SAMPLE PAPER 1

CHEMISTRY

*A Highly Simulated Practice Questions Paper for CBSE **Class XII** (Term I) Examination*

Instructions

(i) This question paper contains three sections.
(ii) Section A has 25 questions. Attempt any 20 questions.
(iii) Section B has 24 questions. Attempt any 20 questions.
(iv) Section C has 6 questions. Attempt any 5 questions.
(v) Each questions carry 0.77 mark.
(vi) There is NO negative marking.

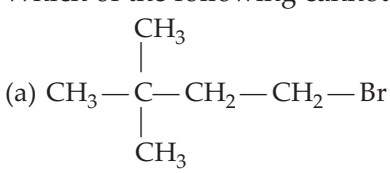
Roll No. | | | | | | | |

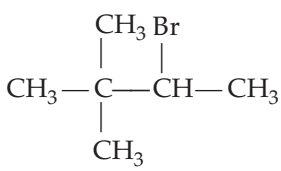
Maximum Marks : 35
Time allowed : 90 min

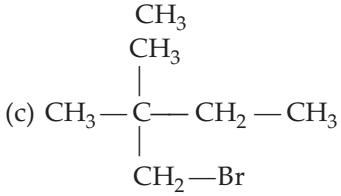
Section A

*This section consists of 25 multiple choice questions with overall choice to attempt **any 20** questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.*

1. Which of the following cannot undergo E2 reaction?

(a) 

(b) 

(c) 

(d) None of these

2. Which of the following compound is formed by the reaction of glucose with HI?
(a) 1-hexene (b) *n*-hexane
(c) Hexanoic acid (d) None of these

3. In an antifluorite structure, cation occupy
(a) centre of cube (b) tetrahedral voids
(c) corners of cube (d) octahedral voids

4. Among the given halides, which one can be used as halide component for Friedel-Crafts' reaction?

(a) *Iso*-propyl chloride (b) Bromobenzene

(c) Chlorobenzene (d) Chloroethene

5. Which of the following is an example of ionic crystal?

(a) NaCl (b) SiC

(c) H_2O(Ice) (d) Graphite

6. The nature of nitrous oxide is .....

(a) acidic (b) basic (c) amphoteric (d) neutral

7. Among the following, the suitable reagent for Wurtz reaction is .....

(a) Na/alcohol (b) Na/ether

(c) Zn/ether (d) Zn/alcohol

8. Which one of the following statements regarding the behaviour of the binary solution of *n*-heptane and ethanol is correct?

(a) The solution formed is non-ideal, showing positive deviation from Raoult's law

(b) The solution form an ideal solution

(c) *n*-heptane shows positive deviation while ethanol show negative deviation from Raoult's law

(d) None of them are correct

9. Which of the following is planar?

(a) XeF_2 (b) XeO_3F

(c) XeO_2F_2 (d) XeF_4

10. For tetrahedral coordination, the radius ratio $\left(\frac{r_+}{r_-}\right)$ should be .....

(a) 0.414 – 0.732 (b) less than 0.155

(c) 0.156 – 0.225 (d) 0.225 – 0.414

11. CsCl crystallise in body centered cubic lattice. If '*a*' is the edge length, then which of the following expressions is correct?

(a) $r_{Cs^+} + r_{Cl^-} = 3a$ (b) $r_{Cs^+} + r_{Cl^-} = \frac{3a}{2}$

(c) $r_{Cs^+} + r_{Cl^-} = \frac{\sqrt{3}a}{2}$ (d) $r_{Cs^+} + r_{Cl^-} = \sqrt{3}a$

12. The molecular formula of dithionic acid is

(a) $H_2S_2O_7$ (b) $H_2S_2O_6$ (c) $H_2S_2O_4$ (d) $H_2S_2O_5$

13. On which of the following factor(s) function of a protein depends?

(a) pH of medium (b) Its shape and structure

(c) Temperature (d) All of these

14. In which of the following species N-atom is present in a state of *sp*-hybridisation?

(a) NO_2^- (b) NO_3^- (c) NO_2 (d) NO_2^+

15. Which of the following is not an example of ideal solution?

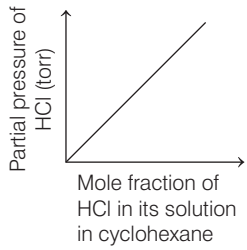
(a) *n*-hexane + *n*-heptane (b) Bromoethene + chloroethane

(c) Benzene + toluene (d) Acetone + benzene

16. Identify the reaction.
"Aniline dissolved in cold aqueous mineral acid with an aqueous solution of sodium nitrate at low temperature (0-5°C)."
(a) Sandmeyer's reaction (b) Swarts reaction
(c) Finkelstein reaction (d) Friedel-Crafts' reaction

17. ZnO turns yellow on heating. It is due to
(a) Frenkel defect (b) Schottky defect
(c) Metal excess defect (d) Metal deficiency defect

18. In the graph given below, what does the slope of the line represent?



(a) Partial pressure of gas in vapour phase (p) (b) Mole fraction of gas in the solution (χ)
(c) Henry's law constant (K_H) (d) All of these

19. Which of the following statements is correct about the allotropes of sulphur?
(a) Rhombic sulphur is yellow in colour
(b) Monoclinic sulphur is stable below 369 K
(c) Monoclinic is also known as α-sulphur
(d) Rhombic sulphur is soluble in water but insoluble in benzene

20. What is the highest covalency of nitrogen?
(a) 2 (b) 5 (c) 4 (d) 3

21. Which of the following statement is incorrect for crystalline solid?
(a) They have sharp melting point
(b) They have irregular shape
(c) They have a definite and characteristic heat of fusion
(d) They are anisotropic in nature

22. Which of the following has the lowest acidic character?
(a) H_2O (b) H_2S (c) H_2Se (d) H_2Te

23. Which of the following is the major product formed on the reaction of cyclohexene with Br_2 in presence of UV light?
(a) Bromocyclohexene (b) 3-bromocyclohexene
(c) 3, 4, 5, 6-tetrabromocyclohxeene (d) 1, 2-dibromocyclohexene

24. The boiling point of ethanol is higher than that of ethane, it is due to
(a) hydrogen bonding (b) ion-dipole interaction
(c) dipole-dipole interaction (d) van der Waals' forces

25. Which of the following will not form a yellow precipitate on heating with an alkaline solution of iodine ?
(a) CH_3OH (b) CH_3CH_2OH
(c) $CH_3CH(OH)CH_3$ (d) $CH_3CH_2CH(OH)CH_3$

Section B

*This section consists of 24 multiple choice questions with overall choice to attempt **any 20** questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.*

26. The vapour pressure of pure solvent '*A*' is 0.8 mm of Hg at a particular temperature. On addition of a non-volatile solute '*B*' the vapour pressure of solution becomes 0.6 mm of Hg. What is the mole fraction of component '*B*' in the solution ?

(a) 0.25 (b) 0.75

(c) 0.50 (d) 0.35

27. The type of bond present in sulphuric anhydride.

(a) 3σ and three $p\pi$-$d\pi$ (b) 3σ and one $p\pi$-$p\pi$ and two $d\pi$-$p\pi$

(c) 2σ and three $p\pi$-$d\pi$ (d) 2σ and two $p\pi$-$d\pi$

28. Consider the following reaction,

$$\text{Chlorobenzene} \xrightarrow{\text{Mg/Dry ether}} A \xrightarrow{\text{Ethanol}} B.$$

Major product *B* formed in above reaction is

(a) benzene (b) phenol

(c) ethyl benzene (d) phenyl ether

29. The mass of compound (molar mass = 256 g mol^{-1}) to be dissolved in 75 g of benzene to lower its freezing point by 0.48 K (K_f = 5.12 K kg mol^{-1}) is

(a) 1.8 g (b) 2.6 g

(c) 0.489 g (d) 5.12 g

30. The edge lengths of unit cells in term of spheres constituting fcc is ...(i)..., in bcc is ...(ii)... and of simple cubic unit cell is ...(iii)... .

	(i)	(ii)	(iii)		(i)	(ii)	(ii)
(a)	$2\sqrt{2}r$	$\frac{4r}{\sqrt{3}}$	$2r$	(b)	$\frac{4r}{\sqrt{3}}$	$2\sqrt{2r}$	$2r$
(c)	$2r$	$2\sqrt{2}r$	$\frac{4r}{\sqrt{3}}$	(d)	$2r$	$\frac{4r}{\sqrt{3}}$	$2\sqrt{2r}$

31. Which of the following statements regarding ozone is not correct?

(a) The ozone molecule is angular in shape

(b) It is a resonance hydride of two structures

(c) It's O—O bond length is identical with that of molecular oxygen

(d) Ozone is used as germicide and disinfectant for the purification of air

32. Consider the following compounds :

I. Glycine II. Sulphanilic acid

III. Anthranilic acid

From above given option. Dipolar (Zwitter) ion can be formed by....

(a) I and II (b) I, II and III (c) II and III (d) I and III

33. Consider the following reaction,

$$CH_3CH_2CH_2Br \xrightarrow[\text{Alcohol}]{\text{KOH}} CH_3CH{=}CH_2$$

Above given reaction is an example of

(a) substitution reaction (b) elimination reaction

(c) addition reaction (d) rearrangement reaction

34. The molality of a urea solution in which 0.0100 g of urea, $[(NH_2)CO]$ is added to 0.3000 dm^3 of water of at STP is

(a) 0.555 m (b) 5.55×10^{-4} m

(c) 33.3 m (d) 3.33×10^{-2} m

35. Which of the following reagents are required for conversion of phenol to anisole?

(a) $NaOH/CH_3Cl$ (b) $CH_3Cl/AlCl_3$

(c) CH_3Cl/Fe dark (d) $NaNO_2$/HCl/0-5°C

36. Which of the following statement is incorrect about fluorine?

(a) It has the highest electronegativity

(b) It has anomalous behaviour

(c) Its bond dissociation enthalpy is lower than that of Cl_2

(d) Other halogen have tendency to forms a number of oxoacids while fluorine form only one

37. Consider the following reactions :

I. $CH_3CH_2OH + HCl \xrightarrow{\text{Anhyd. } ZnCl_2}$

II. $CH_3CH_2OH + HCl \longrightarrow$

III. $(CH_3)_3COH + HCl \longrightarrow$

Which of the above reaction(s) can be used for the preparation of alkyl halides?

(a) I and III (b) Only I (c) Only II (d) II and III

38. Oxygen shows only negative oxidation state as – 2 except in the case of

(a) OH_2 (b) OF_2 (c) OCl_2 (d) CO_2

39. Oleum is chemically known as

(a) a mixture of H_2SO_4 and HNO_3 (b) a mixture of conc. H_2SO_4 and oil

(c) H_2SO_4 which gives fumes of SO_2 (d) H_2SO_4 saturated with sulphur trioxide

40. In the following reaction, identify *A* and *B*,

$$C_6H_{12}O_6 \xrightarrow{NH_2OH} (A)$$
$$\downarrow HCN$$
$$(B)$$

Choose the correct option.

(a) *A* = Glucose oxime; *B* = Glucose cyanohydrin

(b) *A* = Glucose cyanohydrin; *B* = Glucose oxime

(c) *A* = Glucose penta-acetate; *B* = Gluconic acid

(d) *A* = Gluconic acid; *B* = Glucose penta-acetate

41. Which of the following is the correct order for atomic radius of noble gases?

(a) He < Ne < Ar < Kr < Xe (b) He > Ne > Ar > Kr > Xe

(c) He < Ne < Ar < Kr < Xe (d) He < Ne > Ar > Kr > Xe

42. When benzene is sulphonated with oleum then *A* is formed which get further converted to *B* on heating with molten sodium hydroxide. Acidification of *B* gives *C*. Thus, *A*, *B* and *C* are

(a) *A* = benzene sulphonic acid, *B* = sodium phenoxide, *C* = phenol

(b) *A* = phenol, *B* = sodium phenoxide, *C* = benzene

(c) *A* = benzene sulphonic acid, *B* = phenol, *C* = benzene

(d) None of the above

43. The ammonia molecule is ...(i)... in shape. Its nitrogen atom is ...(ii)... hybridised. It has ...(iii)... bond pairs and ...(iv)... lone pair of electron.

	(i)	(ii)	(iii)	(iv)
(a)	trigonal pyramidal	sp^3	3	1
(b)	trigonal pyramidal	sp^2	1	3
(c)	planar	sp^3	3	1
(d)	planar	sp^2	1	3

44. Which of the following is an example of fibrous protein?

(a) Keratin (b) Insulin (c) Albumin (d) Both (a) and (b)

Direction (Q. Nos. 45-49) *For given questions two statements are given-one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.*

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true, but R is not the correct explanation of A.

(c) A is true, but R is false.

(d) A is false, but R is true.

45. **Assertion** pK_a value of phenol is 10.0, while that of ethanol is 15.9.

Reason Ethanol is less acidic than phenol.

46. **Assertion** The presence of nitro group facilitates nucleophilic substitution reactions in aryl halides.

Reason The intermediate carbanion is destabilised due to the presence of nitro group.

47. **Assertion** In an ideal solution ΔH_{mix} is not equal to zero.

Reason In an ideal solution, *AB* interaction are same as *A*—*A* and *B*—*B*.

48. **Assertion** PCl_5 is covalent in gaseous and liquid states but ionic in solid states.

Reason PCl_5 in solid state consists of tetrahedral PCl_4^+ cation and octahedral PCl_6^- anion.

49. **Assertion** Protein are made up of α-amino acids.

Reason During denaturation , secondary and tertiary structure of protein are destroyed.

Section C

This section consists of 6 multiple choice questions with an overall choice to attempt ***any 5****. In case more than desirable number of questions are attempted, ONLY first 5 will be considered for evaluation.*

50. Which of the following analogies is correct?

(a) Packing efficiency in hcp : 74% : : Packing efficiency in bcc : 68%

(b) NaCl – scp lattice : Nno. of atoms = 4 : : CsCl – ccp lattice : No. of atoms = 1

(c) Monoclinic : $a \neq b \neq c; \alpha \neq \beta \neq \gamma \neq 90°$: : Triclinic : $a \neq b \neq c; \alpha \neq \gamma = 90° \neq \beta$

(d) None of the above

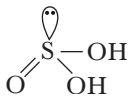
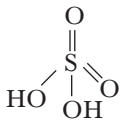
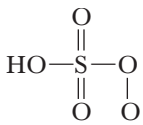
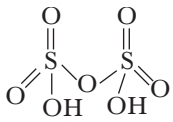
51. Complete the following analogy:

Two solutions having the same molar concentration at the same temperature are : *A* : : For two solutions of different molar concentrations, the one having higher osmotic pressure is : *B*.

(a) *A* : Hypotonic : : *B* : Isotonic (b) *A* : Isotonic : : *B* : Hypertonic

(c) *A* : Hypertonic : : *B* : Hypotonic (d) *A* : Hypertonic : : *B* : Isotonic

52. Match the item given in Column I with the item given in Column II and mark the correct code that are given below.

Column I (Name of oxoacids of sulphur)	**Column II** (Structure of oxoacid of sulphur)
A. Sulphurous acid	1. 
B. Sulphuric acid	2. 
C. Pyrosulphuric acid	3. 
D. Caro's acid	4. 

Codes

	A	B	C	D
(a)	1	3	4	2
(c)	2	3	4	1

	A	B	C	D
(b)	1	2	4	3
(d)	4	3	1	2

Case *Read the passage given below and answer the following questions (53-55)*

Alcohol and phenol are formed by replacing one H-atom from a hydrocarbon by —OH group. They have a variety of application in industry as well as day today life. The sugar we eat, the cotton we used for fabrics, the paper we use for writing, are all made up of compounds having —OH groups.

An alcohol contains one or more hydroxyl groups (—OH), directly attached to carbon(s) of an aliphatic system (like CH_3OH) while a phenol contains —OH group(s) directly attached to C-atom(s) of an aromatic system (like C_6H_5OH).

Alcohols are prepared by many methods like acid catalysed hydration, hydroboration-oxidation, reduction of carboxylic acid and esters etc. Similarly, phenols are prepared from benzene sulphonic acid, from haloarenes, from diazonium salts, from cumene etc.

Alcohols are very versatile compounds. They react both as nucleophiles and electrophiles. In reactions involve cleavage of O—H bond, C—O bond.

Phenols also show many electrophilic aromatic substitution reactions like nitration, halogenation, Kolbe's reaction, Reimer-Tiemann reaction, etc.

Both alcohols and phenols are acidic in nature, but phenols are more acidic than alcohols. Acidic strength of alcohols mainly depends upon the inductive effect. Acidic strength of phenols is a combination of both inductive effect and resonance effects of the substituent and its position on the benzene ring.

Electron withdrawing groups increases the acidic strength of phenols whereas electron donating groups decreases the acidic strength of phenols. Phenol is a weaker acid than carboxylic acid.

53. Which of the following products is formed when propene reacts with water under acidic condition?

(a) Propan-1-ol
(b) Propan-2-ol
(c) Propane
(d) Propanone

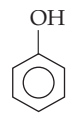
54. Reagent that is used for the conversion of benzene sulphonic acid to phenol

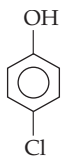
(a) $CaCO_3$
(b) NaOH, HCl
(c) $Ca(OH)_2$
(d) None of these

55. Consider the following compounds:

I. H_2O

II. CH_3CH_2OH

III. 

IV. 

The correct order of acidic strength of the given compounds is

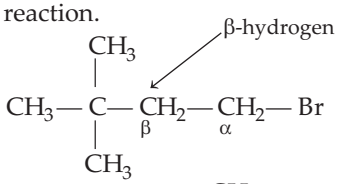
(a) III > IV > II > I
(b) IV > III > I > II
(c) IV > III > II > I
(d) I > II > IV > III

Answers

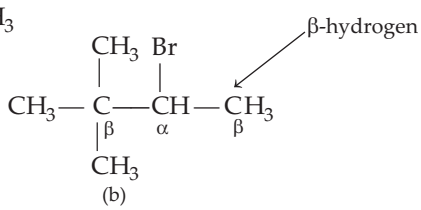
1. (c)	**2.** (b)	**3.** (b)	**4.** (a)	**5.** (a)	**6.** (d)	**7.** (b)	**8.** (a)	**9.** (d)	**10.** (d)
11. (c)	**12.** (b)	**13.** (d)	**14.** (d)	**15.** (d)	**16.** (a)	**17.** (c)	**18.** (c)	**19.** (a)	**20.** (b)
21. (b)	**22.** (d)	**23.** (b)	**24.** (a)	**25.** (a)	**26.** (a)	**27.** (b)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

EXPLANATIONS

1. E2 reaction will easily take place if β-H-atom is present in that compound. Like in (a) and (b) β-H-atom is present, thus, they undergo E2 reaction.

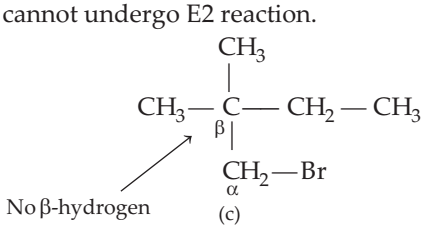


(a)



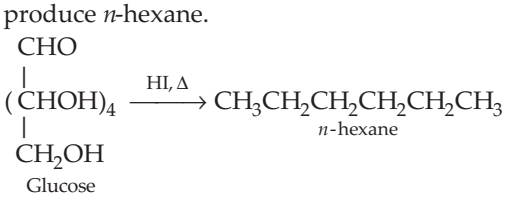
(b)

But in (c) β-H-atom is not present thus it cannot undergo E2 reaction.



(c)

2. HI is a strong reducing agent. It reduces both primary and secondary alcoholic groups of glucose alongwith the carboxyl group to produce *n*-hexane.



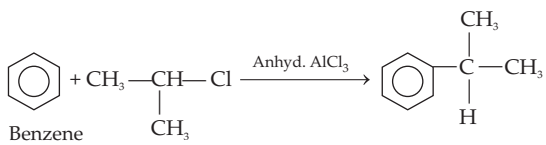
Glucose

3. In an antifluorite structure cations occupy tetrahedral voids and anion has fcc paking.

4. In chlorobenzene, bromobenzene and chloroethene, lone pair of halogen is delocalised with π-bonds, so it attains double bond character.

Thus, these are not suitable as a halide component for Friedel-Crafts' reaction.

While in *iso*-propyl chloride lone pair of chlorine are localised. Hence, it is suitable for as a halide component for Friedel-Craft's reaction.



Benzene *Iso*-propyl chloride *Iso*-propyl benzene

5. Among the given option NaCl is an example of ionic crystal. In these solids, constituents particles are (Na^+) positive (called cation) and (Cl^-) negative (called anion) ions arranged in 3-dimensional space. These ions are held together by strong coulombic forces.

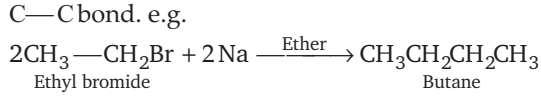
6. Nitrous oxide is a neutral oxide. Neutral oxide are those which show neither basic nor acidic properties and hence do not forms salts when reacted with acids/bases.

Some other examples are CO, N_2O etc.

7. Among the following, the suitable reagent for Wurtz reaction is Na/ether.

In this reaction, etheral solution of an alkyl halide is treated with sodium to produce higher alkanes.

This reaction involves the formation of new C—C bond. e.g.

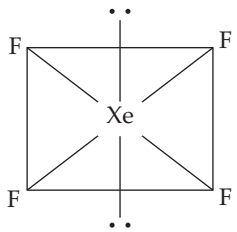


Ethyl bromide Butane

8. *n*-heptane and ethanol forms non-ideal solutions as *n*-heptane-ethanol molecular interaction is very poor in comparison to ethanol-ethanol or *n*-heptane-*n*-heptane.

So, the resulting solution gives positive deviation from Raoult's law.

9. XeF_4 has square planar structure. It involves sp^3d^2-hybridisation of xenon which possesses octahedral geometry in which two axial positions of the geometry are occupied by lone pairs to minimise the repulsion.



10. For tetrahedral coordination, the radius ratio $\left(\frac{r_+}{r_-}\right)$ should be 0.225 to 0.414. For other, the radius ratio are as follows:

less than 0.155 $\rightarrow$ Linear

0.414 to 0.732 $\rightarrow$ Octahedral

0.156 to 0.225 $\rightarrow$ Triangular planar

11. In CsCl , Cl^- lie at the corners of simple cube and Cs^- at the body centre.

Therefore, along the body diagonal, Cs^+ and Cl^- touch each other.

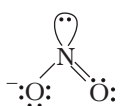
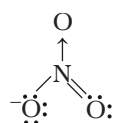
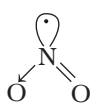
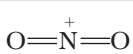
Hence, $\frac{\sqrt{3}a}{2} = r_{Cs^+} + r_{Cl^-}$

12. The name and molecular formula of given acid are as follows **:**

Dithionic acid-$H_2S_2O_6$, Dithionous acid-$H_2S_2O_4$, Disulphurous acid-$H_2S_2O_5$, Disulphuric acid-$H_2S_2O_7$.

13. Functionality of protein depends on its shape and structure, pH of medium and temperature.

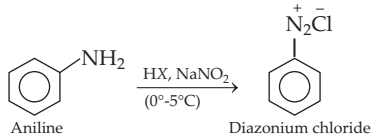
14.

Species	Hybridisation
	sp^2
	sp^2
	sp^2
	sp

15. Acetone and benzene mixture is not an example of ideal solution.

The molecular interaction between acetone and benzene is poor than acetone-acetone and benzene-benzene interaction.

16. The given reaction is Sandmeyer's reaction.



17. Yellow colour of ZnO is due to metal excess defect. Zinc oxide (ZnO) which is white in colour loses oxygen and turn yellow.

$$ZnO \xrightarrow{\Delta} Zn^{2+} + \frac{1}{2}O_2 + 2e^-$$

The excess Zn^{2+} ion, thus, formed get trapped into vacant interstitial sites and the electrons in the neighbouring interstitial sites.

18. On comparing $p = K_H \cdot \chi$ with equation of straight line *viz.*, $y = mx$

$\therefore$ $m = K_H$ (Here, m = slope of the line)

Thus, Henry's law constant is represented by the slope of the line.

19. Rhombic sulphur is yellow in colour.

Rhombic sulphur is known as α-sulphur while. monoclinic sulphur is known as β-sulphur. Monoclinic sulphur is stable above 369 K and transforms into α-sulphur below it. Rhombic sulphur is in soluble in water out soluble in benzene.

20. The highest covalency of nitrogen is 5.

As it has fine electron in its valence shell.

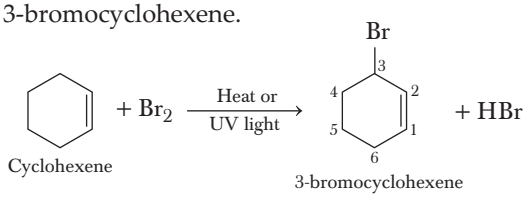
21. Statement (b) is incorrect about crystalline solid. Its correct form is as follows :

They have definite characteristics geometrical shape.

22. The acidic character increases from H_2O to H_2Te as bond enthalpy for the dissociation of H— E bond decreases down the group.

$\therefore H_2O$ has lowest acidic character.

23. Major product formed on reaction of cyclohexene with Br_2 in presence of UV light is 3-bromocyclohexene.



24. Ethanol have hydroxyl group which involve in intermolecular hydrogen bonding due to which they exist as associated molecules. Consequently larger amount of energy is required to break these bonds.

Thus, have high boiling point as compared to ethane.

25. Methanol (CH_3OH) does not respond to the given iodoform test. This test is exhibited by ethyl alcohol, actaldehyde, acetone, methyl ketone, etc.

26. Let p be the particle pressure of pure component A.

p° = vapour pressure of component A

χ = mole fraction of component A.

According to Raoult's law, $p = p^\circ \cdot \chi$

On substituting the value, we get

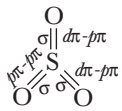
$$0.6 = 0.8 \times \chi$$

$$\chi = \frac{0.6}{0.8} = 0.75$$

Mole fraction of component $A = 0.75$

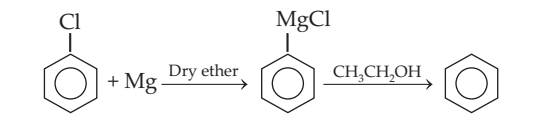
Mole fraction of component $B = 1 - 0.75 = 0.25$

27. Formula of sulphuric anhydride is SO_3 and its structure is as follows :



$\therefore$ SO_3 contains 3σ and one $p\pi$-$p\pi$ and two $d\pi$-pπ bond.

28. Chlorobenzene on reaction with magnesium in presence of dry ether formed Grignard reagent (A). This on further reaction with ethanol give benzene (B) as major product.



29. Given that, $K_f = 5.12$ K kg mol^{-1}

Mass of benzene $w_1 = 75$ g

Depression in freezing point $\Delta T_f = 0.48$ K

$M_2 = 256$ g mol^{-1}

If w_2 is the mass of compound,

then, $\Delta T_f = \dfrac{K_f \times w_2 \times 1000}{w_1 \times M_2}$

$$0.48 = \frac{5.12 \times w_2 \times 1000}{75 \times 256}$$

$$w_2 = 1.8 \text{ g}$$

30. (i) $2\sqrt{2}r$ (ii) $\dfrac{4r}{\sqrt{3}}$ (ii) $2r$

For fcc, face diagonal $\Rightarrow \sqrt{2}\, a = 4r$

$\therefore$ $a = 2\sqrt{2}\, r$

For bcc, body diagonal $\Rightarrow \sqrt{3}\, a = 4r$

$\therefore$ $a = \dfrac{4r}{\sqrt{3}}$

For scc, edge length $\Rightarrow a = 2r$

31. Due to resonance, the bond order in ozone is 1.5 whereas in O_2, bond order is 2. Hence, O—O bond length in O_3 is greater than O—O bond length in O_2.

32. At suitable condition, all the given compounds can exists in Zwitter ionic form because they have (—COOH or —SO_3H) acidic group and basic (—NH_2) group.

33. The given reaction is an example of elimination reaction, in which one molecule of HBr is eliminated from alkyl halide to give alkene.

34. Molality = $\dfrac{\text{Moles of solute}}{\text{Mass of water (in kg)}}$

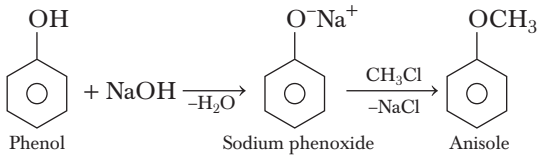
Moles of urea = $\dfrac{0.010}{60}$ mol

Mass of water at STP = $\dfrac{1 \text{ kg}}{\text{dm}^3} \times 0.3 \text{ dm}^3$

[$\because d = 1$ g/cm^3 = 1 kg/dm^3]

$\therefore$ Molality = $\dfrac{0.010}{60 \times 0.3} = 5.55 \times 10^{-4}$ molal

35. For the conversion of phenol to anisole NaOH/CH_3Cl reagent is used.



36. Fluorine tends to form only one oxoacids while other halogen form a number of oxoacids is the incorrect statement about fluorine.

37. I. can be used due to peresence of anhyd. $ZnCl_2$.

II. CH_3CH_2OH is a primary alcohol thus if require catalyst for the conversion into halide.

III. gives alkyl halides due to the formation of more stable carbocation.

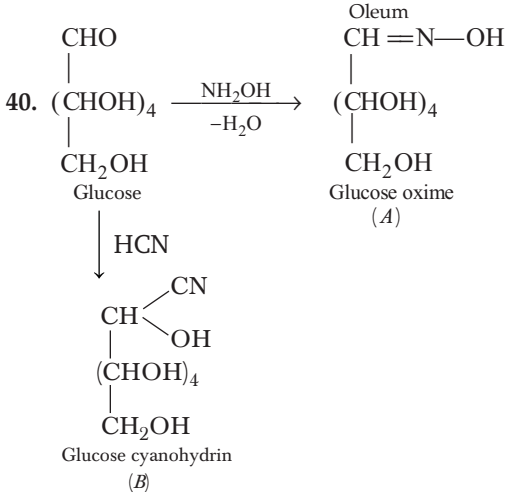
So, I and III can be used for the preparation of alkyl halides.

38. Since, electronegativity of oxygen is very high it shows only negative oxidation state as – 2 except in the case of OF_2 where its oxidation state is + 2 due to higher electronegativity of fluorine.

39. SO_3 is absorbed in H_2SO_4 (conc.) to form oleum ($H_2S_2O_7$).

$$SO_3 + H_2SO_4 \longrightarrow \underset{\text{Oleum}}{H_2S_2O_7}$$

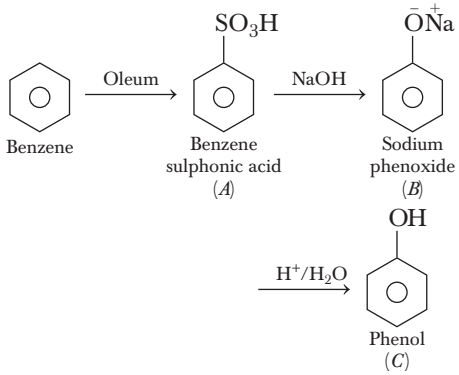
40.



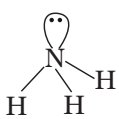
41. Atomic radius of nobel gas increases down the group.

He < Ne < Ar < Kr < Xe

42. The complete reaction is as follows :



43. In ammonia, nitrogen atom is sp^3-hybridised having trigonal pyramidal (with nitrogen atom at the apex). It has three bond pairs and one lone pair of electrons.



44. Keratin is an example of fibrous protein. Fibrous protein have thread like structure in which polypeptide chains run parallel and are held together by hydrogen and disulphide bonds. These proteins are insoluble in water.

45. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Ethanol is less acidic than phenol as phenoxide ion formed after loosing H^+ ion is more stable due to resonance.

46. Assertion is true but Reason is false. The correct Reason is the intermediate carbanion is stabilised due to the presence of (E.W.) nitro group.

47. Assertion is false but Reason is true. The correct assertion is :

In an ideal solution, ΔH_{mix} is zero.

48. Both Assertion and Reason are true but Reason is not the correct explanation for Assertion.

In liquid and gaseous state PCl_5 have trigonal bipyramidal structure in which P atom is sp^3d-hybridised. Thus, have covalent character.

Whereas in solid state it consists of tetrahedral PCl_4^+ cation and octahedral PCl_6^- anion. That means, they exists in ionic form.

49. Both Aassertion and Reason are true but Reason is not the correct explanation of Assertion.

Chemically protein are polymers in which the monomeric units are the α-amino acids.

50. The analogy (a) is correct.

The correct analogy of (b) and (c) are as follows :

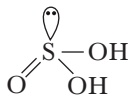
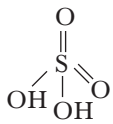
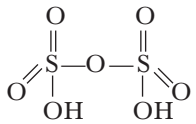
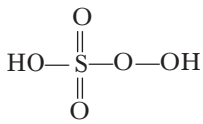
(b) NaCl : No. of atoms =1 : : CsCl : No. of atoms = 4

(c) Monoclinic : $\alpha \neq b \neq c, \alpha = \gamma = 90° \neq \beta$: : Triclinic : $a \neq b \neq c, \alpha \neq \beta \neq \gamma$

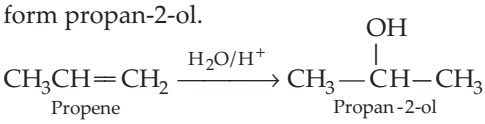
51. Two solutions having the same molar concentration at the same temperature are isotonic (*A*).

For two solutions of different molar concentrations the one having higher osmotic pressure is hypertonic (*B*).

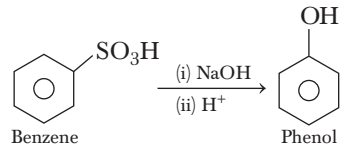
52. A → 1; B → 2; C → 4; D → 3

	Name of oxoacids of sulphur	Structure of oxoacid of sulphur
A.	Sulphurous acid (H_2SO_3)	→ 
B.	Sulphuric acid (H_2SO_4)	→ 
C.	Pyrosulphuric acid ($H_2S_2O_7$)	→ 
D.	Caro's acid (H_2SO_5)	→ 

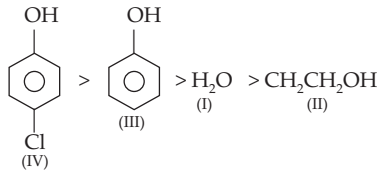
53. Propene on reaction with H_2O in acidic condition undergoes addition reaction to form propan-2-ol.



54. For the conversion of benzene sulphonic acid to phenol NaOH, HCl reagent is used.



55. The correct order is



4-chlorophenol is more acidic than phenol due to $-I$ effect of chlorine which stabilised phenoxide ion.

Phenol is more acidic than water because the phenoxide that formed after the removal of H^+ from phenol is resonance stabilised while in case of water $\bar{O}H$ is not resonance stabilised.

Ethanol is least stable as the attached substitutent (ethyl group) is electron releasing group ($+I$ effect) it makes difficult to remove H^+ from the ethanol molecule.