

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) $\text{BaSO}_3, \text{SO}_2$ b) $\text{BaSO}_4, \text{H}_2\text{S}$
c) $\text{BaSO}_3, \text{H}_2\text{S}$ d) $\text{BaSO}_4, \text{SO}_2$

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 – distorted 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) $\text{V}^{2+}, \text{Co}^{2+}, \text{Ti}^{4+}$ b) $\text{Ni}^{2+}, \text{Cu}^{2+}, \text{Zn}^{2+}$
c) $\text{Ti}^{3+}, \text{Cu}^{2+}, \text{Mn}^{3+}$ d) $\text{Sc}^{3+}, \text{Ti}^{3+}, \text{V}^{3+}$

Ans. c

9. How many moles of acidified $\text{K}_2\text{Cr}_2\text{O}_7$ 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, $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$ and $[\text{Co}(\text{SCN})_4]^{2-}$ 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 $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ is
a) 4 b) 2 c) 5 d) 3

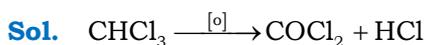
Ans. d

13. Give the IUPAC name of $[\text{Pt}(\text{NH}_3)_4][\text{PtCl}_4]$ is
- Tetra ammine platinum (o) tetra chlorido platinum (IV)
 - Tetra ammine palatinate (II) tetra chlorido platinum (II)
 - Tetra ammine palatinate (o) tetra chlorido platinum (IV)
 - 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
- CCl_4
 - COCl_2
 - CH_2Cl_2
 - Cl_2

Ans. b

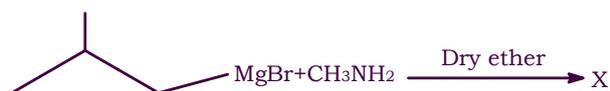


15. Which of the following halide shows highest reactivity towards $\text{S}_{\text{N}}1$ reaction?
- $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$
 - $\text{CH}_3 - \text{CH}_2\text{Cl}$
 - $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2\text{I}$
 - $\text{C}_6\text{H}_5\text{Cl}$

Ans. a

Sol. Rate of $\text{S}_{\text{N}}1$ reaction is directly proportional to stability of carbocation or Reactivity of $\text{S}_{\text{N}}1$ reaction is influenced by stability of carbocation.

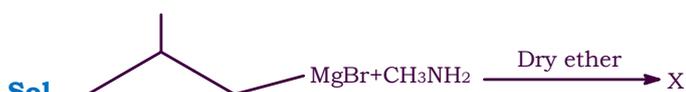
16. In the reaction



The number of possible isomers for the organic compound X is

- 4
- 5
- 3
- 2

Ans. d



x = isobutane and it has two isomers.

17. Which of the following on heating gives an ether as major products?
- P: $\text{C}_6\text{H}_5\text{CH}_2\text{Br} + \text{CH}_3\text{ONa}$
 Q: $\text{C}_6\text{H}_5\text{ONa} + \text{CH}_3\text{Br}$
 R: $(\text{CH}_3)_3\text{C} - \text{Cl} + \text{CH}_3\text{ONa}$
 S: $\text{C}_6\text{H}_5\text{CH} = \text{CHCl} + \text{CH}_3\text{ONa}$

- Both R and S
- Both P and R
- Both Q and S
- Both P and Q

Ans. d

Sol. Primary alkyl halides/benzyl halides reacts with alkoxide/phenoxide through $\text{S}_{\text{N}}2$ mechanism gives ethers. Vinyl and aryl halides least reactive towards $\text{S}_{\text{N}}1$

18. The steps involved in the conversion of propan-2-ol to propan-1-ol are in the order
- Dehydration, addition of HBr, heating with aq. KOH
 - Heating with PCl_5 , heating with alc. KOH, acid catalysed addition of water
 - Heating with PCl_5 , heating with alc. KOH, hydroboration oxidation
 - Dehydration, addition of HBr in presence of peroxide, heating with alc. KOH

Ans. c

19. Which of the following is the strongest base?
- CH_3COO^-
 - Cl^-
 - OH^-
 - CH_3O^-

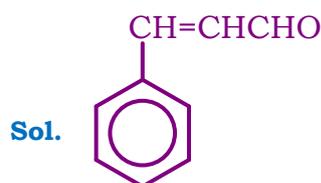
Ans. d



The product 'P' is

-
-
-
-

Ans. c



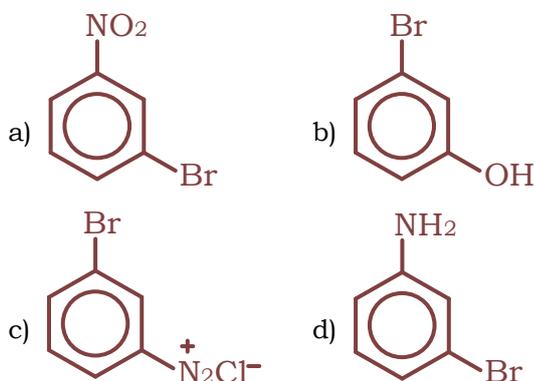
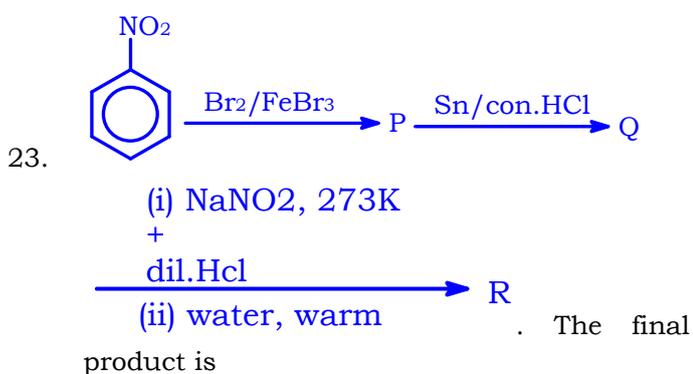
21. Which of the following has the lowest boiling point?
 a) $\text{CH}_3\text{CH}_2\text{OH}$ b) $\text{CH}_3 - \text{CH}_2 - \text{NH}_2$
 c) $\text{CH}_3 - \text{O} - \text{CH}_3$ d) HCOOH

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



Ans. b

24. Hinsberg's reagent is
 a) $(\text{CH}_3\text{CO})_2\text{O}$ / pyridine
 b) $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$
 c) $\text{C}_6\text{H}_5\text{SO}_2\text{NH}_2$
 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. $\text{C}_1\text{-C}_4$ 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) $5f^{14}6d^{10}7s^2 7p^5$
 c) $4f^{14}5d^{10}6s^2 6p^4$
 d) $4f^{14}5d^{10}6s^2 6p^6$

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

q is same (constant)

$\therefore \Delta S \propto \frac{1}{T}$

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 reacts with H_2 with both dil HCl and NaOH (aq) is

- a) Zn b) Mg c) Ca d) Fe

Ans. a

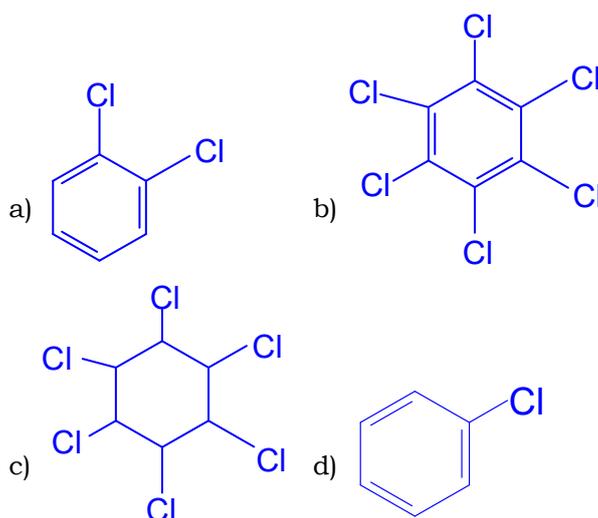
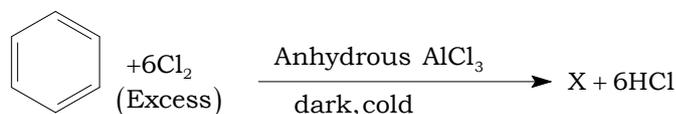
Sol. Amphoteric metals can react with both acids and bases.

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



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. $M_{0.96}O$

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

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

Total positive charges = Total negative charge (in magnitude)

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

$$2x + 2.88 - 3x = 2$$

$$-x = 2 - 2.88$$

$$\therefore x = 0.88$$

$$\begin{aligned} \text{No. of } M^{+3} \text{ ions} &= 0.96 - 0.88 \\ &= 0.08 \end{aligned}$$

$$\begin{aligned} \text{Percentage of } M^{+3} &= \frac{0.08}{0.96} \times 100 \\ &= 8.33\% \end{aligned}$$

48. A metal crystallises in face centred cubic structure with metallic radius $\sqrt{2}A^\circ$. The volume of the unit cell (in m^3) is
 a) 4×10^{-10} b) 6.4×10^{-29}
 c) 4×10^{-9} d) 6.4×10^{-30}

Ans. b

Sol. For FCC

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

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

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

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

$$\begin{aligned} \text{Volume of unit cell} &= a^3 \\ &= (4 \times 10^{-10})^3 \\ &= 64 \times 10^{-30} \\ &= 6.4 \times 10^{-29} \text{ m}^3 \end{aligned}$$

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 possess same value for the constant (A) in the Debye - Huckel - Onsager equation, $\lambda_m = \lambda_m^\circ - A\sqrt{C}$ 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 $0.3^\circ C$. The molar mass of 'X' is [$K_b = 0.52 K \text{ kg mol}^{-1}$]
 a) 13 b) 52 c) 65 d) 26

Ans. d

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

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

$$i = 1 - 0.4 = 0.6$$

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

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

$$\begin{aligned} \text{Molar mass of } x(m) &= \frac{0.52 \times 2.5 \times 10 \times 0.6}{0.3} \\ &= 26 \end{aligned}$$

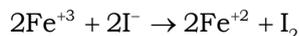
53. Given $E_{Fe^{+3}/Fe^{+2}}^\circ = +0.76V$ and $E_{I_2/I^-}^\circ = +0.55V$. The equilibrium constant for the reaction taking place in galvanic cell consisting of above two electrodes is $\left[\frac{2.303RT}{F} = 0.06 \right]$
 a) 1×10^7 b) 1×10^9 c) 3×10^8 d) 5×10^{12}

Ans. a

Sol. $E_{Fe^{+3}/Fe^{+2}}^\circ = +0.76$ (cathode)

$E_{I_2/I^-}^\circ = +0.55$ (Anode)

$$\begin{aligned} E_{\text{cell}}^\circ &= E_C^\circ - E_A^\circ \\ &= 0.76 - 0.55 = 0.21 \end{aligned}$$



$$E_{\text{cell}}^0 = \frac{0.059}{n} \log k_c$$

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

$$\log k_c = 7$$

$$k_c = 10^7$$

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

- a) F₂ b) H₂ c) Na d) O₂

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) AgNO₃ solution is stirred with a copper spoon
 c) Conc. HNO₃ 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

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

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

$$t = 150 \text{ min}$$

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

a) $\frac{4}{3}(2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$

b) $\frac{3}{4}(2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$

c) $2(2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$

d) $\frac{1}{4}(2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$

Ans. b

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

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

$$= \frac{+3}{4} (2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$$

58. The rate constant of a reaction is given by $k = P Z e^{-E_a/RT}$ 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 AgNO₃ and 0.2M KI, which of the following statement is correct ?

- a) Sol obtained is a negative sol with NO₃⁻ 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