthalpy (Δ_{eg} H) of the halogen atoms is :

(1) F < Cl < Br < I (2) Cl < F < Br < I

(3) I < Br < Cl < F (4) Cl < Br < I < F

34. Properties of elements are periodic function of number of ———— present in the nucleus :

(1) Protons
(2) Electrons
(3) Neutrons
(4) Mesons

35. Paramagnetism is shown by :

(1) N_2 (2) O_2 (3) F_2 (4) CO_2

36. The hybridization of Carbon in molecular CO_2 is :

(1) sp (2) sp^2 (3) sp^3 (4) sp^3d

37. The shape of the ammonia molecule is :

(1) Tetrahedral
(2) Trigonal pyramid
(3) Trigonal bipyramid
(4) Trigonal planar

38. Which of the following elements has the highest value of electron affinity?

(1) O (2) S (3) Se (4) Te

39. The product for reaction between aniline and acetic anhydride is :

(1) o-aminoacetophenone
(2) m- aminoacetophenone
(3) p- aminoacetophenone
(4) Acetanilde

40. The order of basic strength for methyl substituted amine in aqueous solution is :

(1) $N(CH_3)_3 > N(CH_3)_2H > N(CH_3)H_2 > NH_3$
(2) $N(CH_3)H_2 > N(CH_3)_2H > N(CH_3)_3 > NH_3$
(3) $NH_3 > N(CH_3)H_2 > N(CH_3)_2H > N(CH_3)_3$
(4) $N(CH_3)_2H > N(CH_3)H_2 > N(CH_3)_3 > NH_3$

41. The nitration (using nitration mixture) of aniline gives :

(1) p-nitroaniline
(2) o-nitroaniline
(3) m-nitroaniline
(4) All the above

42. A compound with nitro group was reduced by Sn/HCl, followed by treatment with $NaNO_2$/HCl and followed by phenol. The chromophore group in the final compound is :

(1) NO_2 group
(2) NH_2 group
(3) Azo group
(4) OH group

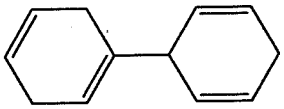
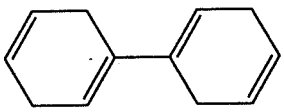
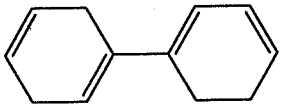
43. The correct order for leaving group ability in a nucleophilic substitution reaction is :

(1) $Br^- > Cl^- > CH_3CO_2^- > HO^- > H^-$
(2) $H^- > OH^- > CH_3CO_2^- > Cl^- > Br^-$
(3) $Br^- > CH_3CO_2^- > Cl^- > OH^- > H^-$
(4) $CH_3CO_2^- > Br^- > Cl^- > OH^- > H^-$

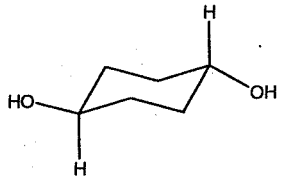
44. Among the choices of alkyl bromide, the least reactive bromide in a SN_2 reaction is:

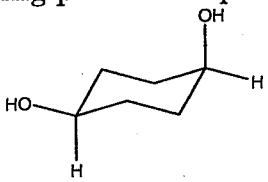
(1) 1-bromopentane
(2) 2-bromo-2-methylbutane
(3) 1-bromo-3-methylbutane
(4) 1-bromo-2-methylbutane

45. Which is the most stable compound among the following?

(1) 
(2) 
(3) 
(4) All the compounds have same stability

46. The correct relation between the following pair of compounds is :





(1) Constitutional isomers
(2) Enantiomers
(3) Diastereomers
(4) None of these

47. For a electrophilic aromatic substitution reaction :

(1) Chlorine is o-p directing group and also electron releasing group

(2) Chlorine is o-p directing group and also electron withdrawing group

(3) Chlorine is meta directing group and also electron releasing group

(4) Chlorine is meta directing group and also electron withdrawing group

48. A nucleophilic substitution reaction proceeds through SN_1 mechanism. So, the reaction is :

(1) Unimolecular

(2) Bimolecular

(3) Termolecular

(4) Rate depends on concentration of incoming nucleophile

49. 2-bromobutane reacts with OH^- in H_2O to give 2-butanol. The reaction involves :

(1) Retention in configuration (2) Inversion in Configuration

(3) Racemization (4) Mutarotation

50. Among the following, which is the least stable conformation of cyclohexane?

(1) Boat conformation (2) Half chair conformation

(3) Twist boat conformation (4) Chair conformation

51. A ketone gives a yellow precipitate when treated with I_2 in an alkaline solution. Thus, the ketone is :

(1) a cyclic ketone

(2) a methyl ketone

(3) an unsaturated ketone

(4) none of these

52. Tollens test can be used to distinguish :

(1) Propionaldehyde and acetone (2) Propanol and propionic acid

(3) Propene and isobutene (4) Isopropanol and propanol

53. The strongest acid among the choices is :

(1) Dichloroacetic acid
(2) Dimethylacetic acid
(3) Trifluoroacetic acid
(4) Triiodoacetic acid

54. If a compound gives an orange or red precipitate with 2,4 dinitrophenylhydrazine, then the compound is :

(1) An Alkyl halide
(2) An Aryl halide
(3) An Amine
(4) A Carbonyl compound

55. Anti-Markownikoff addition of HBr is not observed in :

(1) propene
(2) butene
(3) 2-butene
(4) 2- pentene

56. $(CH_3)_3C-OH$ on treatment with NaCl in aqueous medium gives :

(1) No reaction
(2) $(CH_3)_3C^-Na^+$
(3) $(CH_3)_3C^-Cl^-$
(4) Isobutylene

57. When $FeCl_3$ is added to phenol?

(1) No reaction occurs
(2) A colored complex will be formed
(3) Fe^{3+} will be oxidized to higher state
(4) O-chlorophenol will be formed

58. The correct order of decreasing Lewis acidity is :

(1) $BF_3 > BCl_3 > BBr_3 > BI_3$
(2) $BI_3 > BCl_3 > BBr_3 > BF_3$
(3) $BI_3 > BBr_3 > BCl_3 > BF_3$
(4) $BCl_3 > BF_3 > BBr_3 > BI_3$

59. Boron is unable to form BF_6^{3-} because of :

(1) high electronegativity of boron
(2) high electronegativity of fluorine
(3) lack of d-orbitals in boron
(4) less difference in electronegativity between B and F

60. The molecule NO is :

(1) Paramagnetic (2) Diamagnetic

(3) Ferromagnetic (4) An even electron molecule

61. The correct order of bond energy is :

(1) $Cl_2 > Br_2 > F_2 > I_2$ (2) $Cl_2 > F_2 > Br_2 > I_2$

(3) $I_2 > Br_2 > Cl_2 > F_2$ (4) $I_2 > Br_2 > F_2 > Cl_2$

62. H_5IO_6 is a :

(1) strong reducing agent (2) strong base

(3) strong oxidizing agent (4) weak base

63. The complex $[Co(NH_3)_5Br]^{2+}\ SO_4^{2-}$ and $[Co(NH_3)_5SO_4]^{+}Br^{-}$ are :

(1) Coordination isomers (2) Linkage isomers

(3) Stereoisomers (4) Ionization isomers

64. The C-H bond distance is the longest in :

(1) C_2H_2 (2) C_2H_4

(3) C_2H_6 (4) $C_2H_2Br_2$

65. The effective atomic number for $[Rh(H_2O)_6]^{3+}$ (At. No. for Rh is 45) is :

(1) 42 (2) 45 (3) 48 (4) 54

66. The spin only magnetic moment of $[CrF_6]^{4-}$ (At. No. for Cr is 24) is :

(1) 0 (2) 1.73 BM (3) 2.83 BM (4) 4.9 BM

67. Glucose and fructose can be distinguished by:

(1) Lucas test (2) Ninhydrin test

(3) Benedict reagent test (4) All the above

68. CCl_4 and freons :

(1) Are green compounds because they are green colored

(2) Depletes ozone concentration

(3) Causes increase in ozone concentration

(4) Have no effect on ozone concentration

69. The correct order of increasing oxidizing power in the series is :

(1) $VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$ (2) $Cr_2O_7^{2-} < VO_2^+ < MnO_4^-$

(3) $Cr_2O_7^{2-} < MnO_4^- < VO_2^+$ (4) $MnO_4^- < Cr_2O_7^{2-} < VO_2^+$

70. The most stable oxidation state exhibited by Thallium is :

(1) 0 (2) 1+ (3) 2+ (4) 3+

71. Wrought iron contains :

(1) Cr (2) Cu (3) C (4) Ag

72. The crystal structure of solid Mn(II) oxide is :

(1) NaCl structure (2) Fe_2O_3 structure

(3) CaF_2 structure (4) Na_2O structure

73. The ore magnetite is :

(1) Fe_3O_4 (2) $ZnCO_3$

(3) $CuCO_3.Cu(OH)_2$ (4) FeS_2

74. The first step in the extraction of Cu from copper pyrites is :

(1) Reduction by carbon (2) Electrolysis of ore

(3) Roasting of ore in O_2 (4) Magnetic separation

75. The reduction of zinc oxide with coke occurs at temperature :

(1) Greater than that for CuO (2) Less than that for CuO

(3) Less than that for Ag_2O (4) Equal to that for CuO

Space For Rough Work

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