2022 XI 16 **0230** **Seat No.** | | | | | |

Time : 1½ Hours **FIRST TERM** **CHEMISTRY**

Subject Code

H	4	7	0	3

Total No. of Questions : 40 **(Printed Pages : 15)** **Maximum Marks : 40**

***INSTRUCTIONS* :** (*i*) The question paper consists of 40 Multiple Choice Questions, each carrying *one* mark.

(*ii*) Each question has four choices (A), (B), (C) and (D) for its answer, of which only *one* is correct.

(*iii*) On the OMR sheet, provided to you, for each question number, darken with a blue or black ball point pen, Only ONE bubble corresponding to what you consider to be the most appropriate answer from among the four choices.

(*iv*) Please note that it is not possible to change the answer once you have filled up the bubble with the ball point pen. Hence sufficient care has to be taken while darkening the bubble.

√ (A) • (B) O (C) O (D) O

⊗ (A) • (B) • (C) O (D) O

(*v*) For each question, you will be awarded ONE mark, if you have darkened only one bubble corresponding to the correct answer. In all other cases, you will get zero. There is no negative marking.

(*vi*) Only one OMR sheet will be provided.

(*vii*) In numerical problems, choose the option closest to the correct answer.

1. Doping of AgCl crystal with $CdCl_2$ results in ..... .

(A) Frenkel Defect

(B) Schottky Defect

(C) Impurity Defect

(D) Formation of F-centres

2. To get *n*-type semiconductor from silicon, it should be doped with a substance with valency ..... .

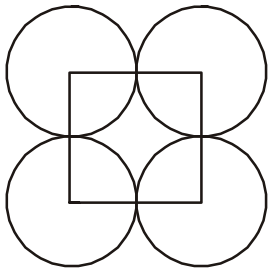
(A) 1

(B) 2

(C) 3

(D) 5

3. The following is a diagram of square closed packed unit cell. The packing efficiency of the said solid is ..... .



(A) 39.27%

(B) 52.4%

(C) 68.02%

(D) 74.05%

4. An element crystallizes in a structure having simple cubic unit cell of an edge length 1.0×10^{-10} cm. Calculate its density if its atomic mass is 6.022 g/mol. ($N_A = 6.022 \times 10^{23}$ mol^{-1})

(A) 10^7 g/cm^3

(B) 10^6 g/cm^3

(C) 10^5 g/cm^3

(D) 10^{13} g/cm^3

5. A solution of acetone in ethanol shows ..... .

(A) the bond strength between the two molecules after mixing becomes stronger than before

(B) an ideal behaviour in accordance with Raoult's law

(C) a negative deviation from Raoult's law

(D) a positive deviation from Raoult's law

6. A raw mango when placed in a concentrated salt solution to prepare pickle tends to shrink due to ..... .

(A) gaining of water due to osmosis

(B) loss of water due to osmosis

(C) gaining of water due to reverse osmosis

(D) loss of water due to reverse osmosis

7. In a binary mixture, if the mole fraction of one component is 0.386, then the mole fraction of the other component will be ..... .

(A) 0.386

(B) 0.489

(C) 0.614

(D) 0.772

8. Isotonic solutions are the solutions having the same ..... .

(A) Surface tension

(B) Density

(C) Osmotic pressure

(D) Viscosity

9. The increase in the boiling point of a 0.05 molal solution is 0.50°C. The molal elevation constant of the solution is ..... .

(A) 0.05 K kg mol^{-1}

(B) 0.5 K kg mol^{-1}

(C) 1 K kg mol^{-1}

(D) 10 K kg mol^{-1}

10. The rate law for the following reaction, $A + 2B \longrightarrow AB_2$ is $Rate = k[A]^1[B]^2$, if the concentration of B is doubled, then the rate of reaction will ..... .

(A) increase by 4 times

(B) decrease by 2 times

(C) increase by 2 times

(D) remain the same

11. Photochemical reactions like formation of HCl from H_2 and Cl_2 are ..... .

(A) zero order reactions

(B) first order reactions

(C) second order reactions

(D) third order reactions

12. A first order reaction is half completed in 3 minutes. How long does it take for completion of 99% of the reaction ?

(Given : $\frac{2.303}{0.231} = 9.969$; $\log 100 = 2.0000$)

(A) 1.9938 minutes

(B) 19.938 minutes

(C) 9.969 minutes

(D) 91.93 minutes

13. If the rate constant of a reaction is 0.3×10^{-4} mol^{-1} L s^{-1}, the order of the reaction is ..... .

(A) zero order

(B) first order

(C) second order

(D) fractional order

14. Consider the chemical reaction,

$$3NO_{2(g)} + H_2O_{(l)} \longrightarrow 2HNO_{3(aq)} + NO_{(g)}$$

The differential rate expression of the above reaction can be expressed in terms of concentration of $3NO_{2(g)}$, $H_2O_{(l)}$, $2HNO_{3(aq)}$, $NO_{(g)}$. The instantaneous rate expressions for the above equation are ..... .

(A) Rate = $-3d[NO_2]/dt = -d[H_2O]/dt = +2d[HNO_3]/dt = +d[NO]/dt$

(B) Rate = $1/3d[NO_2]/dt = d[H_2O]/dt = 1/2d[HNO_3]/dt = d[NO]/dt$

(C) Rate = $-1/3d[NO_2]/dt = -d[H_2O]/dt = +1/2d[HNO_3]/dt = +d[NO]/dt$

(D) Rate = $-d[NO_2]/dt = -d[H_2O]/dt = +d[HNO_3]/dt = +d[NO]/dt$

15. Chlorine water on standing loses its yellow colour due to the formation of ..... .

(A) HCl and O_2

(B) H_2 and ClO_2

(C) HCl and HOCl

(D) H_2 and Cl_2O

16. From the following Xenon compounds, distorted octahedral structure is shown by compound ..... .

(A) $XeOF_4$

(B) XeF_4

(C) XeO_3

(D) XeF_6

17. Nitric acid is a very powerful oxidizing agent and it can attack most of the metals *except* ..... .

(A) Copper

(B) Platinum

(C) Nickel

(D) Zinc

18. Sulphur belonging to Group 16 of the periodic table has a maximum oxidation state as ..... .

(A) 2

(B) 4

(C) 6

(D) 8

19. The decreasing order of the thermal stability of the hydrides of Group 16 is ..... .

(A) $H_2O < H_2S < H_2Se < H_2Te < H_2Po$

(B) $H_2O > H_2S > H_2Se > H_2Te > H_2Po$

(C) $H_2O < H_2S < H_2Se > H_2Te > H_2Po$

(D) $H_2O > H_2S > H_2Se < H_2Te < H_2Po$

20. Oleum is formed by the mixing of ..... .

(A) $H_2SO_4 + SO_3$

(B) $H_2SO_4 + CaF_2$

(C) $H_2SO_4 + H_2O$

(D) $H_2SO_4 + Cu$

21. For the compounds 1-Bromobutane, 2-Bromo-2-methylpropane, 2-Bromobutane; the decreasing order of the boiling points will be ..... .

(A) 1-Bromobutane > 2-Bromo-2-methylpropane > 2-Bromobutane

(B) 2-Bromobutane > 2-Bromo-2-methylpropane > 1-Bromobutane

(C) 2-Bromo-2-methylpropane > 2-Bromobutane > 1-Bromobutane

(D) 1-Bromobutane > 2-Bromobutane > 2-Bromo-2-methylpropane

22. When chlorobenzene reacts with chloromethane in presence of sodium and dry ether, the major product obtained is ..... .

(A) Methylbenzene

(B) ethane

(C) 4-chloro-1-methylbenzene

(D) diphenyl

23. From the compounds 2-bromopropane, 2-bromo-2-methylpropane, 1-bromopropane, 2,2-dibromopropane, the compound that undergoes substitution nucleophilic reaction with complete inversion in its configuration is ..... .

(A) 2-bromopropane

(B) 2-bromo-2-methylpropane

(C) 1-bromopropane

(D) 2,2-dibromopropane

24. The compound which has a asymmetric carbon atom in the following compounds is ..... .

$CH_3CH_2CH_2CH_2Cl$; $CH_3CH_2CH(Cl)\,CH_3$; $(CH_3)_2CH\,CH_2(Cl)$; $(CH_3)_3C\,Cl$

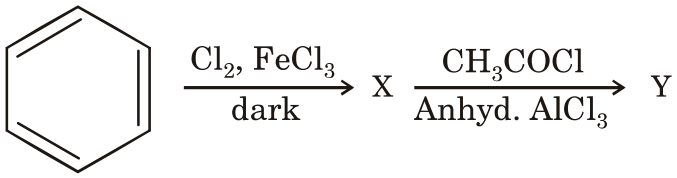
(A) $CH_3CH_2CH(Cl)\,CH_3$

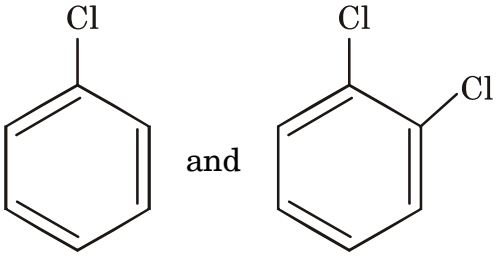
(B) $(CH_3)_2CH\,CH_2(Cl)$

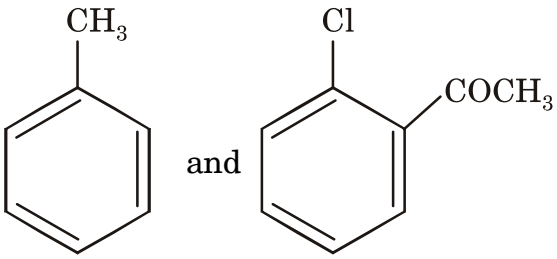
(C) $CH_3CH_2CH_2CH_2Cl$

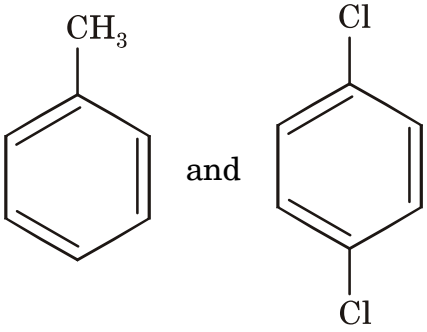
(D) $(CH_3)_3C\,Cl$

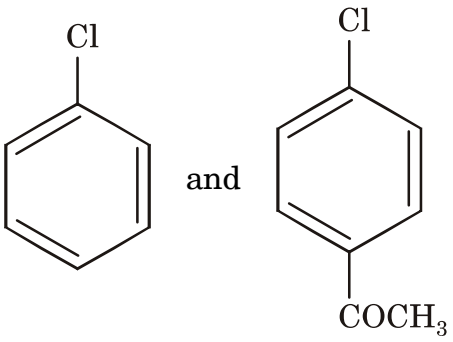
25. In the following reaction, the compounds X and Y are ..... .



(A) 

(B) 

(C) 

(D) 

26. Phenol is more acidic than ethyl alcohol because ..... .

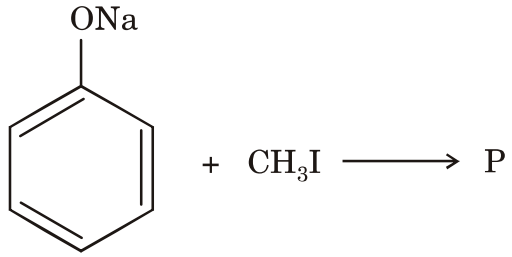
(A) Phenoxide ion is more resonance stabilised than phenol

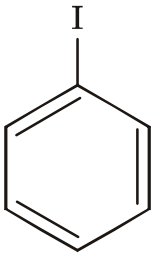
(B) There is more hydrogen bonding in phenol than ethyl alcohol

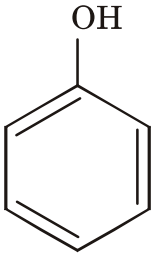
(C) Ethoxide ion is less resonance stabilised than ethyl alcohol

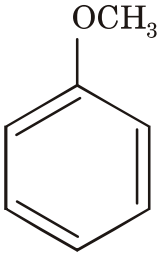
(D) Phenol has higher boiling point than ethyl alcohol

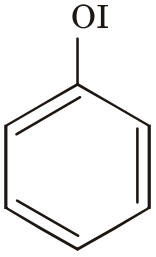
27. For the following reaction, the product 'P' is ..... .



(A) 

(B) 

(C) 

(D) 

28. The compound formed by the oxidation of butan-2-ol with CrO_3/PCC is ..... .

(A) Propanoic acid

(B) Butan-2-al

(C) Methanoic acid

(D) Propan-1-al

29. When an acetone is treated with an appropriate Grignard Reagent, the product obtained is 2-methylpropan-2-ol. The Grignard reagent is ..... .

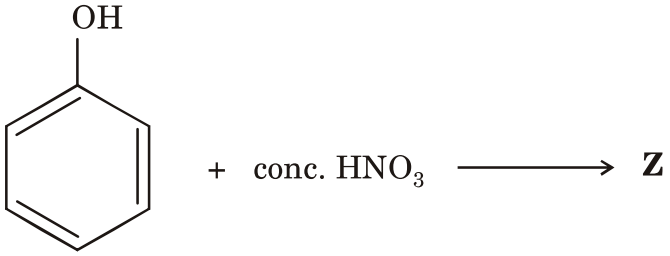
(A) ethyl magnesium iodide

(B) isopropyl magnesium iodide

(C) methyl magnesium iodide

(D) tert-butyl magnesium iodide

30. In the following reaction, the product 'Z' is ..... .



(A) 2-nitrophenol

(B) 2,4-dinitrophenol

(C) 2,6-dinitrophenol

(D) 2,4,6-trinitrophenol

31. Ethanamine when treated with chloromethane forms the final product ..... .

(A) $(CH_3)_4\,N^+Cl^-$

(B) $CH_3 - NH_2$

(C) $(CH_3)_3\,N$

(D) $(CH_3)_2\,NH$

32. Choose the correct order of decreasing basic strength of the following amine compounds in aqueous solution ..... .

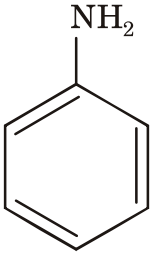
$C_6H_5NH_2$; $C_2H_5NH_2$; NH_3; $(CH_3)_2NH$

(A) $C_6H_5NH_2 > C_2H_5NH_2 > NH_3 > (CH_3)_2NH$

(B) $(CH_3)_2NH > C_2H_5NH_2 > NH_3 > C_6H_5NH_2$

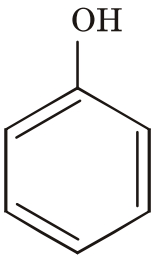
(C) $C_2H_5NH_2 > C_6H_5NH_2 > NH_3 > (CH_3)_2NH$

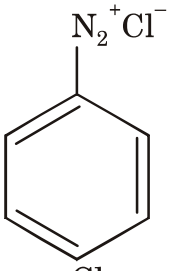
(D) $(CH_3)_2NH > NH_3 > C_2H_5NH_2 > C_6H_5NH_2$

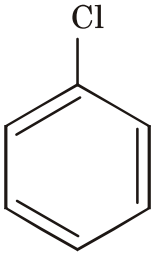
33. 

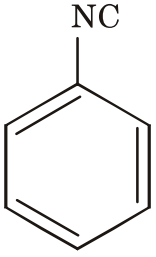
$+ \quad CHCl_3 + 3KOH_{(alcoholic)} \longrightarrow S$

In the above reaction, the product 'S' is ..... .

(A) 

(B) 

(C) 

(D) 

34. The product formed when CH_3CONH_2 is treated with Br_2 and NaOH is ..... .

(A) $CH_3CH_2NH_2$

(B) $CH_3–NH_2$

(C) $CH_3CH=N-OH$

(D) $CH_2=N-CH_3$

35. Most common types of secondary structures of proteins are ..... .

(A) α-helix and β-helix structures

(B) α-helix and β-pleated sheet structures

(C) right and left hand twisted structures

(D) globular and fibrous structures

36. The six membered cyclic structure of glucose is called ..... .

(A) Pyranose structure

(B) Furanose structure

(C) Azetidines structure

(D) Oxetanes structure

37. Rajesh is suffering from symptoms such as fatigue, shortness of breath, weight loss and has been diagnosed with Pernicious anaemia. The vitamin whose deficiency causes Pernicious anaemia is ..... .

(A) Vitamin B_1

(B) Vitamin B_2

(C) Vitamin B_6

(D) Vitamin B_{12}

38. A popular cationic detergent used in hair conditioners is ..... .

(A) Cetyltrimethylammonium bromide

(B) Sodium laurylsulphate

(C) Sodium dodecylbenzenesulphonate

(D) Tetramethyl ammonium chloride

39. The substance which when taken as 0.2% solution acts as an antiseptic while the same substance when taken as 1% solution acts as a disinfectant is ..... .

(A) Iodine

(B) Phenol

(C) Bithionol

(D) Chlorine

40. The non-narcotic analgesic used in the prevention of heart attacks is ..... .

(A) Paracetamol

(B) Morphine

(C) Codein

(D) Aspirin

Space for rough work