

CUET Chemistry Solved Paper-2022

Held on 18 August 2022

1. Atoms of B forms fcc lattice and those of element A occupy alternate tetrahedral voids. The formula of the compound formed by elements A and B

(a) AB_2 (b) A_2B
(c) AB (d) A_2B_3

2. Which amongst the following compounds is a diamagnetic compound?

C_6H_6 , CrO_2 , MnO , $MgFe_2O_4$

(a) CrO_2 (b) C_6H_6
(c) MnO (d) $MgFe_2O_4$

3. Match list I with list II.

List-I

Type of unit cell

List-II

Number of lattice points

A. Primitive unit cell I. 9
B. Body centred unit cell II. 8
C. Face centred unit cell III. 10
D. End centred unit cell IV. 14

Choose the correct answer from the option given below.

(a) A-II, B-IV, C-I, D-III
(b) A-II, B-I, C-IV, D-III
(c) A-III, B-I, C-IV, D-II
(d) A-IV, B-I, C-II, D-III

4. During electrolysis of aqueous sodium chloride

A. Sodium metal is obtained at anode
B. Hydrogen is evolved at cathode
C. Oxygen is evolved at anode
D. Oxygen is evolved at cathode
E. Chlorine is evolved at anode

Choose the correct answer from the option given below.

(a) B, E only (b) A, E only
(c) B, D only (d) B, C only

5. When a lead storage battery is recharged

A. Pb acts as cathode
B. PbO_2 acts as anode
C. H_2SO_4 is produced
D. 38% NH_4Cl is used as electrolyte
E. Lead storage cell has a longer life than nickelcadmium cell

Choose the correct answer from the option given below.

(a) A only (b) B only
(c) C only (d) D, E only

6. Molar conductivity of _____ increases drastically on dilution.

(a) NH_4Cl (b) $NaCl$
(c) CH_3COOH (d) CH_3COONa

7. When temperature changes from 293 K to 313 K, the rate of reaction

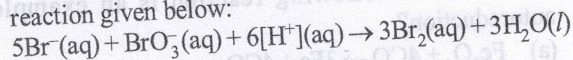
(a) Remains same (b) Gets halved
(c) Gets doubles (d) Gets quadruples

8. The decomposition of dimethyl ether leads to formation of CH_4 , H_2 and CO . The reaction rate is given by $Rate = k[PCH_3OCH_3]^{3/2}$

If pressure is measured in bar and time in minutes, what is the unit of rate constant?

(a) $bar^{-1/2} min^{-1}$ (b) $bar^{3/2} min^{-1}$
(c) $bar^{-1} min^{-1}$ (d) $bar^{-3/2} min^{-1}$

9. Which of the following expression is correct for the rate of reaction given below:



(a) $\frac{\Delta[Br^-]}{\Delta t} = 5 \frac{\Delta[H^+]}{\Delta t}$

(b) $\frac{\Delta[Br^-]}{\Delta t} = \frac{6}{5} \frac{\Delta[H^+]}{\Delta t}$

(c) $\frac{\Delta[Br^-]}{\Delta t} = \frac{5}{6} \frac{\Delta[H^+]}{\Delta t}$

(d) $\frac{\Delta[Br^-]}{\Delta t} = 6 \frac{\Delta[H^+]}{\Delta t}$

10. Which of the following will not cause coagulation of a colloid?

(a) Electrophoresis
(b) Addition of peptizing agent
(c) Boiling
(d) Persistent dialysis

11. Match List-I with List-II.

List-I
State of dispersed phase and dispersion medium

List-II
Example of colloidal system

a. Dispersed phase : Solid I. Soap lather

Dispersion medium : Liquid

b. Dispersed phase : Liquid II. Paints

Dispersion medium : Solid

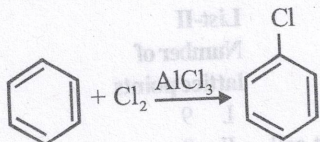
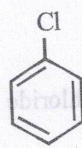
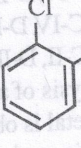
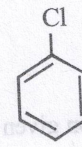
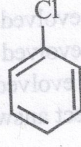
c. Dispersed phase : Gas III. Pumice stone

Dispersion medium : Liquid

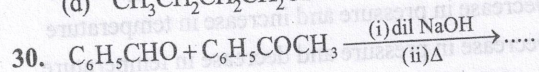
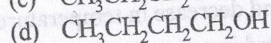
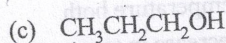
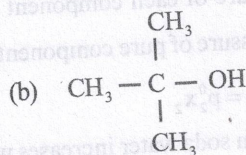
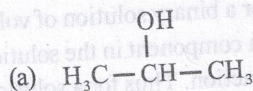
d. Dispersed phase : Gas IV. Jellies

Dispersion medium : Solid

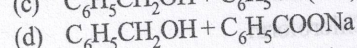
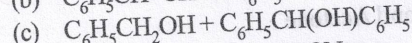
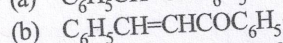
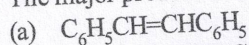
Choose the correct answer from the options given below:

- (a) a-III, b-IV, c-II, d-I
(b) a-IV, b-I, c-III, d-II
(c) a-II, b-IV, c-I, d-III
(d) a-I, b-II, c-IV, d-III
12. A gas that is readily adsorbed on 1 g of activated charcoal by physical adsorption
(a) Dihydrogen (critical temperature 33 K)
(b) Helium (critical temperature 2.15 K)
(c) Methane (critical temperature 190 K)
(d) Sulphur Dioxide (critical temperature 630 K)
13. Nickel is refined by
(a) Zone Refining
(b) Electrolytic Refining
(c) Van Arkel Method for Refining
(d) Mond Process for Refining
14. Which of the following reaction is an example of autoreduction?
(a) $\text{Fe}_3\text{O}_4 + 4\text{CO} \rightarrow 3\text{Fe} + 4\text{CO}_2$
(b) $\text{Cu}_2\text{O} + \text{C} \rightarrow 2\text{Cu} + \text{CO}$
(c) $\text{Cu}^{2+}(\text{aq}) + \text{Fe}(\text{s}) \rightarrow \text{Cu} + \text{Fe}^{3+}(\text{aq})$
(d) $\text{Cu}_2\text{O} + \frac{1}{2}\text{Cu}_2\text{S} \rightarrow 3\text{Cu} + \frac{1}{2}\text{SO}_2$
15. Which of the following oxoacids of chlorine is most acidic?
(a) HClO
(b) HClO_2
(c) HClO_3
(d) HClO_4
16. Bond dissociation enthalpy of (E-H) (E=element) are given below. Which of the following compounds is strongest reducing agent?
- | Compound | NH_3 | PH_3 | AsH_3 | SbH_3 |
|---|---------------|---------------|----------------|----------------|
| $\Delta_{\text{diss}}(\text{E-H})/\text{kJ mol}^{-1}$ | 389 | 322 | 297 | 255 |
- (a) NH_3
(b) PH_3
(c) AsH_3
(d) SbH_3
17. Identify the one that does not exist
(a) XeOF_4
(b) NeF_2
(c) XeF_2
(d) XeF_6
18. Highest oxidation state of Manganese in fluorides is +4(MnF_4) but highest oxidation state in oxides is +7(Mn_2O_7) because _____.
(a) Fluorine is more electronegative than oxygen
(b) Fluorine does not possess d-orbitals
(c) Fluorine stabilises lower oxidation state
(d) In covalent compounds, fluorine can form single bond only while oxygen form double bond
19. Ziegler Natta catalyst is
(a) Cu_2Cl_2
(b) V_2O_5
(c) $\text{TiCl}_4 + \text{Al}(\text{CH}_3)_3$
(d) Ni in presence of Iron
20. Element of 3d series with highest melting point is
(a) Cr
(b) Mn
(c) Fe
(d) Co
21. A type of isomerism in co-ordination compound that arises when the counter ion in a complex salt is itself a potential ligand and can displace a ligand which can then become a counter ion
(a) Linkage Isomerism
(b) Co-ordination Isomerism
(c) Ionisation Isomerism
(d) Solvate Isomerism
22. Identify the most stable complex species
(a) $[\text{Fe}(\text{CO})_5]$
(b) $[\text{Fe}(\text{CN})_6]^{3-}$
(c) $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$
(d) $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$
23. The CFSE for octahedral $[\text{CoCl}_6]^{4-}$ is $18,000 \text{ cm}^{-1}$. The CFSE for tetrahedral $[\text{CoCl}_4]^{2-}$ will be
(a) $20,000 \text{ cm}^{-1}$
(b) $18,000 \text{ cm}^{-1}$
(c) $16,000 \text{ cm}^{-1}$
(d) $8,000 \text{ cm}^{-1}$
24. Which one of the following species attacks the benzene ring in the above reaction?
- 
- (a) Cl^-
(b) Cl^+
(c) AlCl_3
(d) $[\text{AlCl}_4]^-$
25. _____ has the highest rate of reaction towards nucleophilic substitution
- (a) 
(b) 
(c) 
(d) 
26. Identify the major product (P) formed on reaction of $(\text{CH}_3)_3\text{CBr} + \text{KOH} \xrightarrow[\text{heat}]{\text{Ethanol}}$ (P)
(a) $(\text{CH}_3)_3\text{COH}$
(b) $(\text{CH}_3)_2\text{C}=\text{O}$
(c) $(\text{CH}_3)_2\text{C}=\text{CH}_2$
(d) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
27. Monochlorination of toluene in sunlight followed by hydrolysis with aq NaOH gives
(a) Benzylalcohol
(b) 2, 4-Dihydroxytoluene
(c) m-cresol
(d) o-cresol
28. Phenol on oxidation with chromic acid gives
(a) Benzene
(b) Benzaldehyde
(c) Quinol
(d) Benzoquinone

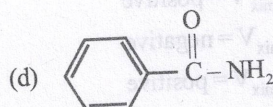
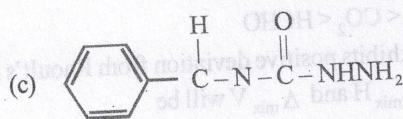
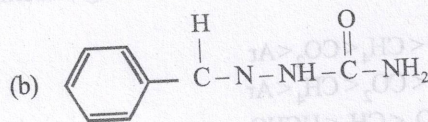
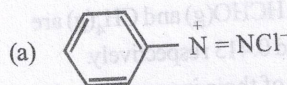
29. The compound formed on reaction of propanone with methylmagnesium bromide followed by hydrolysis is



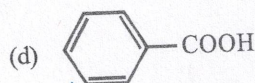
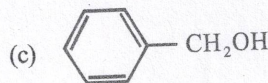
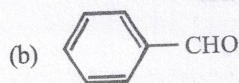
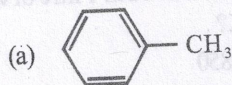
The major product in the above reaction is



31. Benzaldehyde reacts with semicarbazide to give



32. A compound 'A' on reaction with NaCN/HCl gives compound B which on hydrolysis in acidic medium gives α -Hydroxyphenyl acetic acid. Identify compound A



33. Aniline does not undergo

(a) Sulphonation

(b) Friedel-Crafts alkylation

(c) Bromination

(d) Nitration

34. IUPAC name of Acetanilide is

(a) N-Ethylethanamide

(b) N-Phenylethanamide

(c) N,N-Diethylethanamide

(d) N-Methyl benzamide

35. Which of the following organic compounds show Carbylamine test?

A. Ethanamine

B. N-Ethylethanamine

C. N,N-Dimethylethanamine

D. Aniline

E. N-Methyl aniline

Choose the correct answer from the options given below:

(a) A, B only

(b) C only

(c) A, D only

(d) D, E only

36. Nucleotides are joined together by

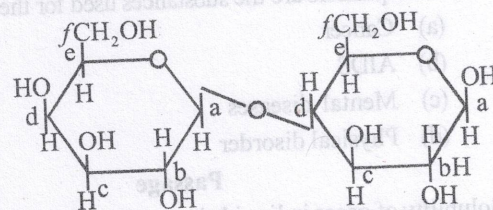
(a) Phosphodiester linkage

(b) Glycosidic linkage

(c) Peptide linkage

(d) Hydrogen bond

37. Lactose is a disaccharide formed from β -D-galactose and β -D-glucose. Identify anomeric carbon atoms in monosaccharide units



(a) 'a' carbon of galactose and 'd' carbon of glucose

(b) 'd' carbon of galactose and 'a' carbon of glucose

(c) 'a' carbon of galactose and 'a' carbon of glucose

(d) 'e' carbon of galactose and 'e' carbon of glucose

38. Identify the incorrect statements from the following.

(a) Pentose sugar in DNA is β -D-2-deoxyribose

(b) DNA has four bases Adenine, Cytosine, Guanine, Uracil

(c) Two strands of DNA are complementary to each other

(d) DNA finger printing is used to identify racial groups to rewrite biological evolution

39. Identify the monomers which forms biodegradable polymers
 (a) Ethylene glycol + phthalic acid
 (b) Caprolactam
 (c) Phenol + Formaldehyde
 (d) Amino caproic acid + glycine
40. In view of general awareness and concerns for accumulation of polymeric solid waste materials, certain biodegradable synthetic polymers have been developed. Which amongst the following are biodegradable synthetic polymers?
 (a) Novolac (b) Neoprene
 (c) PHBV (d) BUNA-S
41. Which of these following is not a non-narcotic analgesic?
 (a) Aspirin
 (b) Ibuprofen
 (c) Codeine
 (d) Dichlorofenac sodium
42. Which of the following is likely to cause ulcer in the stomach?
 (a) Luminal (b) Aspirin
 (c) Phenelzine (d) Iproniazid
43. Which of the following is responsible for the mood changes/depression in humans?
 (a) Thyroid (b) Norethindrone
 (c) Noradrenaline (d) Terfenadine
44. Which category of drug can act, both as antipyretic as well as analgesic?
 (a) Narcotic analgesics
 (b) Non narcotic analgesics
 (c) Tranquilizers
 (d) Antibiotic
45. Tranquilizers are the substances used for the treatments of
 (a) Cancer
 (b) AIDS
 (c) Mental diseases
 (d) Physical disorder

Passage

Solubility of gases in liquids is greatly affected by pressure and temperature. Henry gave the quantitative relationship between pressure and solubility of gas in a solvent. According to Henry's law, partial pressure of a gas above a liquid is directly proportional to its mole fraction in solution and is expressed as $P = K_H \cdot x$, where K_H is Henry's constant and x is mole fraction of gas. K_H is a function of nature of gas.

F M Raoult gave a quantitative relationship between partial pressures and mole fractions in the binary solution of volatile liquids. Raoult's law states that for a binary solution of volatile liquids, the partial pressure of each component in the solution is directly proportional to its mole fraction. Thus for a solution of component 1 and 2, partial pressure of each component $P_1 = p_1^0 x_1$, where p_1^0 is the vapour pressure of pure component 1 at the same temperature. Similarly $p_2 = p_2^0 x_2$

46. Solubility of Carbon dioxide in soda water increases with
 (a) Increase in pressure and temperature both
 (b) Increase in pressure and decrease in temperature
 (c) Decrease in pressure and increase in temperature
 (d) Decrease in pressure and decrease in temperature
47. Which of the following show negative deviation from Raoult's law?
 (a) Water and Ethanol
 (b) Ethanol and Acetone
 (c) Acetone and Chloroform
 (d) Carbondisulphide and Acetone
48. K_H value for Ar(g), CO(g), HCHO(g) and CH₄(g) are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Identify the correct order of their increasing solubility in water
 (a) HCHO < CH₄ < CO₂ < Ar
 (b) HCHO < CO₂ < CH₄ < Ar
 (c) Ar < CO₂ < CH₄ < HCHO
 (d) Ar < CH₄ < CO₂ < HCHO
49. If a solution exhibits positive deviation from Raoult's Law then sign of $\Delta_{mix} H$ and $\Delta_{mix} V$ will be
 (a) $\Delta_{mix} H = \text{positive}$; $\Delta_{mix} V = \text{positive}$
 (b) $\Delta_{mix} H = \text{positive}$; $\Delta_{mix} V = \text{negative}$
 (c) $\Delta_{mix} H = \text{negative}$; $\Delta_{mix} V = \text{positive}$
 (d) $\Delta_{mix} H = \text{negative}$; $\Delta_{mix} V = \text{negative}$
50. Henry's law constant for O₂ in water at 293 K is 46.82 bar. The mole fraction of oxygen in air is 0.21. What mole fraction of oxygen is dissolved in 1 litre of water at 2.026 bar pressure and 293 K?
 (a) 0.4254 (b) 0.850
 (c) 0.018 (d) 0.009

Hints & Explanations

1. (c) Number of atom 'B' forming Fcc lattice

$$= \frac{1}{8} \times 8 + \frac{1}{2} \times 6 = 4$$

Number of atom 'A' (Occupying alternate tetrahedral voids)
 $= 1 \times 4$

$$\therefore A : B \Rightarrow 4 : 4$$

$\therefore$ Formula of compound is AB.

2. (b) CrO_2 : Ferromagnetic ; C_6H_6 : Diamagnetic ; MnO : Antiferromagnetic ; MgFe_2O_4 : Ferrimagnetic

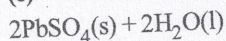
3. (b) A-II, B-I, C-IV, D-III

4. (a) $\text{NaCl(aq)} \longrightarrow \text{Na}^+(\text{aq}) + \text{Cl}^-(\text{aq})$

At anode : $2\text{Cl}^-(\text{aq}) \longrightarrow \text{Cl}_2(\text{g}) + 2\text{e}^-$

At cathode : $2\text{H}_2\text{O(l)} + 2\text{e}^- \longrightarrow \text{H}_2(\text{g}) + 2\text{OH}^-(\text{aq})$

5. (c) Net reaction :



38% H_2SO_4 solution is used as electrolyte.

Nickel - cadmium cell has longer life than lead - storage cell.

6. (c) Molar conductivity of weak electrolyte increases on dilution because of increase in number of ions.

7. (d) Temperature is increased from 293 K to 313 K

$$n = \frac{313 - 293}{10} = 2$$

$$\text{Rate} = 2^n = 2^2 = 4 \text{ times}$$

8. (a) $\text{Rate} = k[\text{PCH}_3\text{OCH}_3]^{3/2}$

$$\text{Order of reaction} = \frac{3}{2}$$

$$\text{Unit of } k = (\text{bar})^{1-n} \text{ min}^{-1}, \text{ where } n = \frac{3}{2}$$

$$\therefore \text{unit of } k = (\text{bar})^{1-\frac{3}{2}} \text{ min}^{-1}$$

$$k = \text{bar}^{-1/2} \text{ min}^{-1}$$

$$9. (c) \text{Rate} = \frac{-1}{5} \frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{-\Delta[\text{BrO}_3^-]}{\Delta t} = \frac{-1}{6} \frac{\Delta[\text{H}^+]}{\Delta t}$$

$$= \frac{1}{3} \frac{\Delta[\text{Br}_2]}{\Delta t} = \frac{1}{3} \frac{\Delta[\text{H}_2\text{O}]}{\Delta t}$$

$$\therefore \frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{5}{6} \frac{\Delta[\text{H}^+]}{\Delta t}$$

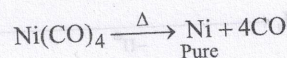
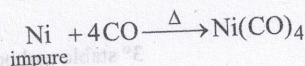
10. (b) Peptizing agent is the electrolyte used for converting a precipitate into colloidal sol.

11. (c) A-II, B-IV, C-I, D-III

Dispersed phase	Dispersion medium	Example
Solid	Liquid	Paints
Liquid	Solid	Jellies
Gas	Liquid	Soap lather
Gas	Solid	Pumice stone

12. (d) Greater the critical temperature, greater is the ease of liquefaction, greater is the physical adsorption.

13. (d) Mond process is used for refining of nickel



14. (d) Copper is reduced by itself, therefore, it is a autoreduction reaction.

15. (d) Acidic strength order : $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$

16. (d) With decrease in (E-H) bond dissociation enthalpy from NH_3 to SbH_3 , the reducing character is increasing.

17. (b) No true compound of Ne is yet known.

18. (d) Highest Mn fluoride is MnF_4 whereas Mn oxide is Mn_2O_7 because of ability of oxygen to form multiple bonds.

19. (c) Ziegler Natta catalyst : $\text{TiCl}_4 + \text{Al(CH}_3)_3$

20. (a) Cr has highest melting point in 3d series due to greater number of unpaired electrons to participate in interatomic bonding.

21. (c) Ionisation isomerism arises when the counter ion in a complex salt is itself a potential ligand and can displace a ligand which can then become the counter ion.

22. (c) $\text{C}_2\text{O}_4^{2-}$ is bidentate chelating ligand and increases the stability of complex due to chelation effect.

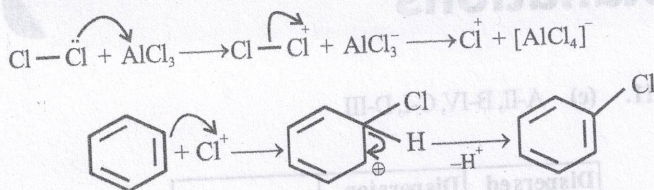
23. (d) $\Delta_o = 18000 \text{ cm}^{-1}$

$$\Delta_t = \frac{4}{9} \Delta_o$$

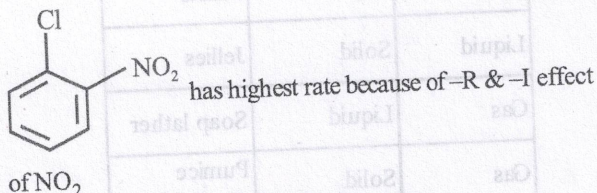
$$\Delta_t = \frac{4}{9} \times 18000 = 8000 \text{ cm}^{-1}$$

c-44

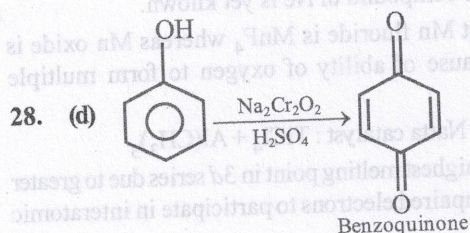
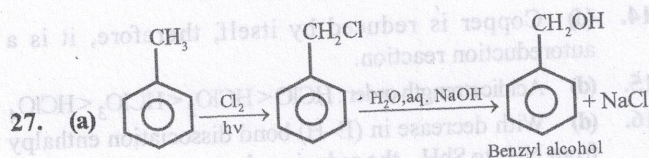
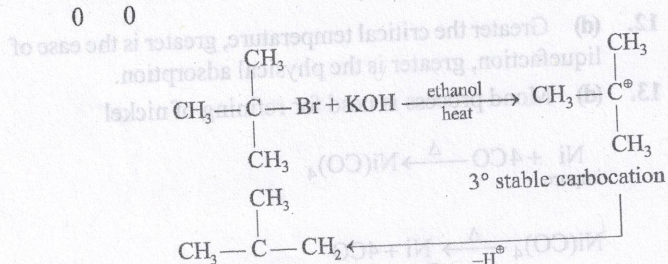
24. (b)



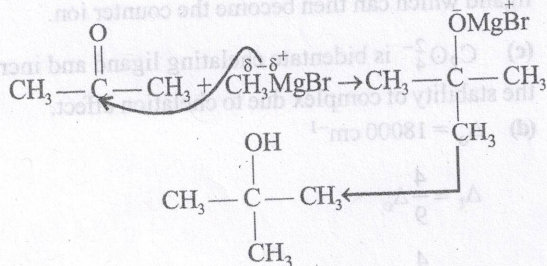
25. (b) Electron withdrawing group ($-\text{NO}_2$) increases the reactivity towards nucleophilic substitution reaction



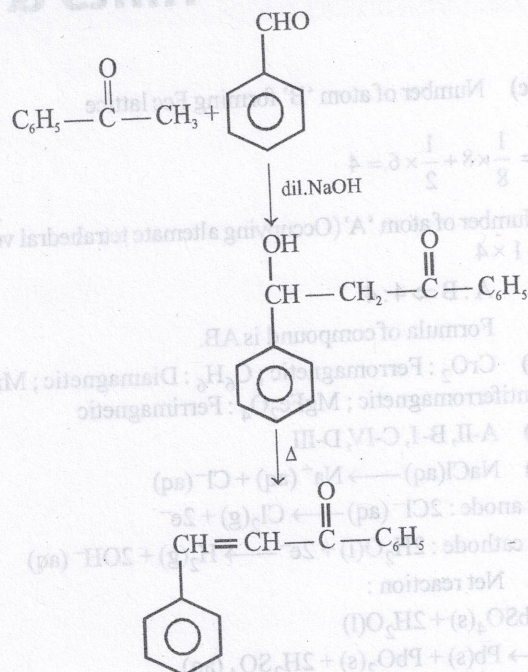
26. (c) Reaction follows E_1 type mechanism



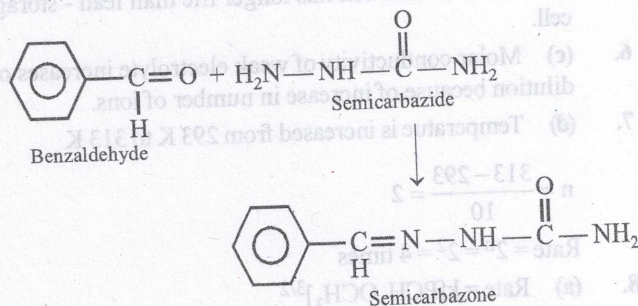
29. (b)



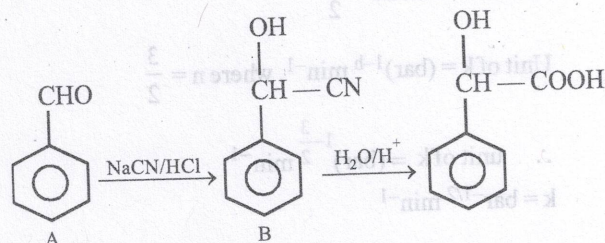
30. (b) It is an aldol condensation reaction



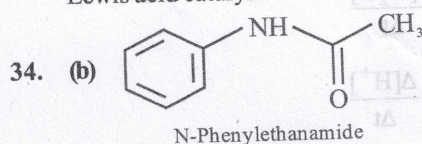
31. (b)



32. (b)

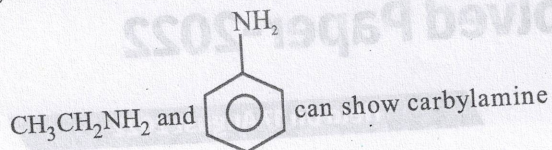


33. (b) Aniline does not undergo Friedel-Crafts alkylation due to the salt formation with AlCl_3 which is used as a Lewis acid catalyst.



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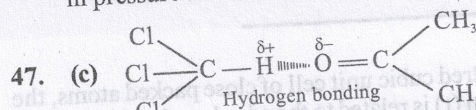
35. (c) Aliphatic and aromatic primary amines shows carbylamine test.



reaction.

36. (a) Nucleotides are joined together by phosphodiester linkage between 5' and 3' carbon atoms of pentose sugar.
37. (c) Lactose is formed of C1 of galactose and C4 of glucose. So, 'a' carbon of galactose and 'a' carbon of glucose are anomeric carbon atoms.
38. (b) DNA contain four bases viz. adenine, guanine, cytosine and thymine. Uracil is present in RNA.
39. (d) Nylon 2-nylon 6 is a polymer of glycine and amino caproic acid and is biodegradable. Other given polymers are non-biodegradable.
40. (c) PHBV undergoes bacterial degradation in environment.
41. (a) Aspirin is non-narcotic analgesics. It reduces or abolishes pain.
42. (b) Aspirin like pain reliever causes ulcer in stomach.
43. (c) Noradrenaline is one of the neurotransmitters that plays a role in mood change.

44. (b) Non-narcotic analgesic drugs have other effects such as reducing fever (antipyretic)
45. (c) Tranquilizers are used for the treatments of mental diseases.
46. (b) Solubility of $\text{CO}_2(\text{g})$ in water increases with increase in pressure and decrease in temperature.



A mixture of chloroform and acetone shows negative deviation from Raoult's law, it is due to H-bonding.

48. (c) Solubility of a gas in water varies inversely to its K_H value, so correct order of solubility is
- $$\text{Ar} < \text{CO}_2 < \text{CH}_4 < \text{HCHO}$$
49. (a) For a solution exhibiting positive deviation from Raoult's law
- $$\Delta_{\text{mix}} H > 0, \Delta_{\text{mix}} V > 0$$
50. (d) Partial pressure of $\text{O}_2 = 2.026 \times 0.21$

Now, applying Henry's law

$$p_{\text{O}_2} = K_H \times X_{\text{O}_2}$$

$$\therefore X_{\text{O}_2} = \frac{p_{\text{O}_2}}{K_H} = \frac{0.425}{46.82} = 0.009$$