KCET EXAMINATION – 2020
SUBJECT : CHEMISTRY

DATE :- 31-07-2020 **TIME : 02.30 PM TO 03.50 PM**

1. Copper is extracted from copper pyrites by
a) Thermal decomposition
b) Reduction by coke
c) Electrometallurgy
d) Auto reduction

Ans. d

2. Function of potassium ethyl xanthate in froth floatation process is to make the ore
a) Lighter b) Hydrophobic
c) Hydrophilic d) Heavier

Ans. b

3. Sulphide ore on roasting gives a gas X. X reacts with Cl_2 in the presence of activated charcoal to give Y. Y is:
a) SO_2Cl_2 b) S_2Cl_2 c) SCl_6 d) $SOCl_2$

Ans. a

4. Aqueous solution of a salt (A) forms a dense white precipitate with $BaCl_2$ solution. The precipitate dissolves in dilute HCl to produce a gas (B) which decolourises acidified $KMnO_4$ solution
A and B respectively are:
a) $BaSO_3$, SO_2 b) $BaSO_4$, H_2S
c) $BaSO_3$, H_2S d) $BaSO_4$, SO_2

Ans. a

5. Bond angle in PH_4^+ is more than that of PH_3. This is because
a) Lone pair – bond pair repulsion exists in PH_3
b) PH_4^+ has square planar structure
c) PH_3 has planar trigonal structure
d) Hybridisation of P changes when PH_3 is converted to PH_4^+

Ans. a

6. Incorrectly matched pair is:
a) XeO_3 – pyramidal
b) XeF_4 – tetrahedral
c) XeF_6 – disorted octahedral
d) $XeOF_4$ – square pyramidal

Ans. b

7. Phosphorus pentachloride
a) On hydrolysis gives an oxo acid of phosphorus which is tribasic
b) On hydrolysis gives an oxo acid of phosphorus which is a good reducing agent
c) Has all the five equivalent bonds
d) Exists as an ionic solid in which cation has octahedral structure and anion has tetrahedral structure

Ans. a

8. Identify the set of paramagnetic ions among the following:
a) V^{2+}, Co^{2+}, Ti^{4+} b) $Ni^{2+}, Cu^{2+}, Zn^{2+}$
c) $Ti^{3+}, Cu^{2+}, Mn^{3+}$ d) Sc^{3+}, Ti^{3+}, V^{3+}

Ans. c

9. How many moles of acidified $K_2Cr_2O_7$ is required to liberate 6 moles of I_2 from an aqueous solution of I^- ?
a) 2 b) 1 c) 0.25 d) 0.5

Ans. a

10. Cu_2Cl_2 and $CuCl_2$ in aqueous medium
a) $CuCl_2$ is more stable than Cu_2Cl_2
b) Stability of Cu_2Cl_2 is equal to stability of $CuCl_2$
c) Both are unstable
d) Cu_2Cl_2 is more stable than $CuCl_2$

Ans. a

11. The Co-ordination number of Fe and Co in the complex ions, $\left[Fe(C_2O_4)_3\right]^{3-}$ and $\left[Co(SCN)_4\right]^{2-}$ are respectively:
a) 3 and 4 b) 6 and 8
c) 4 and 6 d) 6 and 4

Ans. d

12. Number of stereoisomers exhibited by $\left[Co(en)_2Cl_2\right]^+$ is
a) 4 b) 2 c) 5 d) 3

Ans. d

13. Give the IUPAC name of $\left[Pt(NH_3)_4\right][PtCl_4]$ is

a) Tetra ammine platinum (o) tetra chlorido platinum (IV)
b) Tetra ammine palatinate (II) tetra chlorido platinum (II)
c) Tetra ammine palatinate (o) tetra chlorido platinum (IV)
d) Tetra ammine platinum (II) tetra chlorido palatinate (II)

Ans. d

14. Prolonged exposure of chloroform in humans may cause damage to liver. It is due to the formation of the following compound

a) CCl_4 b) $COCl_2$ c) CH_2Cl_2 d) Cl_2

Ans. b

Sol. $CHCl_3 \xrightarrow{[o]} COCl_2 + HCl$

15. Which of the following halide shows highest reactivity towards S_N1 reaction?

a) $C_6H_5CH_2Cl$
b) $CH_3 - CH_2Cl$
c) $CH_3 - CH_2 - CH_2 - CH_2I$
d) C_6H_5Cl

Ans. a

Sol. Rate of SN^1 reaction is directly proportional to stability of carbocation or Reactivity of SN^1 reaction is influenced by stability of carbocation.

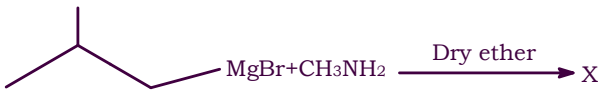
16. In the reaction

The number of possible isomers for the organic compound X is

a) 4 b) 5 c) 3 d) 2

Ans. d

Sol.



x = isobutane and it has two isomers.

17. Which of the following on heating gives an ether as major products?

P: $C_6H_5CH_2Br + CH_3ONa$
Q: $C_6H_5ONa + CH_3Br$
R: $(CH_3)_3C - Cl + CH_3ONa$
S: $C_6H_5CH = CHCl + CH_3ONa$

a) Both R and S b) Both P and R
c) Both Q and S d) Both P and Q

Ans. d

Sol. Primary alkyl halides/benzyl halides reacts with alkoxide/phenoxide through SN^2 mechanism gives ethers.
Vinyl and aryl halides least reactive towards SN^1

18. The steps involved in the conversion of propan -2-ol to propan -1-ol are in the order

a) Dehydration, addition of HBr, heating with aq. KOH
b) Heating with PCl_5, heating with alc. KOH, acid catalysed addition of water
c) Heating with PCl_5, heating with alc. KOH, hydroboration oxidation
d) Dehydration, addition of HBr in presence of peroxide, heating with alc. KOH

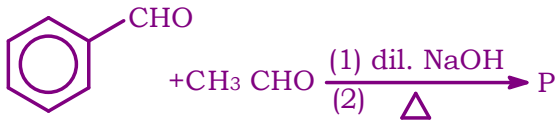
Ans. c

19. Which of the following is the strongest base?

a) CH_3COO^- b) Cl^-
c) OH^- d) CH_3O^-

Ans. d

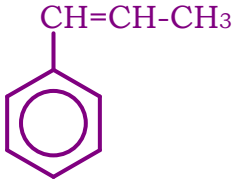
20.



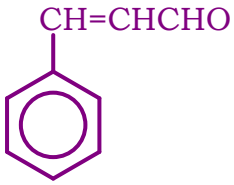
The product 'P' is

a)

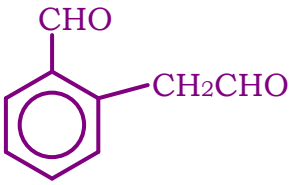
b)



c)

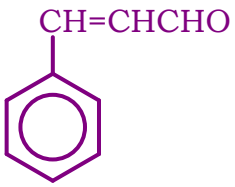


d)



Ans. c

Sol.



21. Which of the following has the lowest boiling point?

a) CH_3CH_2OH b) $CH_3 - CH_2 - NH_2$

c) $CH_3 - O - CH_3$ d) HCOOH

Ans. c

22. The carbonyl compound that does not undergo aldol condensation is

a) Acetone

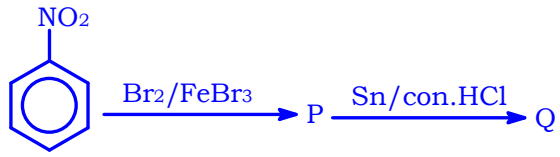
b) Di chloro acetaldehyde

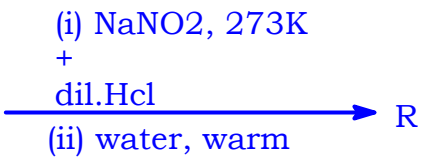
c) Tri chloro acetaldehyde

d) Acetaldehyde

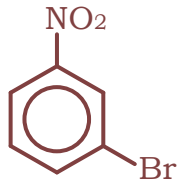
Ans. c

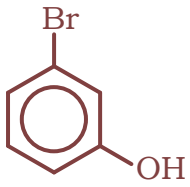
Sol. Aldehydes and ketones containing alpha hydrogens will undergo aldol condensation

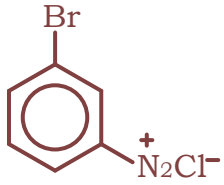
23. 

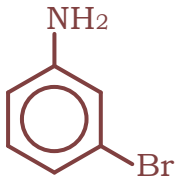


. The final product is

a) 

b) 

c) 

d) 

Ans. b

24. Hinsberg's reagent is

a) $(CH_3CO)_2O$ / pyridine

b) $C_6H_5SO_2Cl$

c) $C_6H_5SO_2NH_2$

d) CH_3COCl / pyridine

Ans. b

25. Which one of the following vitamins is not stored in adipose tissue?

a) A b) B_6 c) D d) E

Ans. b

26. Hypothyroidism is caused by the deficiency of

a) Vitamin B-12 b) Adrenalin

c) Thyroxine d) Glucocorticoid

Ans. c

27. C_1-C_4 glycosidic bond is NOT found in

a) Maltose b) Sucrose

c) Lactose d) Starch

Ans. b

28. Which of the following polymer has strongest intermolecular forces of attraction?

a) Neoprene b) Terylene

c) Polythene d) Polystyrene

Ans. b

29. Which of the following monomers can undergo condensation polymerization?

a) Styrene b) Glycine

c) Isoprene d) Propene

Ans. b

30. A food additive that acts as an antioxidant is

a) BHA b) Saccharin

c) Sugar syrup d) Salt

Ans. a

31. Which of the following is not related to drug-enzyme interaction?

a) Allosteric site b) Antagonist

c) Co-enzymes d) Enzyme inhibitor

Ans. b

32. 0.4 g of dihydrogen is made to react with 7.4 g of dichlorine to form hydrogen chloride. The volume of hydrogen formed at 273K and 1 bar pressure is

a) 9.08L b) 4.54L c) 90.8L d) 45.4L

Ans. b

33. With regard to photoelectric effect, identify the correct statement among the following

a) Energy of e^- ejected increases with the increase in the intensity of incident light

b) Number of e^- ejected increases with the increase in the frequency of incident light

c) Number of e^- ejected increases with the increase in work function

d) Number of e^- ejected increases with the increase in the intensity of incident light

Ans. d

34. The last element of the p-block in 6th period is represented by the outer most electronic configuration
a) $7s^2\ 7p^6$
b) $5f^{14}6d^{10}7s^27p^5$
c) $4f^{14}5d^{10}6s^26p^4$
d) $4f^{14}5d^{10}6s^26p^6$

Ans. d

35. The conjugate base of NH_3 is
a) NH_4^+ b) NH_4OH c) NH_2OH d) NH_2^-

Ans. d

36. A gas mixture contains 25% He and 75% CH_4 by volume at a given temperature and pressure. The percentage by mass of methane in the mixture is approximately____
a) 75% b) 25% c) 92% d) 8%

Ans. c

37. The percentage of s-character in the hybrid orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are
a) 33.3%, 50%, 25% b) 33.3%, 25%, 50%
c) 50%, 33.3%, 25% d) 25%, 50%, 33.3%

Ans. c

38. The formal charge on central oxygen atom in ozone is
a) -1 b) 0 c) +2 d) +1

Ans. d

39. When the same quantity of heat is absorbed by a system at two different temperatures T_1 and T_2, such that $T_1 > T_2$, change in entropies are ΔS_1 and ΔS_2 respectively. Then
a) $\Delta S_1 < \Delta S_2$ b) $\Delta S_1 = \Delta S_2$
c) $S_2 > S_1$ d) $\Delta S_2 < \Delta S_1$

Ans. a

Sol. $\boxed{\Delta S = \frac{q}{T}}$

q is same (constant)

$\therefore \boxed{\Delta S \alpha \frac{1}{T}}$

40. The oxidation number of nitrogen atoms in NH_4NO_3 are
a) +5, +5 b) -3, +5 c) +3, -5 d) -3, -3

Ans. b

41. A Lewis acid 'X' reacts with $LiAlH_4$ in ether medium to give a highly toxic gas. This gas when heated with NH_3 gives a compound commonly known as inorganic benzene. The gas is
a) B_2O_3 b) B_2H_6 c) $B_3N_3H_6$ d) BF_3

Ans. b

42. The oxide of potassium that does not exist is
a) K_2O b) KO_2 c) K_2O_2 d) K_2O_3

Ans. d

43. The metal that products H_2 with both dil HCl and NaOH (aq) is
a) Zn b) Mg c) Ca d) Fe

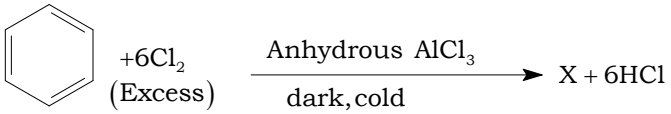
Ans. a

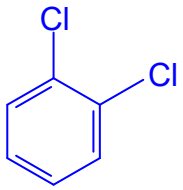
Sol. Amphoteric metals can react with both acids and bases.

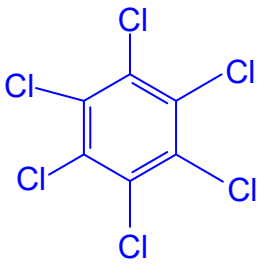
44. Which of the following is NOT a pair of functional isomers?
a) $C_2H_5OC_2H_5$ and $C_3H_7OCH_3$
b) CH_3CH_2OH and CH_3OCH_3
c) $CH_3CH_2NO_2$ and H_2NCH_2COOH
d) CH_3COOH and $HCOOCH_3$

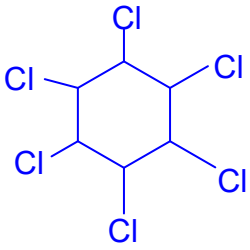
Ans. a

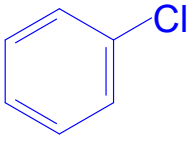
45. Identify 'X' in the following reaction



a) 

b) 

c) 

d) 

Ans. b

46. Which of the following is NOT a green house gas?
a) CFC b) CO_2 c) O_2 d) NO_2

Ans. c

47. A metal exists as an oxide with formula $M_{0.96}O$. Metal M can exist as M^{+2} and M^{+3} in its oxide $M_{0.96}O$. The percentage of M^{+3} in the oxide is nearly

a) 8.3% b) 4.6% c) 5% d) 9.6%

Ans. **a**

Sol. $M_O.96^0$

No. of M^{+2} ions = x

No. of M^{+3} ions = $0.96 - x$

Total positive charges = Total negative charge (in magnitude)

$x(2) + (0.96 - x)(3) = 1\ (2)$

$2x + 2.88 - 3x = 2$

$-x = 2 - 2.88$

$\therefore x = 0.88$

No. of M^{+3} ions = $0.96 - 0.88$

$= 0.08$

Percentage of $M^{+3} = \frac{0.08}{0.96} \times 100$

$= 8.33\ \%$

48. A metal crystallises in face centred cubic structure with metallic radius $\sqrt{2}A^0$. The volume of the unit cell (in m^3) is

a) $4x10^{-10}$ b) $6.4x10^{-29}$

c) $4x10^{-9}$ d) $6.4x10^{-30}$

Ans. **b**

Sol. For FCC

$$\boxed{\text{Atomic radius}(r) = \frac{\sqrt{2}a}{4}}$$

$\sqrt{2} \times 10^{-10} = \frac{\sqrt{2}a}{4}$

$a = \frac{4 \times \sqrt{2} \times 10^{-10}}{\sqrt{2}}$

$a = 4 \times 10^{-10}\ m$

Volume of unit cell = a^3

$= \left(4 \times 10^{-10}\right)^3$

$= 64 \times 10^{-30}$

$= 6.4 \times 10^{-29}\ m^3$

49. Silicon doped with gallium forms

a) n-type semiconductor

b) both n and p type semiconductor

c) an intrinsic semiconductor

d) p-type semiconductor

Ans. **d**

50. The pair of electrolytes that posses same value for the constant (A) in the Debye – Huckel – Onsagar equation, $\lambda_m = \lambda_m^e - A\sqrt{C}$ is

a) $MgSO_4$, $NaSO_4$ b) NH_4Cl, NaBr

c) NaBr, $MgSO_4$ d) NaCl, $CaCl_2$

Ans. **b**

51. Which of the following pair of solutions is isotonic ?

a) 0.01M $BaCl_2$ and 0.015M NaCl

b) 0.001M $Al_2(SO_4)_3$ and 0.01 M $BaCl_2$

c) 0.001M $CaCl_2$ and 0.001M $Al_2(SO_4)_3$

d) 0.01M $BaCl_2$ and 0.001M $CaCl_2$

Ans. **a**

Sol. When solute particle concentration is same then they are isotonic

52. Solute 'X' dimerises in water to the extent of 80%. 2.5g of 'X' in 100g of water increases the boiling point by 0.3 ^0C. The molar mass of 'X' is [K_b=0.52K kg mol^{-1}]

a) 13 b) 52 c) 65 d) 26

Ans. **d**

Sol. $i = 1 + \alpha\left(\frac{1}{n} - 1\right)$

$i = 1 + 0.8\left(\frac{1}{2} - 1\right)$

$i = 1 - 0.4 = 0.6$

$\Delta T_b = k_b \times \frac{W}{m} \times \frac{100}{W(gm)} \times i$

$0.3 = 0.52 \times \frac{2.5}{m} \times \frac{1000}{100} \times 0.6$

Molar mass of $x(m) = \frac{0.52 \times 2.5 \times 10 \times 0.6}{0.3}$

$= 26$

53. Given $E^0_{Fe^{+3}/Fe^{+2}} = +0.76V$ and $E^0_{I_2/I^-} = +0.55V$. The equilibrium constant for the reaction taking place in galvanic cell consisting of above two electrodes is $\left[\frac{2.303RT}{F} = 0.06\right]$

a) $1x10^7$ b) $1x10^9$ c) $3x10^8$ d) $5x10^{12}$

Ans. **a**

Sol. $E^0_{Fe^{+3}/Fe^{+2}} = +0.76\ (\text{cathode})$

$E^0_{I_2/I^-} = +0.55\ (\text{Anode})$

$E^0_{cell} = E^0_C - E^o_A$

$= 0.76 - 0.55 = 0.21$

$$2Fe^{+3} + 2I^- \rightarrow 2Fe^{+2} + I_2$$

$$E^0_{Cell} = \frac{0.059}{n}\log k_c$$

$$0.21 = \frac{0.059}{2}\log\ k_c$$

$$\log k_c = 7$$

$$\boxed{k_c = 10^7}$$

54. If an aqueous solution of NaF is electrolyzed between inert electrodes, the product obtained at anode is

a) F_2 b) H_2 c) Na d) O_2

Ans. d

55. In which of the following cases a chemical reaction is possible ?

a) $ZnSO_{4(aq)}$ is placed in a copper vessel

b) $AgNO_3$ solution is stirred with a copper spoon

c) Conc. HNO_3 is stored in a platinum vessel

d) gold ornaments are washed with dil HCl

Ans. b

56. The time required for 60% completion of a first order reaction is 50 min. The time required for 93.6% completion of the same reaction will be

a) 100 min b) 83.8 min

c) 50 min d) 150 min

Ans. d

Sol. 60% completion

$$K = \frac{2.303}{t}\log\frac{[R_0]}{[R]}$$

$$K = \frac{2.303}{50}\log\frac{100}{40}$$

$$K = \frac{2.303}{50}\times 0.397$$

93.6% completion

$$K = \frac{2.303}{t}\log\frac{[R_0]}{[R]}$$

$$\frac{2.303}{50}\times 0.397 = \frac{2.303}{t}\log\frac{100}{6.4}$$

$$t = 150\ min$$

57. For an elementary reaction 2A+3B→ 4C+D the rate of appearance of C at time 't' is 2.8×10^{-3} mol $L^{-1}S^{-1}$. Rate of disappearance of B at 't' t will be

a) $\frac{4}{3}\left(2.8\times10^{-3}\right)$mol L^{-1} S^{-1}

b) $\frac{3}{4}\left(2.8\times10^{-3}\right)$mol L^{-1} S^{-1}

c) $2\left(2.8\times10^{-3}\right)$mol L^{-1} S^{-1}

d) $\frac{1}{4}\left(2.8\times10^{-3}\right)$mol L^{-1} S^{-1}

Ans. b

Sol. $$-\frac{1}{3}\frac{d(B)}{dt} = +\frac{1}{4}\frac{d(C)}{dt}$$

$$\frac{-d(B)}{dt} = +\frac{3}{4}\frac{d(C)}{dt}$$

$$= \frac{+3}{4}\left(2.8\times10^{-3}\right)\text{mol } L^{-1}\ S^{-1}$$

58. The rate constant of a reaction is given by $k=P\ Ze^{-Ea/RT}$ under standard notation. In order to speed up the reaction, which of the following factors has to be decreased ?

a) Z b) Both Z and T

c) E_a d) T

Ans. c

59. A sol of AgI is prepared by mixing equal volumes of 0.1M $AgNO_3$ and 0.2M KI, which of the following statement is correct ?

a) Sol obtained is a negative sol with NO_3^- adsorbed on AgI

b) Sol obtained is a positive sol with Ag^+ adsorbed on AgI

c) Sol obtained is a positive sol with K^+ adsorbed on AgI

d) Sol obtained is a negative sol with I^- adsorbed on AgI

Ans. d

60. During Adsorption of a gas on a solid

a) $\Delta G<0$, $\Delta H<0$, $\Delta S<0$

b) $\Delta G>0$, $\Delta H>0$, $\Delta S>0$

c) $\Delta G<0$, $\Delta H<0$, $\Delta S>0$

d) $\Delta G<0$, $\Delta H>0$, $\Delta S>0$

Ans. a