

Time allowed: 45 minutes


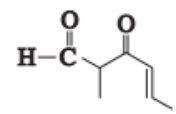
Maximum Marks: 200

General Instructions: Same as Practice Paper-1.

Choose the correct option.

1. The catalyst used in the contact process of sulphuric acid manufacture is
(a) oxides of nitrogen (b) nickel (c) vanadium pentoxide (d) manganese dioxide
2. The rate of a reaction can be increased in general by all the factors except
(a) using a catalyst. (b) increasing the temperature.
(c) increasing activation energy. (d) increasing the concentration of reactants.
3. On increasing dilution, the specific conductance
(a) increases (b) decreases (c) remains constant (d) none of these
4. Which of the following statements is false?
(a) Units of atmospheric pressure and osmotic pressure are the same.
(b) In reverse osmosis, solvent molecules move through a semipermeable membrane from a region of lower concentration of solute to a region of higher concentration.
(c) The value of molal depression constant depends on nature of solvent.
(d) Relative lowering of vapour pressure, is a dimensionless quantity.
5. The total number of octahedral voids in the face centred unit cell is _____.
(a) 6 (b) 4 (c) 10 (d) 12
6. If a reaction is 50% complete in 2 hours and 75% complete in 4 hours, then the order of the reaction is
(a) Zero (b) 1 (c) 2 (d) 3
7. When lead storage battery is discharged
(a) SO_2 is evolved. (b) PbSO_4 is consumed.
(c) Lead is formed. (d) Sulphuric acid is consumed.
8. Which one of the following is a covalent solid?
(a) Fe (b) Diamond (c) Cu (d) NaCl
9. The vapour pressure of two liquids P and Q are 80 and 60 torr, respectively. The total vapour pressure of solution obtained by mixing 3 moles of P and 2 moles of Q would be
(a) 72 torr (b) 140 torr (c) 68 torr (d) 20 torr
10. If 96500 coulomb of electricity is passed through CuSO_4 solution it will liberate
(a) 63.5 g of Cu (b) 31.75 g of Cu (c) 96500 g of Cu (d) 100 g of Cu
11. A device which converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is called as
(a) Ni-Cd cell (b) fuel cell (c) electrolytic cell (d) none of these

12. A metallic crystal has the *bcc* type stacking pattern. What percentage of volume of this lattice is empty space?
 (a) 68% (b) 32% (c) 26% (d) 74%
13. A sample of hard water was found to contain 40 mg of MgSO_4 in 10 kg of sample. The ppm of MgSO_4 in the sample will be
 (a) 2 ppm (b) 4 ppm (c) 8 ppm (d) 15 ppm
14. Kohlrausch's law helps in determining:
 (a) ionic product of water (b) solubility of sparingly soluble salt
 (c) degree of dissociation of weak electrolytes (d) all of these
15. For a reaction, $3A \longrightarrow 2B$, the rate of reaction $+\frac{d}{dt}[B]$ is equal to
 (a) $-\frac{3}{2}\frac{d[A]}{dt}$ (b) $-\frac{2}{3}\frac{d[A]}{dt}$ (c) $-\frac{1}{3}\frac{d[A]}{dt}$ (d) $+2\frac{d[A]}{dt}$
16. Enzymes are
 (a) microorganisms (b) proteins (c) inorganic compounds (d) moulds
17. Ethylene diammine is a
 (a) monodentate ligand (b) bidentate ligand (c) hexadentate ligand (d) tridentate ligand
18. The electronic configuration of an element is $1s^2 2s^2 2p^6 3s^2 3p^2$. What is the atomic number of the element which is just below the above element?
 (a) 32 (b) 34 (c) 36 (d) 49
19. In the preparation of HNO_3 , we get NO gas by catalytic oxidation of ammonia. The moles of NO produced by the oxidation of two moles of NH_3 will be
 (a) 2 (b) 3 (c) 4 (d) 6
20. Which of the following is a best example of $\text{S}_{\text{N}}2$ reaction?
 (a) $\text{CH}_3\text{Br} + \text{OH}^- \longrightarrow \text{CH}_3\text{OH} + \text{Br}^-$
 (b) $(\text{CH}_3)_2\text{CHBr} + \text{OH}^- \longrightarrow (\text{CH}_3)_2\text{CHOH} + \text{Br}^-$
 (c) $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{-\text{H}_2\text{O}} \text{CH}_2=\text{CH}_2$
 (d) $(\text{CH}_3)_3\text{C-Br} + \text{OH}^- \longrightarrow (\text{CH}_3)_3\text{C-OH} + \text{Br}^-$
21. The process of concentrating Ag and Au ores is based upon their solubility in
 (a) NH_3 (b) HNO_3 (c) HCl (d) KCN
22. The equilibrium $\text{Cr}_2\text{O}_7^{2-} \rightleftharpoons 2\text{CrO}_4^{2-}$ is shifted to right in
 (a) an acidic medium (b) a basic medium
 (c) a neutral medium (d) all of these
23. Which of the following is π -acid ligand?
 (a) NH_3 (b) CO (c) F^- (d) ethylenediammine
24. Among the following outermost configuration of transition metals, which one shows the highest oxidation states?
 (a) $3d^3 4s^2$ (b) $3d^5 4s^1$ (c) $3d^5 4s^2$ (d) $3d^6 4s^2$
25. The compound which does not show paramagnetism is
 (a) $[\text{Cu}(\text{NH}_3)_4]\text{Cl}_2$ (b) $[\text{Ag}(\text{NH}_3)_2]\text{Cl}$ (c) NO (d) NO_2
26. Bleaching action of SO_2 is due to its
 (a) reducing property (b) oxidising property (c) basic property (d) acidic property
27. Two isomeric alkenes A and B having molecular formula $\text{C}_5\text{H}_9\text{Cl}$ on adding hydrogen, A gives optically inactive compound while B gives a chiral compound. The two isomers are
 (a) A is 3-chloro-pent-1-ene and B is 4-chloro-pent-2-ene
 (b) A is 4-chloro-pent-1-ene and B is 2-chloro-pent-2-ene
 (c) A is 3-chloro-pent-2-ene and B is 2-chloro-pent-2-ene
 (d) A is 1-chloro-pent-1-ene and B is 5-chloro-pent-1-ene

28. The reaction involved in the formation of fluoromethane from methyl bromide in presence of silver fluoride is called
 (a) Swarts reaction (b) Finkelstein reaction (c) Sandmeyer reaction (d) Wurtz reaction
29. The number of unpaired electrons in ferrous ion ($Z = 26$) is
 (a) 3 (b) 2 (c) 4 (d) 5
30. In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with:
 (a) iron (II) sulphide (b) carbon monoxide
 (c) copper (I) sulphide (d) sulphur dioxide
31. Which of the following molecules will form linear polymeric structure due to hydrogen bonding?
 (a) HCl (b) HF (c) H_2O (d) NH_3
32. In which reaction an aromatic aldehyde is treated with acetic anhydride in presence of corresponding salt of the acid to give an unsaturated aromatic acid ?
 (a) Friedel crafts reaction (b) Perkins reaction
 (c) Wurtz reation (d) None of these
33. Which of the following confirms the presence of five $-OH$ groups in glucose?
 (a) Reaction with HI (b) Reaction with acetic anhydride
 (c) Reaction with hydroxylamine (d) Reaction with hydrogen cyanide
34. Terylene is:
 (a) Polyamide (b) Polyethylene
 (c) Polyvinyl chloride (d) Polyester
35. The compound N-ethyl-N-methylpropanamine forms non-superimposable mirror image but does not show any optical activity. This is due to:
 (a) absence of a chiral N atom. (b) presence of a chiral N atom.
 (c) presence of a lone pair on N atom. (d) rapid flipping of one form into another.
36. The reaction of  with $RMgX$ leads to the formation of
 (a) $RCH(OH)R$ (b) $RCH(OH)CH_3$ (c) R_2CHCH_2OH (d) RCH_2CH_2OH
37. Which of the following is laevorotatory?
 (a) Glucose (b) Sucrose (c) Fructose (d) None of these
38. Among the given compounds the most susceptible to nucleophilic attack at the carbonyl group is :
 (a) $MeCOCl$ (b) $MeCHO$ (c) $MeCOOMe$ (d) $MeCOOCOMe$
39. The reduction of benzoyl chloride with Pd and $BaSO_4$ produces
 (a) Benzyl chloride (b) Benzaldehyde (c) Benzoic acid (d) None of the above
40. Bactericidal antibiotic among the following is
 (a) ofloxacin (b) erythromycin (c) chloramphenicol (d) tetracycline
41. The repeating unit of PVC is:
 (a) Ethylene (b) Tetrachloroethylene
 (c) Vinyl chloride (d) Acrylonitrile
42. The IUPAC name of  is
 (a) 5-formylhex-2-en-3-one (b) 5-methyl-4-oxohex-2-en-5-al
 (c) 3-keto-2-methylhex-5-enal (d) 3-keto-2-methylhex-4-enal

43. Match the medicines given in Column I with their use given in Column II.

Column I	Column II
A. Ranitidine	(i) Tranquilizer
B. Furacine	(ii) Antibiotic
C. Phenelzine	(iii) Antihistamine
D. Chloramphenicol	(iv) Antiseptic

(a) A-(iii), B-(iv), C-(i), D-(ii)

(b) A-(iii), B-(iv), C-(ii), D-(i)

(c) A-(iv), B-(i), C-(ii), D-(iii)

(d) A-(i), B-(ii), C-(iii), D-(iv)

44. Phenol on heating with chloroform and conc. KOH gives

(a) salicylic acid

(b) salicylaldehyde

(c) benzaldehyde

(d) chlorobenzene

45. Which of these when passed over heated Cu at 573 K forms an alkene?

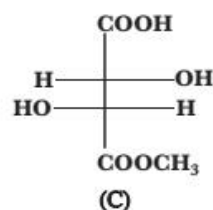
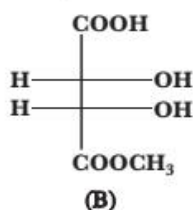
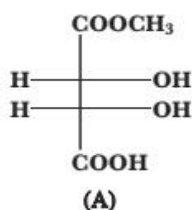
(a) An alkane

(b) An alkyne

(c) Secondary alcohol

(d) Tertiary alcohol

46. The correct statement about the compounds A, B and C is



(a) A and B are identical.

(b) A and B are diastereomers.

(c) A and C are enantiomers.

(d) A and B are enantiomers.

47. Which of the following will not be soluble in sodium bicarbonate?

(a) 2, 4, 6-trinitrophenol

(b) Benzoic acid

(c) *o*-Nitrophenol

(d) Benzene sulphonic acid

48. Among the compounds $\text{C}_3\text{H}_7\text{NH}_2$, NH_3 , CH_3NH_2 , and $\text{C}_6\text{H}_5\text{NH}_2$, the least basic is

(a) $\text{C}_3\text{H}_7\text{NH}_2$

(b) NH_3

(c) CH_3NH_2

(d) $\text{C}_6\text{H}_5\text{NH}_2$

49. Number of structural isomers possible from the molecular formula $\text{C}_3\text{H}_9\text{N}$ is

(a) 4

(b) 3

(c) 2

(d) 5

50. Given below are two statements labelled as Statement P and Statement Q:

Statement P : Most of the synthetic polymers are not biodegradable.

Statement Q : Polymerisation process induced toxic character in organic molecules.

(a) P is true, but Q is false

(b) P is false, but Q is true

(c) Both P and Q are true

(d) Both P and Q are false



Answers

PRACTICE PAPER – 8

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

Solutions

PRACTICE PAPER – 8

1. (c) Contact process for the manufacture of sulphuric acid.

$$2\text{SO}_2(g) + \text{O}_2(g) \xrightarrow{\text{V}_2\text{O}_5(s)/\text{Pt}(s)} 2\text{SO}_3(g)$$
2. (c) Activation energy is inversely proportional to the rate of the reaction. For fast reactions, activation energy is low whereas for slow reactions, activation energy is high.
3. (b) Specific Conductivity decreases with a decrease in concentration or increase in dilution. This is because the number of ions per unit volume that carry current in a solution decreases with increase in dilution.
4. (b) The correct statement is, In reverse osmosis, solvent molecules move through a semipermeable membrane from a region of higher concentration of solute to a region of lower concentration.
5. (b) The total of atoms in $\text{fcc} = 4$, and number of octahedral voids = number of atoms.
6. (b) For a first order reaction, $T_{75\%} = 2T_{50\%}$
 \therefore According to the given condition in question, the reaction is of first order.
7. (d) The cell reactions when the battery is in use(discharged) are:
At Anode: $\text{Pb}(s) + \text{SO}_4^{2-}(aq) \longrightarrow \text{PbSO}_4(s) + 2e^-$
At Cathode:
 $\text{Pb}(s) + \text{SO}_4^{2-}(aq) \longrightarrow \text{PbSO}_4(s) + 2e^-$
 The overall reaction is:

$$\text{Pb}(s) + \text{PbO}_2(s) + 2\text{H}_2\text{SO}_4(aq) \longrightarrow 2\text{PbSO}_4(s) + 2\text{H}_2\text{O}(l)$$

 Thus, sulphuric acid is consumed.
8. (b) Covalent solids form crystals which can be viewed as a single giant molecule made up of an almost endless number of covalent bonds. Out of the given solids, diamond is an example of covalent solid while Fe and Cu is a metallic solid, and NaCl is an ionic solid.
9. (a) By Raoult's law,

$$P_T = p_P^0 x_P + p_Q^0 x_Q$$

$$P_T = 80 \times \frac{3}{5} + 60 \times \frac{2}{5} = 48 + 24 = 72 \text{ torr}$$
10. (b) At cathode, $\text{Cu}^{2+}(aq) + 2e^- \longrightarrow \text{Cu}(s)$
 1 mole of CuSO_4 required = 2×96500 coulomb of electricity.
 or, 2×96500 C electricity gives 63.5 g Cu
 \therefore 96500 C will give = $\frac{63.5}{2} = 31.75$ g of Cu
11. (b) Fuel cell is a galvanic cell in which chemical
15. (b) The instantaneous rate is given as

$$\frac{-1}{3} \frac{d[A]}{dt} = \frac{+1}{2} \frac{d[B]}{dt}$$

$$\Rightarrow \frac{d[B]}{dt} = \frac{-2}{3} \frac{d[A]}{dt}$$
16. (b) Enzymes are complex nitrogenous organic compounds produced in living cells of plants and animals. Chemically, enzymes are globular proteins with high molar mass ranging from 15,000 to 1,000,000 g mol^{-1} .
17. (b) Ethylene diamine ($\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2$) is a bidentate ligand as it contains 2 donor atoms.
18. (a) The given element with electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^2$ is silicon having atomic number 14. Therefore, the element just below this will be Germanium having atomic number 32 and electronic configuration $[\text{Ar}] 3d^{10} 4s^2 4p^2$.
19. (a) $4\text{NH}_3 + 5\text{O}_2 \xrightarrow{\Delta} 4\text{NO} + 6\text{H}_2\text{O}$
 or $2\text{NH}_3 + \frac{5}{2}\text{O}_2 \xrightarrow{\Delta} 2\text{NO} + 3\text{H}_2\text{O}$
20. (a) The order of reactivity of alkyl halide towards $\text{S}_\text{N}2$ mechanism follows the order:
 $\text{CH}_3\text{Br} > (\text{CH}_3)_2\text{CHBr} > (\text{CH}_3)_3\text{C—Br}$
 Thus, reaction (a) is a best example of $\text{S}_\text{N}2$ reaction.
21. (d) Native silver or gold is treated with a dilute solution (0.5%) of sodium or potassium cyanide, they go into the solution forming a soluble complex. From this soluble complex, metal is precipitated by adding zinc.
22. (b) $\text{Cr}_2\text{O}_7^{2-} + 2\text{OH}^- \rightleftharpoons 2\text{CrO}_4^{2-} + \text{H}_2\text{O}$
 Equilibrium can be shifted to right, in an alkaline (or basic) medium.

energy from combustion of fuels like methanol, methane, hydrogen, etc. is converted into electrical energy. The most successful fuel cell uses the reaction of hydrogen with oxygen to form water.

12. (b) Packing efficiency in *bcc* is 68%. Hence empty space = $100 - 68 = 32\%$

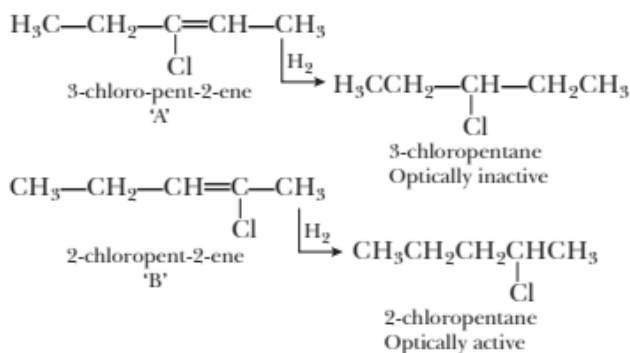
$$13. (b) \frac{\text{ppm of solute}}{10^6} = \frac{\text{Weight of solute}}{\text{Weight of solution}}$$

$$\frac{\text{ppm of MgSO}_4}{10^6} = \frac{40 \text{ mg}}{10 \text{ kg}}$$

$$\text{ppm of MgSO}_4 = \frac{40 \times 10^{-3} \text{ g}}{10 \times 10^3 \text{ g}} \times 10^6 = 4 \text{ ppm}$$

14. (d) Kohlrausch's law helps in determining ionic product of water, solubility of sparingly soluble salts, degree of dissociation of weak electrolytes and molar or equivalent conductance at infinite dilution of weak electrolytes.

27. (c)

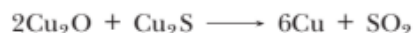


29. (c) Fe ($Z = 26$) : $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2$
 Fe^{2+} (Ferrous ion) : $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$



Number of unpaired electrons = 4.

30. (c) In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with copper(I) sulphide.



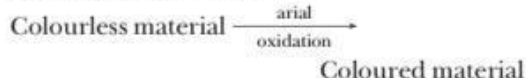
32. (b) In Perkins reaction, an aromatic aldehyde undergoes condensation with acid anhydride

23. (b) CO is π -acid ligand. It is a good π acceptor (Lewis acid) due to presence of empty π orbitals and a good σ donor (Lewis acid).

24. (c) ^{25}Mn with electronic configuration, $[\text{Ar}] 3d^5 4s^2$, has the highest oxidation state of +7.

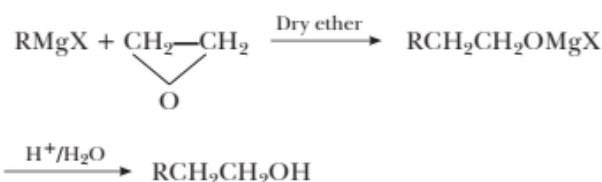
25. (b) The electronic configuration of Ag in the ground and excited state is $[\text{Kr}] 4d^{10} 5s^1$ and $[\text{Kr}] 4d^{10}$ respectively. Hence, the number of unpaired electron is 0.

26. (a) SO_2 bleaches coloured material by reduction and hence bleaching is temporary since when the bleached colourless material is exposed to air, it gets oxidised and the colour is restored.



35. (d) Flipping takes place rapidly and therefore, isolation of the two forms is not possible.

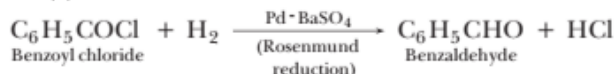
36. (d)



37. (c) Fructose belongs to D-series and is a laevorotatory compound. It is appropriately written as D-(-)-fructose. It is also called, levulose, after its laevorotatory property of rotating plane polarised light to the left.

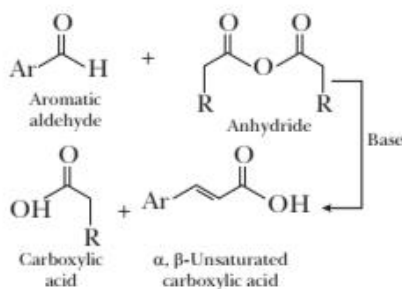
38. (a) Since chloride ion is a very good leaving group and therefore MeCOCl is the most susceptible to nucleophilic attack at the carbonyl group.

39. (b)

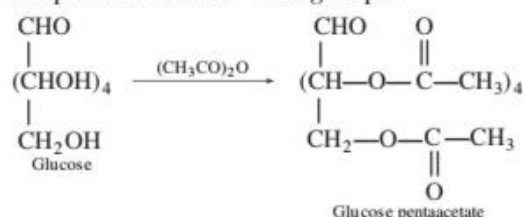


40. (a) Ofloxacin is a bactericidal antibiotic while others are bacteriostatic *i.e.*, suppress the multiplication of bacteria.

in presence of a base (i.e., sodium salt of the acid from which the anhydride is derived) to form α, β -unsaturated acid.

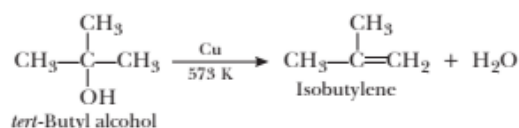


33. (b) Glucose gives pentaacetate derivative on acetylation with acetic anhydride. This confirms the presence of five $-\text{OH}$ groups.

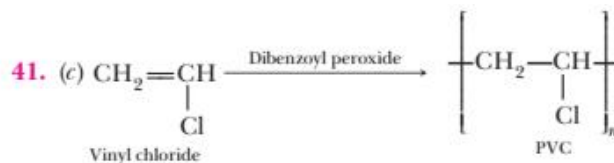
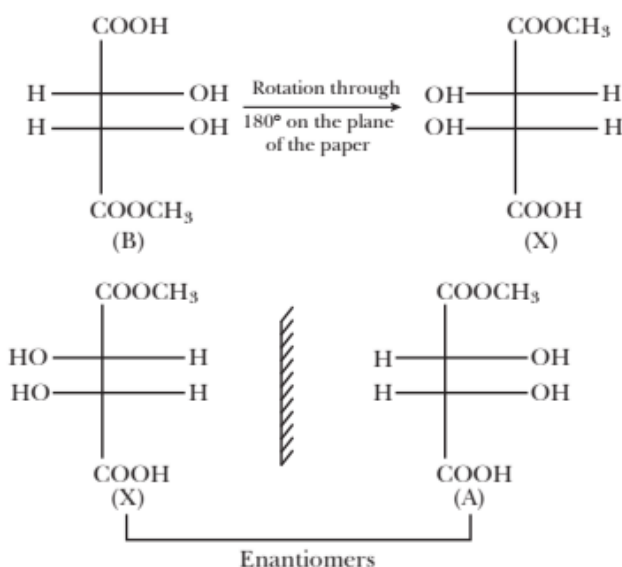


34. (d) Polyesters are the polycondensation products of dicarboxylic acids and diols. The formation of terylene or dacron by the interaction of ethylene glycol and terephthalic acid is an example of this type of polymerisation.

45. (d) Tertiary alcohols undergo dehydration to give alkenes.

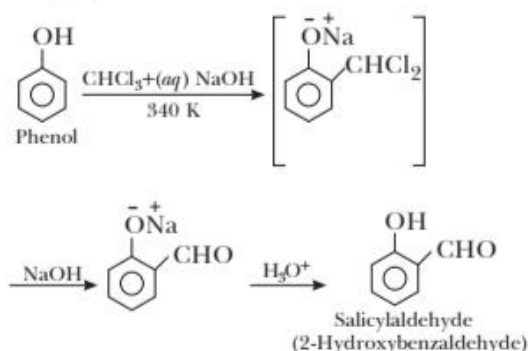


46. (d)



42. (d) IUPAC name : 3-keto-2-methyl-hex-4-enal

44. (b) Reimer-Tiemann reaction: Treatment of phenol with chloroform in the presence of sodium hydroxide followed by hydrolysis of resulting product gives *o*-hydroxybenzaldehyde (salicylaldehyde) as a major product.



47. (c) 2, 4, 6-trinitrophenol, benzoic acid and benzene sulphonic acid are soluble in NaHCO_3 . This reaction is possible in the forward direction if acid is more acidic than H_2CO_3 . *o*-nitrophenol is less acidic than H_2CO_3 . Hence, it is not soluble in NaHCO_3 .

48. (d) $\text{C}_6\text{H}_5\text{NH}_2$ is least basic because due to resonance, unshared electrons on nitrogen in aromatic amines are less available for sharing with a proton.

49. (a) There are 4 possible structural isomers for $\text{C}_3\text{H}_9\text{N}$

