KCET 2015 CHEMISTRY QUESTION PAPER

1. The unit cell with crystallographic dimensions $a \neq b \neq c, \alpha = \gamma = 90$ and $\beta \neq 90$ is
   a) Triclinic b) Monoclinic
   c) Orthorhombic d) Tetragonal

2. While charging the lead storage battery _____
   a) $PbSO_4$ on anode is reduced to Pb
   b) $PbSO_4$ on cathode is reduced to Pb
   c) $PbSO_4$ on cathode is oxidized to Pb
   d) $PbSO_4$ on anode is oxidized to PbO_2

3. Adenosine is an example of
   a) Nucleotide b) Purine base
   c) Pyrimidine base d) Nucleoside

4. Orlon has monomeric unit
   a) Acrolein b) Glycol
   c) Vinyl cyanide d) Isoprene

5. The two electrons have the following set of quantum numbers:
   $p = 3, 2. -2 + \frac{1}{2}$
   $Q = 3, 0, 0 + \frac{1}{2}$
   Which of the following statement is true?
   a) P and Q have same energy
   b) P has greater energy than Q
   c) P has lesser energy than Q
   d) P and Q represent same electron

6. H_2O_2 cannot oxidise
   a) PbS b) Na_2SO_3
   c) O_3 d) KI

7. In the given set of reaction, 2 – Bromopropane $\xrightarrow[\text{alc./heat}]{AgCN} X \xrightarrow{LiA/H_4} Y$ the IUPAC 'name of product 'Y' is
   a) N – Methylpropanamine
   b) N – Isopropylmethanamine
   c) Butan – 2 – amine
   d) N – Methylpropan – 2 – amine

8. On heating with concentrated NaOH solution in an inert atmosphere of CO_2, white phosphorus gives a gas. Which of the following statement is incorrect about the gas?
   a) It is less basic than NH_3
   b) It is more basic than NH_3
   c) It is highly poisonous and has smell like rotten fish.
   d) It's solution in water decomposes in the presence of light

9. Sodium metal crystallizes in B.C.C. lattice with edge length of 4.29 A. The radius of sodium atom is
   a) 2.857 A b) 1.601 A
   c) 2.145 A d) 1.857 A

10. 0.06% (w/v) aqueous solution of urea is isotonic with
    a) 0.06% glucose solution
    b) 0.6% glucose
    c) 0.01 M glucose solution
    d) 0.1 M glucose solution

11. In a first order reaction, the concentration of the reactant is reduced to 12.5% in one hour. When was it half completed?
    a) 3 hr b) 20 min
    c) 30 min d) 15 min

12. The electrolyte having maximum flocculation value for AgI / Ag^+ sol. is
    a) Nacl b) Na_2S
    c) Na_2SO_4 d) Na_3PO_4

13. Copper is extracted from Copper pyrites by heating in a Bessemer converter. The method is based on the principle that
    a) Copper has more affinity for oxygen than sulphur at high temperature
    b) Iron has less affinity for oxygen than Sulphur at high temperature.
    c) Copper has less affinity than for oxygen sulphur at high temperature
    d) Sulphur has less affinity for oxygen at high temperature.

14. Which of the following will be able to show geometrical isomerism?
a) MA_3B – Square planar
b) MA_2B_2 – Tetrahedral
c) MABCD – Square planar
d) MABCD – Tetrahedral

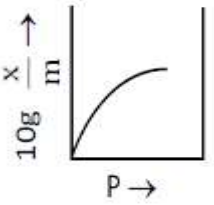
15. The electronic configuration of Gd^2 is (at. No. of Gd is 64)
a) $[Xe]4f^{+8}$ b) $[Xe]4f^8$
c) $[Xe]4f^{+7}5d^16s^2$ d) $[Xe]4f^{+7}5d^1$

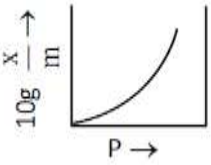
16. $MSO_4 \xrightarrow{NH_4OH} \downarrow X \underset{white}{} \xrightarrow[excess]{NH_4OH} Y \xrightarrow{H_2S} \downarrow Z$
Here M and Z are
a) Cu, ZnS b) Zn, ZnS
c) Fe, FeS d) Al, Al_2S_3

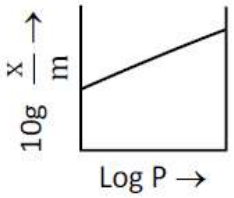
17. The hydrolysis of optically active 2 – bromobutane with aqueous NaOH result in the formation of
a) $(+)$ butan – 2 – ol
b) $(-)$ butan – 2 – ol
c) $(\pm)$ butan – 1 – ol
d) $(\pm)$ butan – 2 – ol

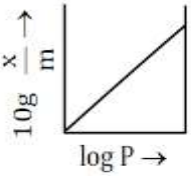
18. The distinguishing test between Methanoic acid and Ethanoic acid is
a) Litmus test
b) Tollen's test
c) Esterification test
d) Sodium bicarbonate test

19. In H_2O_2 fuel cell the reaction occurring at cathode is
a) $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(l)}$
b) $O_{2(g)} + 2H_2O_{(l)} + 4e^- \rightarrow 4OH_{(aq)}$
c) $H^+e^- \rightarrow \frac{1}{2}H_2$
d) $H^+_{(aq)} + \overline{O}H_{(aq)} \rightarrow H_2O_{(l)}$

20. Which of the following curve is in accordance with Freundlich adsorption isotherm?
a. 

b. 

c. 

d. 

21. How many ions per molecule are produced in the solution when Mohr salt is dissolved in excess of water?
a) 4 b) 5
c) 6 d) 10

22. Glycogen is
a) A polymer of β – D - glucose units
b) A structural polysaccharide
c) Structurally very much similar to amylopectin
d) Structurally similar to amylopectin but extensively branched

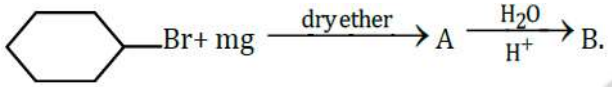
23. Number of possible alkynes with formula C_5H_8 is
a) 2 b) 3
c) 4 d) 5

24. Which of the following aqueous has the highest freezing point?
a) 0.1 M Sucrose b) 0.01 M NaCl
c) 0.1 M NaCl d) 0.01 M Na_2SO_4

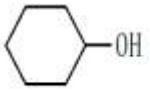
25. Half-life period of a first order reaction is 10 min. Staring with initial concentration 12 M, the rate after 20 min is
a) $0.0693 \times M\,min^{-1}$ b) $0.693 \times 3\,M\,min^{-1}$
c) $0.0693 \times 3\,M\,min^{-1}$ d) $0.0693 \times 4\,min^{-1}$

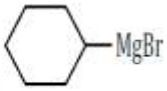
26. The salt which responds to dilute and concentrated H_2SO_4 is
a) CaF_2 b) $Ba(NO_3)_2$
c) Na_2SO_4 d) Na_3PO_4

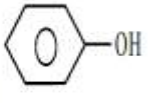
27. On heating potassium permanganate, one of the following compound is not obtained:
a) O_2 b) MnO
c) MnO_2 d) K_2MnO_4

28. 

The product 'B' is

a. 

b. 

c. 
d. 

29. The formation of cyanohydrins from a ketone is an example of
a) Nucelophilic substitution
b) Nucelophilic addition
c) Electrophilic addition
d) Electrophilic substitution

30. One of the following is an essential amino acid
a) Tyrosine b) Cysteine
c) Isoleucine d) Serine

31. The aqueous solution of following salt will have the lowest pH :
a) $NaClO_3$ b) NaClO
c) $NaClO_2$ d) $NaClO_4$

32. For one of the element various successive ionization enthalpies (in kJ mol^{-1}) are given below:

I.E	1st	2nd	3rd	4th	5th
	577.5	1810	2750	11,580	14,820

The element is
a) Si b) P
c) Al d) Mg

33. 0.30 g of an organic compound containing C, H and Oxygen on combustion yields 0.44 g CO_2 and 0.18 g H_2O. If one mol of compound weight 60, then molecular formula of the compound is
a) CH_2O b) C_3H_8O
c) C_4H_6O d) $C_2H_4O_2$

34. One of the following amide will not undergo Hoffmann bromamide reaction
a) CH_3CONH_2 b) $CH_3CONHCH_3$
c) $C_6H_5CONH_2$ d) $CH_3CH_2CONH_2$

35. Cheilosis and digestive disorders are due to the deficiency of
a) Thiamine b) Ascorbic acid
c) Riboflavin d) Pyridoxine

36. How many Coulombs of electricity are required for the oxidation of one mol of water to dioxygen?
a) 9.65×10^4C b) 1.93×10^4C
c) 1.93×10^5C d) 19.3×10^5C

37. 100 cm^3 of 1 M CH_3COOH was mixed with 100 cm^3 of 2 M CH_3OH to form an ester. The change in the initial rate if each solution is diluted with equal volume of water would be
a) 2 times b) 4 times
c) 0.5 times d) 0.25 times

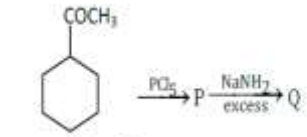
38. Which of the following colloids cannot be easily coagulated?
a) Lyophobic colloids
b) Multimolecular colloids
c) Macromolecular colloids
d) Irreversible colloids

39. The complex ion having minimum magnitude of Δ_0(CFSE) is
a) $[Cr(CN)_6]^{3-}$ b) $[Co(NH_3)_6]^{3+}$
c) $[Co(Cl)_6]^{3-}$ d) $[Cr(H_2O)_6]^{3+}$

40. The arrangement of following compounds
i. Bromomethane
ii. Bromoform
iii. Chloromethane
iv. Dibromomethane
In the increasing order of their boiling point is
a) iii < i < iv < ii b) iv < iii < i < ii
c) ii < iii< i < iv d) i < ii < iii < iv

41. Iodoform can be prepared from all, except
a) Propan – 2 – ol b) butan – 2 – one
c) Propan – 1 – ol d) Acetophenone

42. Identify 'Q' in the following sequence of reactions:

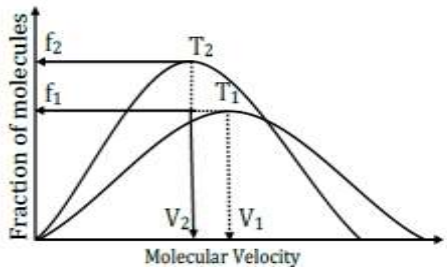


43. Cryolite is
a) Na_3AlF_6 and is used in the electrolysis of alumina for decreasing electrical conductivity.
b) Na_3AlF_6 and is used in the electrolysis of alumina for lowering the melting point of alumina only
c) Na_3AlF_6 and is used in the electrolysis of alumina for lowering the melting point and increasing the conductivity of alumina.
d) Na_3AlF_6 and is used in the electrolytic refining of alumina.

44. Which of the following compound of Xenon has pyramidal geometry?
a) $XeOF_4$ b) XeF_4
c) XeO_3 d) XeF_4

45. After adding non – volatile solute point of water decreases to $-0.186^{\circ}C$. Calculate ΔT_b if $K_r = 1.86\ K\ kg\ mol^{-1}$ and $K_b = 0.521\ K\ kg\ mol^{-1}$
a) 0.521 b) 0.0521
c) 1.86 d) 0.0186

46. Plot of Maxwell's distribution of velocities is given below



Which of the following is correct about this plot?
a) $T_1 < T_2$ b) $f_1 > f_2$
c) $T_1 > T_2$ d) $V_1 < V_2$

47. The pair of compound which cannot exist together in solution is
a) $NaHCO_3$ and $NaOH$
b) $NaHCO_3$ and H_2O
c) $NaHCO_3$ and Na_2CO_3
d) Na_2CO_3 and $NaOH$

48. What amount of dioxygen (in gram) contains 1.8×10^{22} molecules?
a) 0.0960 b) 0.960
c) 9.60 d) 96.0

49. Using MOT, compare O_2^+ and O_2^- species and choose the incorrect option
a) O_2^+ have higher bond order than O_2^-
b) O_2^- is less stable
c) O_2^+ is diamagnetic while O_2^- is paramagnetic
d) Both O_2^+ and O_2^- are paramagnetic

50. Which of the following is not true?
a) Erythromycin is a bacteriostatic antibiotic
b) Ampicillin is not a natural antibiotic
c) Prontosil is not converted into sulfanilamide in the body
d) Vancomycin is a broad – spectrum antibiotic

51. In the reaction

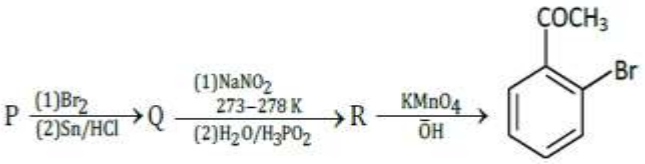
$S + \frac{3}{2}O_2 \rightarrow SO_3 + 2x\ kj$ and

$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3 + y\ kJ$

Heat of formation of SO_2 is
a) $x + y$ b) $x - y$
c) $2x - y$ d) $2x + y$

52. Arrange the following compounds in the increasing order of their acidic strength:
i. m – nitrophenol ii) m – cresol
iii. Phenol iv) m – Chlorophenol
a) iii < ii < i < iv b) ii < iv < iii < i
c) ii < iii < iv < i d) ii < iii < i < iv

53. In the sequence of following reactions:



The starting compound 'P' is

a) o – nitro toluene b) m – nitro toluene
c) o – bromo toluene d) p – nitro toluene

54. Acetic acid is treated with $Ca(OH)_2$ and the product so obtained is subjected to dry distillation. The final product is

a) Ethanal b) Propanal
c) Propanone d) Ethanol

55. The correct statement is

a) BF_3 is the strongest Lewis acid among the other boron halides.
b) Bl_3 is the weakest Lewis acid among the boron halides.
c) There is maximum $p\pi - p\pi$ back bonding in BF_3.
d) There is minimum $p\pi - p\pi$ back bonding in BF_3.

56. Which of the following compound possesses the "C – H" bond with the lowest bond dissociation energy?

a) Toluene b) Benzene
c) n – pentane d) 2, 2 – dimethyl propane

57. In presence of HCl, H_2S results the precipitation of Group – 2 elements but not Group – 4 elements during qualitative analysis. It is due to

a) Higher concentration of S^{2-}
b) Higher concentration of H^+
c) Lower concentration of S^{2-}
d) Lower concentration of H^+

58. One of the following conversion results in the change of hybridization and geometry

a) CH_4 TO C_2H_6 b) NH_3 to NH_4
c) BF_3 to BF_4 d) H_2O to H_2O

59. Water softening by Clark's process uses

a) $CaHCO_3$ b) $NaHCO_3$
c) Na_2CO_3 d) $Ca(OH)_2$

60. An alkali metal hydride (NaH) reacts with diborane in 'A' to give a tetrahedral compound 'B' which is extensively used as reducing agent in organic synthesis. The compound 'A' and 'B' respectively are

a) C_2H_6 and C_2H_5Na
b) CH_3COH_3 and $B_3N_3H_6$
c) C_6H_6 and $NaBH_4$
d) $(C_2H_5)_2O$ and $NaBH_4$

ANSWER KEYS

1. (b)	2. (a)	3. (d)	4. (c)	5. (b)	6. (c)	7. (d)	8. (b)	9. (d)	10. (c)
11. (b)	12. (a)	13. (a)	14. (c)	15. (d)	16. (b)	17. (d)	18. (b)	19. (b)	20. (c)
21. (b)	22. (d)	23. (b)	24. (b)	25. (c)	26. (b)	27. (b)	28. (c)	29. (b)	30. (c)
31. (d)	32. (c)	33. (d)	34. (b)	35. (c)	36. (c)	37. (d)	38. (c)	39. (c)	40. (a)
41. (c)	42. (c)	43. (c)	44. (c)	45. (b)	46. (c)	47. (a)	48. (b)	49. (c)	50. (c)
51. (G)	52. (c)	53. (d)	54. (c)	55. (c)	56. (a)	57. (c)	58. (c)	59. (d)	60. (d)