

### KCET 2020 CHEMISTRY QUESTION PAPER

1. Aqueous solution of a salt (A) forms a dense white precipitate with  $\text{BaCl}_2$  solution. The precipitate dissolves in dilute  $\text{HCl}$  to produce a gas (B) which decolourises acidified  $\text{KMnO}_4$  solution. A and B respectively are:
  - a)  $\text{BaSO}_3 \cdot \text{H}_2\text{S}$
  - b)  $\text{BaSO}_4 \cdot \text{SO}_2$
  - c)  $\text{BaSO}_3 \cdot \text{SO}_2$
  - d)  $\text{BaSO}_4 \cdot \text{H}_2\text{S}$
2. Bond angle in  $\text{PH}_4^+$  is more than that of  $\text{PH}_3$ . This is because
  - a)  $\text{PH}_3$  has planar trigonal structure
  - b) Hybridisation of P changes when  $\text{PH}_3$  is converted to  $\text{PH}_4^+$
  - c) Lone pair – bond pair repulsion exists in  $\text{PH}_3$
  - d)  $\text{PH}_4^+$  has a square planar structure
3. Incorrectly matched pair is:
  - a)  $\text{XeF}_6$  – distorted octahedral
  - b)  $\text{XeOF}_4$  – square pyramidal
  - c)  $\text{XeO}_3$  – pyramidal
  - d)  $\text{XeF}_4$  – tetrahedral
4. Phosphorous pentachloride
  - a) Has all the five equivalent bond
  - b) Exist as an ionic solid in which the cation has an octahedral structure and the anion has a tetrahedral structure
  - c) On hydrolysis gives an oxo acid of phosphorus which is tribasic
  - d) On hydrolysis given an oxo acid of phosphorous which is a good reducing agent
5. Identify the set of paramagnetic ions among the following:
  - a)  $\text{Ti}^{3+}, \text{Cu}^{2+}, \text{Mn}^{3+}$
  - b)  $\text{Sc}^{3+}, \text{Ti}^{3+}, \text{V}^{3+}$
  - c)  $\text{V}^{2+}, \text{Co}^{2+}, \text{Zn}^{2+}$
  - d)  $\text{Ni}^{2+}, \text{Cu}^{2+}, \text{Zn}^{2+}$
6. How many moles of  $\text{K}_2\text{Cr}_2\text{O}_7$  is required to liberate 6 moles of  $\text{I}_2$  an aqueous solution of  $\text{I}^-$ ?
  - a) 0.25
  - b) 0.5
  - c) 2
  - d) 1
7.  $\text{Cu}_2\text{Cl}_2$  and  $\text{CuCl}_2$  in aqueous medium
  - a) Both are unstable
  - b)  $\text{Cu}_2\text{Cl}_2$  is more stable than  $\text{CuCl}_2$
  - c)  $\text{CuCl}_2$  is more stable than  $\text{Cu}_2\text{Cl}_2$
  - d) Stability of  $\text{Cu}_2\text{Cl}_2$  is equal to the stability of  $\text{CuCl}_2$
8. The co-ordination number of Fe and Co in the complex ions  $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$  and  $[\text{Co}(\text{SCN})_4]^{2-}$ 
  - a) 4 and 6
  - b) 6 and 4
  - c) 3 and 4
  - d) 6 and 8
9. Number of stereoisomers exhibited by  $[\text{Co}(\text{en})_2\text{Cl}_2]^+$  is
  - a) 5
  - b) 3
  - c) 4
  - d) 2
10. The IUPAC name of  $[\text{Pt}(\text{NH}_3)_4][\text{PtCl}_4]$  is
  - a) Tetra ammine palatinate (0) tetra chloride platinum (IV)
  - b) Tetra ammine platinum (II) tetra chloride palatinate (II)
  - c) Tetra ammine platinum (0) tetra chloride platinum (IV)
  - d) Tetra ammine palatinate (II) tetra chloride platinum (II)
11. Prolonged exposure of chloroform in humans may cause damage to liver. It is due to the formation of the following compound
  - a)  $\text{CH}_2\text{Cl}_2$
  - b)  $\text{Cl}_2$
  - c)  $\text{CCl}_4$
  - d)  $\text{COCl}_2$

12. Which of the following halides show the highest reactivity towards  $S_N1$  reactions?

- $CH_3-CH_2-CH_2-CH_2I$
- $C_6H_5Cl$
- $C_6H_5CH_2Cl$
- $CH_3CH_2Cl$

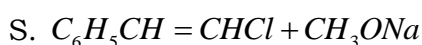
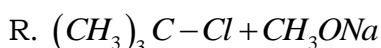
13. In the reaction



The number of possible isomers for the compound is

- 3
- 2
- 4
- 5

14. Which of the following on heating gives ether as the major product?



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

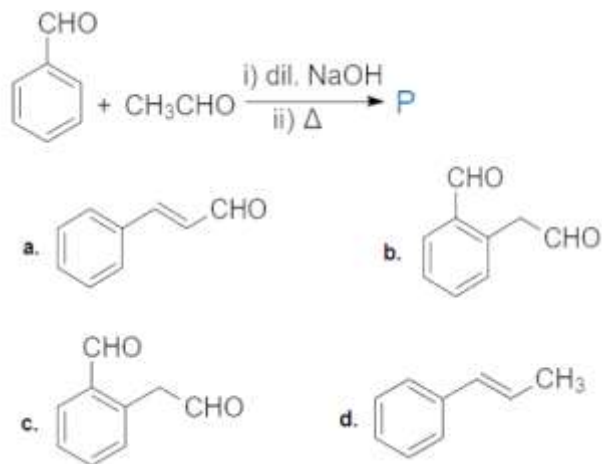
15. The steps involved in the conversion of propan-2-ol to propan-1-ol are in the order

- Heating with  $PCl_5$ , heating with  $alc.KOH$ , hydroboration-oxidation
- Dehydration, addition of  $HBr$  in the presence of a peroxide, heating with  $alc.KOH$
- Dehydration, addition of  $HBr$ , heating with  $alc.KOH$
- Heating with  $PCl_5$ , heating with  $alc.KOH$ , acid catalysed addition of water

16. Which of the following is the strongest base?

- $OH^-$
- $CH_3O^-$
- $CH_3COO^-$
- $Cl^-$

17. Product 'P' is



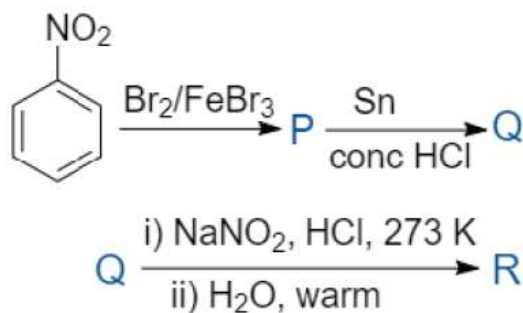
18. Which of the following has the lowest boiling point?

- $CH_3-O-CH_3$
- $HCOOH$
- $CH_3CH_2OH$
- $CH_3CH_2NH_2$

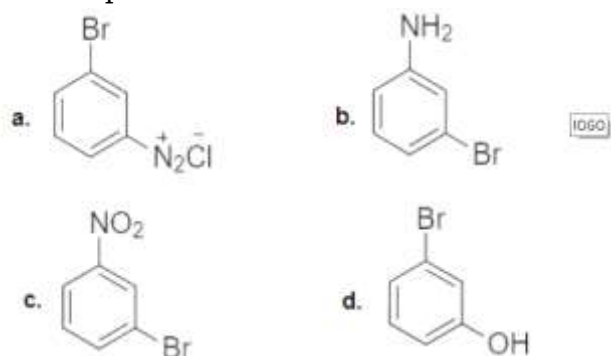
19. The carbonyl compound that does not undergo aldol condensation is

- Trichloroacetaldehyde
- Acetaldehyde
- Acetone
- Dichloroacetaldehyde

20.



The final product R is



21. Hinsberg's reagent is  
 a)  $C_6H_5SO_2NH_2$   
 b)  $CH_3COCl$  / pyridine  
 c)  $(CH_3CO)_2O$  / pyridine  
 d)  $C_6H_5SO_2Cl$
22. Which of the following vitamins is not stored in the adipose tissue?  
 a) D  
 b) E  
 c) A  
 d)  $B_6$
23. Hypothyroidism is caused by the deficiency of  
 a) Thyroxine  
 b) glucocorticoid  
 c) Vitamin B - 12  
 d) Adrenalin
24.  $C_1 - C_4$  glycosidic bond is NOT found in  
 a) Lactose  
 b) Starch  
 c) Maltose  
 d) Sucrose
25. Which of the following polymers has the strongest intermolecular forces of attraction?  
 a) Polythene  
 b) Polystyrene  
 c) Neoprene  
 d) Terylene
26. Which of the following monomers can undergo condensation polymerisation?  
 a) Isoprene  
 b) Propene  
 c) Styrene  
 d) Glycine
27. A food additive that also acts as an anti-oxidant is  
 a) Sugar syrup  
 b) Salt  
 c) BHA  
 d) Saccharin
28. Which of the following is not related to drug - enzyme interaction?  
 a) Co - enzymes  
 b) Enzyme inhibitor  
 c) Allosteric site  
 d) Antagonist
29. 0.4 g of Dihydrogen is made to react with 7.1 g of dichloride to form hydrogen chloride. The volume of hydrogen chloride formed at 273 K and 1 bar pressure is  
 a) 90.8 L  
 b) 45.4 L  
 c) 9.08 L  
 d) 4.54 L
30. With regard to photoelectric effect, identify the correct statement among the following  
 a) Number of electrons ejected increases with the increase in work function  
 b) Number of electrons ejected increases with the increases of incident light  
 c) Energy of ejected electrons increases with the increases in the intensity of incident light  
 d) Numbers of electrons ejected increases with the increases in the frequency of the incident light
31. The last element of the p - Block in the 6<sup>th</sup> period is represented by the outer most electronic configuration:  
 a)  $4f^{14}5d^{10}6s^26p^4$   
 b)  $4f^{14}5d^{10}6s^26p^6$   
 c)  $7s^27p^6$   
 d)  $4f^{14}6d^{10}7s^27p^6$
32. The conjugate base of  $NH_3$  is  
 a)  $NH_2OH$   
 b)  $NH_2^-$   
 c)  $NH_4^+$   
 d)  $NH_4OH$
33. 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) 92%  
 b) 8%  
 c) 75%  
 d) 25%
34. The percentage of s - character in the hybrid orbitals of nitrogen in  $NO_2^+$ ,  $NO_3^-$  and  $NH_4^+$  respectively are  
 a) 50%, 33.3%, 25%  
 b) 25%, 50%, 33.3%  
 c) 33.3%, 50%, 25%  
 d) 33.3%, 25%, 50%
35. The formal charge on the central oxygen atom in ozone is:  
 a) +2  
 b) +1  
 c) -1  
 d) 0

36. 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  $\Delta S_1$  and  $\Delta S_2$  respectively. Then

- a)  $S_2 > S_1$                       b)  $\Delta S_2 < S_1$   
c)  $\Delta S_1 < S_2$                       d)  $\Delta S_2 = S_1$

37. The oxidation number of nitrogen atoms in  $NH_4NO_3$  are:

- a) +3, -5                              b) -3, -3  
c) +5, -5                              d) -3, +5

38. 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)  $B_3N_3H_6$                               b)  $BF_3$   
c)  $B_2O_3$                                  d)  $B_2H_6$

39. The oxide of potassium that does NOT exist is:

- a)  $K_2O_2$                                  b)  $K_2O_3$   
c)  $K_2O$                                   d)  $KO_2$

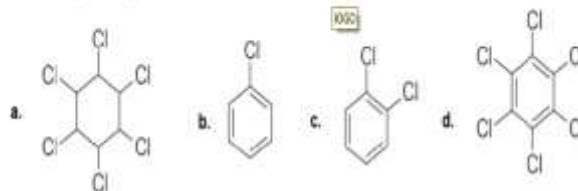
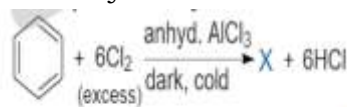
40. The metal that produces  $H_2$  with both dil. HCl and NaOH(aq) is

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

41. Which of the following is not a pair of functional isomers?

- a)  $CH_3CH_2NO_2$  and  $H_2NCH_2COOH$   
b)  $CH_3COOH$  and  $HCOOCH_3$   
c)  $C_2H_5OC_2H_5$  and  $C_3H_7OCH_3$   
d)  $CH_3CH_2OH$  and  $CHOCH_3$

42. Identify 'X' in the following reaction



43. Which of the following is NOT a group greenhouse gas?

- a)  $O_2$                                       b)  $NO_2$   
c) CFC                                      d)  $CO_2$

44. A metal exists as an oxide with the 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) 5%                                        b) 9.6%  
c) 8.3%                                      d) 4.6%

45. A metal crystallizes in a face centred cubic structure having a metallic radius of  $\sqrt{2}A^\circ$ . The volume of the unit cell (in  $m^3$ ) is

- a)  $4 \times 10^{-9}$                                 b)  $6.4 \times 10^{-30}$   
c)  $4 \times 10^{-10}$                               d)  $6.4 \times 10^{-29}$

46. Silicon doped with gallium forms:

- a) An intrinsic semiconductor  
b) P - type semiconductor  
c) N - type semiconductor  
d) Both n and p type semiconductor

47. The pair of electrolytes that possess the same value for the constant (A) in the Debye - Huckel - Onsager equation

$$\lambda_m = \lambda_m^\circ - A\sqrt{C}$$

- a)  $NaBr, MgSO_4$                         b)  $NaCl, CaCl_2$   
c)  $MgSO_4, Na_2SO_4$                     d)  $NH_4Cl, NaBr$

48. Which of the following pairs of solution are isotonic?
- 0.001 M  $\text{CaCl}_2$  and 0.001 M  $\text{Al}_2(\text{SO}_4)_3$
  - 0.01 M  $\text{BaCl}_2$  and 0.001 M  $\text{CaCl}_2$
  - 0.01 M  $\text{BaCl}_2$  and 0.015 M  $\text{NaCl}$
  - 0.001 M  $\text{Al}_2(\text{SO}_4)_3$  and 0.01M  $\text{BaCl}_2$
49. Solute 'X' dimerises in water to an extent of 80%. 2.5 g of 'X' in 100 g of water increase the boiling point by  $0.3^\circ\text{C}$ . The molar mass of X is:  $[K_b = 0.52 \text{ Kkgmol}^{-1}]$
- 65
  - 26
  - 13
  - 52
50. Given  $E^\circ_{\text{Fe}^{+3}/\text{Fe}^{+2}} = +0.76$  and  $E^\circ_{\text{I}_2/\text{I}^-} = +0.55 \text{ V}$ . The equilibrium constant for the reaction taking place in the galvanic cell consisting of the above two electrodes is:  $\left[\frac{2.303RT}{F} = 0.06\right]$
- $3 \times 10^8$
  - $5 \times 10^{12}$
  - $1 \times 10^8$
  - $1 \times 10^9$
51. If an aqueous solution of NaF is electrolyzed between inert electrodes, the product obtained at the anode is:
- Na
  - $\text{O}_2$
  - $\text{F}_2$
  - $\text{H}_2$
52. In which of the following cases a chemical reaction is possible
- Conc.  $\text{HNO}_3$  is stored in a platinum vessel
  - Gold ornaments are washed with dil.  $\text{HCl}$
  - $\text{ZnSO}_4$  is placed in a copper vessel
  - $\text{AgNO}_3$  solution is stirred with a copper spoon
53. 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
- 50 min
  - 150 min
  - 100 min
  - 83.8 min
54. 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
- $2(2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$
  - $\frac{1}{4}(2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$
  - $\frac{4}{3}(2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$
  - $\frac{3}{4}(2.8 \times 10^{-3}) \text{ mol L}^{-1} \text{ S}^{-1}$
55. The rate constant of a reaction is given by  $k = P Z e^{-\frac{E_a}{R_T}}$  under standard notation. In order to speed up the reaction, which of the following factors has to be decreased?
- $E_a$
  - T
  - Z
  - Both z and T
56. A sol of  $\text{AgI}$  is prepared by mixing equal volumes of 0.1 M  $\text{AgNO}_3$  and 0.2M  $\text{KI}$ , which of the following statement is correct?
- Sol obtained is a positive sol with  $\text{K}^+$  adsorbed on  $\text{AgI}$
  - Sol obtained is a negative sol with  $\text{I}^-$  adsorbed on  $\text{AgI}$
  - Sol obtained is a negative sol with  $\text{NO}_3^-$  adsorbed on  $\text{AgI}$
  - Sol obtained is a positive sol with  $\text{Ag}^+$  adsorbed on  $\text{AgI}$

57. 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)  $\Delta G > 0, \Delta H > 0, \Delta S > 0$

58. Copper is extracted from copper pyrites by

- a) Electrometallurgy
- b) Auto reduction
- c) Thermal decomposition
- d) Reduction by coke

59. Function of potassium ethylxanthate in froth floatation process is to make ore:

- a) Hydrophilic
- b) Heavier
- c) Lighter
- d) Hydrophobic

60. 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)  $SCl_6$
- b)  $SOCl_2$
- c)  $SO_2Cl_2$
- d)  $S_2Cl_2$

### ANSWER KEYS

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