

PRACTICE PAPER

25

Time allowed: 45 minutes

Maximum Marks: 200

General Instructions: Same as Practice Paper-1.

Choose the correct option.

- The temperature coefficient of most of the reactions lies between
 (a) 2 and 4 (b) 2 and 3
 (c) 1 and 3 (d) 1 and 4
- Freundlich adsorption isotherm is numerically represented as
 (a) $\frac{x}{m} = k \log p$ (b) $\frac{x}{m} = kp^{\frac{1}{n}}$
 (c) $\frac{x}{m} = \log k + n \log p$ (d) $\frac{\log x}{m} = kp^n$
- The sharp melting point of crystalline solids is due to _____.
 (a) a regular arrangement of constituent particles observed over a short distance in the crystal lattice.
 (b) a regular arrangement of constituent particles observed over a long distance in the crystal lattice.
 (c) same arrangement of constituent particles in different directions.
 (d) different arrangement of constituent particles in different directions.
- At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is _____.
 (a) less than the rate of crystallisation
 (b) greater than the rate of crystallisation
 (c) equal to the rate of crystallisation
 (d) zero

5. Match the terms given in Column I with the units given in Column II.

Column I	Column II
A. Δ_m	(i) S cm^{-1}
B. E_{cell}	(ii) m^{-1}
C. κ	(iii) $\text{S cm}^2 \text{mol}^{-1}$
D. G^*	(iv) V

- (a) A-(iii), B-(i), C-(ii), D-(iv) (b) A-(iii), B-(iv), C-(i), D-(ii)
 (c) A-(ii), B-(i), C-(iii), D-(iv) (d) A-(i), B-(ii), C-(iii), D-(iv)
6. In the hydrogenation of oils, the catalyst used is
 (a) Iron (b) Copper
 (c) Nickel (d) Molybdenum

7. The half-life period of a first order reaction is 100 minutes. The amount left after 400 minutes from 2 g substance will be
[Given: $\text{Antilog } 1.2036 = 1.875$]
(a) 0.1 g (b) 0.25 g
(c) 0.75 g (d) 0.125 g
8. When zinc is added to CuSO_4 solution, copper gets precipitated. This is because of
(a) reduction of Zn (b) reduction of Cu^{2+}
(c) hydrolysis of CuSO_4 (d) reduction of SO_4^{2-}
9. If 5.85 g of NaCl is dissolved in 90 g of water, then the mole fraction of solute is
(a) 0.1 (b) 0.2 (c) 0.01 (d) 0.0196
10. Given below are two statements labelled as Assertion and Reason:
Assertion (A) : Semiconductors are solids with conductivities in the intermediate range from $10^{-6} - 10^4 \text{ ohm}^{-1} \text{ m}^{-1}$.
Reason (R) : Intermediate conductivity in semiconductor is due to partially filled valence band.
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.
11. Structure of a mixed oxide is cubic close packed (ccp). The cubic unit cell of mixed oxide is composed of oxide ions. One fourth of the tetrahedral voids are occupied by divalent metal A and the octahedral voids are occupied by a monovalent metal B. The formula of the oxide is
(a) ABO_2 (b) A_2BO_2 (c) $\text{A}_2\text{B}_3\text{O}_4$ (d) AB_2O_2
12. The concentration of a cane-sugar solution which is isotonic with 0.86% solution of urea (mol. wt. = 60 g/mol) is
(a) 4.9% (b) 3% (c) 5.8% (d) 8.4%
13. A solution containing one mole per litre of each $\text{Cu}(\text{NO}_3)_2$, AgNO_3 , $\text{Hg}(\text{NO}_3)_2$ and $\text{Mg}(\text{NO}_3)_2$ is being electrolysed by using inert electrodes. The values of standard electrode potentials (reduction potential) in volts are $\text{Ag}^+/\text{Ag} = +0.80$; $\text{Hg}_2^{2+}/\text{Hg} = +0.79$; $\text{Cu}^{2+}/\text{Cu} = +0.34$; $\text{Mg}^{2+}/\text{Mg} = -2.37$. With increasing voltage, the sequence of deposition of metals on the cathode will be
(a) Ag, Hg, Cu, Mg (b) Mg, Cu, Hg, Ag
(c) Hg, Ag, Cu, Mg (d) Cu, Hg, Ag, Mg
14. A zero order reaction is the one
(a) in which the reactants don't react.
(b) in which one of the reactant is taken in large excess.
(c) in which rate does not change with the concentration of the reactant.
(d) in which difference between concentration of reactant and product is equal to zero.
15. Four metals A, B, C and D have standard electrode potentials -3.05 , -1.66 , -0.40 and $+0.80$ V, respectively. The metal that will be most reactive is
(a) A (b) B (c) C (d) D
16. The simple Galvanic cell is :
(a) Fuel cell (b) Daniel cell
(c) Mercury cell (d) Lead accumulator
17. Which of the following alkyl halides will undergo $\text{S}_\text{N}1$ reaction most readily?
(a) $(\text{CH}_3)_3\text{C}-\text{F}$ (b) $(\text{CH}_3)_3\text{C}-\text{Cl}$
(c) $(\text{CH}_3)_3\text{C}-\text{Br}$ (d) $(\text{CH}_3)_3\text{C}-\text{I}$

18. The outer electronic configuration of copper is
 (a) $3d^{10} 4s^1$ (b) $3d^9 4s^2$ (c) $3d^{10} 4s^0$ (d) $3d^{10} 4s^2$
19. Which of the following ion in aqueous solution has orange colour?
 (a) $\text{Cr}_2\text{O}_7^{2-}$ (b) Cr^{3+} (c) MnO_4^- (d) CrO_4^{2-}
20. The oxidation number of Pt in $[\text{Pt}(\text{C}_2\text{H}_4)\text{Cl}_3]^-$ is
 (a) + 1 (b) + 2 (c) + 3 (d) + 4
21. The most electropositive metals are isolated from their ores by
 (a) high temperature reduction with carbon (b) self reduction
 (c) thermal decomposition (d) electrolytic reduction
22. Which of the following is isoelectronic pair?
 (a) ICl_2 , ClO_2 (b) BrO_2^- , BrF_2^-
 (c) ClO_2 , BrF (d) CN^- , O_3
23. The correct order of electron affinity of the given elements is
 (a) $\text{O} > \text{S} > \text{Se} > \text{Te} > \text{Po}$ (b) $\text{S} > \text{O} > \text{Se} > \text{Te} > \text{Po}$
 (c) $\text{S} > \text{Se} > \text{Te} > \text{Po} > \text{O}$ (d) $\text{Po} > \text{Te} > \text{Se} > \text{S} > \text{O}$
24. Which of the following properties is shown by the transition elements?
 (a) They exhibit inert pair effect. (b) They exhibit variable oxidation states.
 (c) They have low melting points. (d) They do not show catalytic activity.
25. In the equation $4\text{M} + 8\text{CN}^- + 2\text{H}_2\text{O} + \text{O}_2 \longrightarrow 4[\text{M}(\text{CN})_2]^- + 4\text{OH}^-$, the M is
 (a) copper (b) iron (c) gold (d) zinc
26. Given below are two statements labelled as Assertion and Reason:
Assertion (A) : $[\text{Ni}(\text{CN})_4]^{2-}$ is square planar and diamagnetic.
Reason (R) : It has no unpaired electrons due to presence of strong ligand.
 (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
 (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
 (c) Assertion is correct statement but reason is wrong statement.
 (d) Assertion is wrong statement but reason is correct statement.
27. The correct structure of $\text{Fe}(\text{CO})_5$ is
 (a) octahedral (b) tetrahedral
 (c) square pyramidal (d) trigonal bipyramidal
28. Which of the compound is formed in the following reactions?
 $\text{Xe} + \text{F}_2 \xrightarrow{\text{Ni-vessel}}$
 (1 : 20 vol)
 (a) XeF_2 (b) XeF_4 (c) XeF_6 (d) XeO_3
29. The product formed when SO_2 is passed through the solution of H_2S is
 (a) H_2SO_5 is formed (b) sulphur is precipitated
 (c) H_2SO_3 is formed (d) $\text{H}_2\text{S}_2\text{O}_2$ is formed
30. The $\text{Cl}-\text{C}-\text{Cl}$ angle in 1, 1, 2, 2-tetrachloroethene and tetrachloromethane will be about
 (a) 120° and $109^\circ 28'$ (b) 90° and 109.5° (c) 109.5° and 90° (d) 109.5° and 120°
31. The replacement of chlorine of chlorobenzene to give phenol requires drastic conditions but chlorine of 2, 4-dinitrochlorobenzene is readily replaced since
 (a) NO_2 makes the ring electron rich at *o*- and *p*.
 (b) NO_2 withdraws electrons from the *m*-position.
 (c) NO_2 donates electrons at *m*-position.
 (d) NO_2 withdraws electrons from *o*- and *p*-positions.

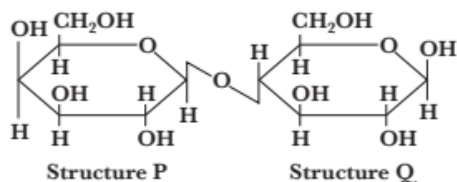
- 32. Phenol and benzoic acid may be distinguished by their reaction with :**
 (a) Aqueous NaOH (b) Aqueous NaHCO_3
 (c) AgNO_3 sol (d) Aqueous NH_3
- 33. Which of the following is an example of aldohexose?**
 (a) Sucrose (b) Glucose
 (c) Fructose (d) Lactose
- 34. Reaction of nitrous acid with aliphatic primary amine in cold gives**
 (a) a diazonium salt (b) an alcohol
 (c) a nitrite (d) a dye
- 35. Ethanol is converted into ethoxy ethane**
 (a) by heating excess of ethanol with conc. H_2SO_4 at 140°C .
 (b) by heating Ethanol with excess of conc. H_2SO_4 at 443 K .
 (c) by treating with conc. H_2SO_4 at room temperature.
 (d) by treating with conc. H_2SO_4 at 273 K .
- 36. Which of the following compounds is optically active?**
 (a) butan-1-ol (b) butan-2-ol
 (c) propan-1-ol (d) propan-2-ol
- 37. Which element is not present in Saccharin, an artificial sweetener ?**
 (a) C (b) P (c) S (d) N
- 38. Which of the following is a thermosetting plastic?**
 (a) PVC (b) PVA
 (c) Bakelite (d) Perspex
- 39. On oxidation with nitric acid, glucose yields**
 (a) monocarboxylic acid (b) dicarboxylic acid
 (c) tricarboxylic acid (d) none of these
- 40. Of the following reactions, formic and acetic acid differ in which respect?**
 (a) Replacement of hydrogen by sodium (b) Formation of ester with alcohol
 (c) Reduction of Fehling solution (d) Blue litmus reaction
- 41. Benzaldehyde can be prepared by the hydrolysis of :**
 (a) Benzyl chloride (b) Benzal chloride
 (c) Benzotrichloride (d) Benzonitrile
- 42. Given below are two statements labelled as Statement P and Statement Q:**

Statement P : In order to convert R-Cl to pure R-NH_2 , Gabriel-phthalimide synthesis can be used.

Statement Q : With proper choice of alkyl halides, phthalimide synthesis can be used to prepare 1° , 2° or 3° amines.

- (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

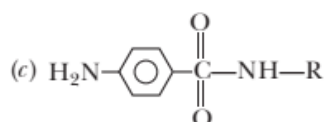
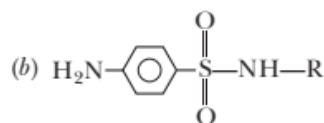
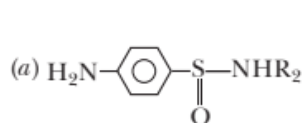
43.



Structure R is formed by joining structure P and Q, so give the names of P, Q, R.

- (a) P = α - D (+) glucose, Q = β - D (+) galactose, R = α (+) lactose
 (b) P = β - D (+) galactose, Q = α - D (+) glucose, R = α (+) lactose
 (c) P = α - D (+) glucose, Q = α - D (+) galactose, R = α (+) lactose
 (d) P = β - D (+) galactose, Q = β - D (+) glucose, R = β - D (+) lactose

44. Which of the following is the structure of sulphonamide drugs?



(d) All of the above

45. $\text{F}_2\text{C} = \text{CF}_2$ is a monomer of:

(a) Teflon

(b) Glyptal

(c) Nylon-6, 6

(d) Buna-S

46. The enolic form of acetone contains

(a) 9 σ bond, 1 π bond, 2 lone pairs

(b) 8 σ bond, 2 π bond, 1 lone pair

(c) 10 σ bond, 1 π bond, 2 lone pairs

(d) 9 σ bond, 2 π bond, 1 lone pair

47. Strongest acid among the following is

(a) *o*-methoxyphenol

(b) *p*-methoxyphenol

(c) *m*-methoxyphenol

(d) phenol

48. Which of the following ethers is not cleaved by HI?

(a) Dicyclohexyl ether

(b) Phenetole

(c) Di-*tert*-butyl ether

(d) Diphenyl ether

49. The order of basicity of

(I) *p*-Methylaniline

(II) *m*-Methylaniline

(III) Aniline

(IV) *o*-Methylaniline

(a) (I) > (II) > (III) > (IV)

(b) (I) > (II) > (IV) > (III)

(c) (IV) > (I) > (II) > (III)

(d) (II) > (I) > (IV) > (III)

50. An organic compound $\text{C}_3\text{H}_6\text{O}$ does not give a precipitate with 2, 4-dinitrophenyl hydrazine reagent and does not react with metallic sodium. It would be

(a) $\text{CH}_3\text{CH}_2\text{CHO}$

(b) $\text{CH}_2=\text{CH}-\text{CH}_2\text{OH}$

(c) CH_3COCH_3

(d) $\text{CH}_2=\text{CH}-\text{O}-\text{CH}_3$

Answers

PRACTICE PAPER – 5

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

Solutions

PRACTICE PAPER – 5

1. (b) Temperature coefficient (n)

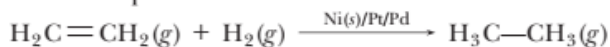
$$= \frac{\text{Rate ionstant at } T + 10^\circ}{\text{Rate ionstant at } T^\circ}$$

For most of the reactions, the temperature coefficient lies between 2 and 3.

2. (b) Freundlich adsorption isotherm gives the relationship between magnitude of adsorption (x/m) and pressure at a constant temperature.

It can be expressed as $\frac{x}{m} = kp^{\frac{1}{n}}$

6. (c) Hydrogenation of unsaturated organic compounds.



7. (d) Given $t_{1/2} = 100$ minutes

$$t = 400 \text{ mins}$$

For first order reaction,

$$t_{1/2} = \frac{0.693}{k} \quad \dots(i)$$

$$k = \frac{2.303}{t} \log \frac{a}{a-x} \quad \dots(ii)$$

\therefore From equation(i) and(ii), we get

$$\frac{0.693}{100} = \frac{2.303}{400} \log \frac{2}{2-x}$$

$$1.2036 = \log \frac{2}{2-x}$$

$$\text{Antilog } 1.2036 = \frac{2}{2-x}$$

$$\Rightarrow 15.98 = \frac{2}{2-x}$$

$$\Rightarrow 1.875 = x$$

\therefore Amount left = 0.125 g

8. (b) Zinc being more reactive than copper, displaces copper from CuSO_4 solution. Therefore, when Zn is added to copper sulphate solution, zinc is oxidised to zinc sulphate and copper ions get reduced to form copper.

The reaction is as follows:



9. (d) $n_{\text{NaCl}} = \frac{m_{\text{NaCl}}}{M_{\text{NaCl}}}$, where m = Mass,

M = Molecular mass

$$= \frac{5.85}{58.5} = 0.1 \text{ moles}$$

$$n_{\text{H}_2\text{O}} = \frac{m_{\text{H}_2\text{O}}}{M_{\text{H}_2\text{O}}} = \frac{90}{18} = 5 \text{ moles}$$

$$\chi = \frac{0.1}{0.1 + 5} = 0.0196$$

10. (c) The correct reason is there is a small energy gap between filled valence band and conduction band.

11. (d) Number of atoms in $\text{ccp} = 4 = \text{O}^{2-}$

Number of tetrahedral voids $= 2 \times 4 = 8$

So, number of A^{2+} ions $= 8 \times \frac{1}{4} = 2$

Number of octahedral voids = Number of B^+ ion = 4

So, Ratio, $\text{O}^{2-} : \text{A}^{2+} : \text{B}^+$

4 : 2 : 4

2 : 1 : 2

Hence, formula of oxide $= \text{AB}_2\text{O}_2$

12. (a) Molar concentration of cane sugar

$$= \frac{W_{\text{cane sugar}}}{342 \times 100} \times 1000 \quad \dots(i)$$

Molar concentration of urea

$$= \frac{W_{\text{urea}}}{60 \times 100} \times 1000 \quad \dots(ii)$$

On equating equation (i) and (ii), we get

$$\frac{W_{\text{cane sugar}}}{342} = \frac{0.86}{60}$$

$$W_{\text{cane sugar}} = \frac{0.86}{60} \times 342$$

$$\frac{4.9 \text{ moles}}{100 \text{ mL}} = 4.9\%$$

13. (a) Higher the reduction potential, higher is the tendency of deposition.

14. (c) In zero order reactions, the rate remains constant throughout the course of reaction, i.e., the rate does not change with the change in concentration of reactants.

15. (a) The more negative is the reduction potential of a metal, more easily it can lose electrons and hence greater is its reactivity.

16. (b) Electrochemical cells which convert the chemical energy produced due to indirect redox reaction into electrical energy. The simple galvanic cell is Daniel cell.



17. (d) The reactivity of the halides are

$\text{R-I} > \text{R-Br} > \text{R-Cl} > \text{R-F}$. Hence, $(\text{CH}_3)_3\text{C-I}$ will undergo the reaction most readily.

18. (a) The expected electronic configuration of copper will be $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2$

For extra stability of fully filled d -orbital, one electron from $4s$ -subshell shifts to $3d$ -subshell.

So, the electronic configuration of copper will be $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4s^1$.

19. (a) The colour of the given ions in the aqueous solution is as follows:

$\text{Cr}_2\text{O}_7^{2-} \Rightarrow$ Orange in colour.

$\text{Cr}^{3+} \Rightarrow$ Green in colour.

$\text{MnO}_4^- \Rightarrow$ Purple in colour.

$\text{CrO}_4^{2-} \Rightarrow$ Yellow in colour.

20. (b) Let the oxidation number of Pt be x .

$$x + 0 + 3(-1) = -1$$

Therefore, $x = +2$

21. (d) Electrolytic reduction method is used for highly electropositive metals. e.g. Na, K, Mg, Al, etc.

22. (b) Isoelectronic pair means electrons same number of valence

No. of valence electrons in BrO_2^-	No. of valence electrons in BrF_2^-
$35 + 2 \times 8 + 1$	$35 + 2 \times 9 - 1$
$35 + 17 = 52$	$35 + 17 = 52$

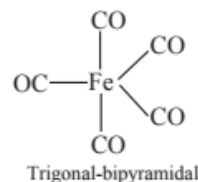
23. (c) The electron affinity decreases down the group. But, due to small size of the oxygen atom, the electron-electron repulsion in the relatively small $2p$ -subshell are comparatively large and therefore it has less electron affinity. Thus, the correct order is

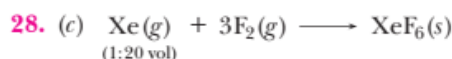
$\text{S} > \text{Se} > \text{Te} > \text{Po} > \text{O}$

24. (b) Transition elements exhibits variable oxidation states as $(n-1)d$ and ns orbitals have comparable energies so that electrons electrons both can take part in bonding.

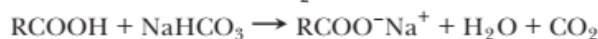
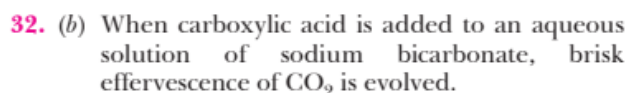
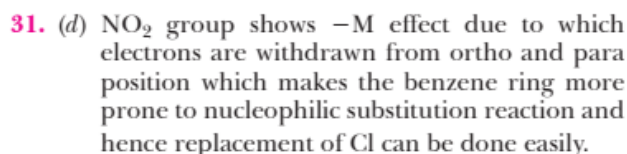
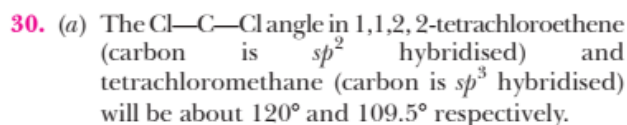
25. (c) M can be silver or gold. When native silver or gold is treated with a dilute solution (0.5%) of sodium or potassium cyanide, they go into the solution forming a soluble complex. From this soluble complex, metal is precipitated by adding zinc.

27. (d) The correct structure of $\text{Fe}(\text{CO})_5$ with hybridisation dsp^3 is trigonal bipyramidal.

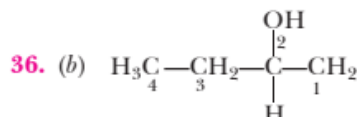
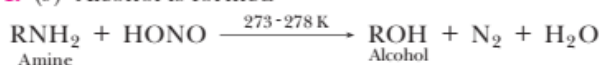
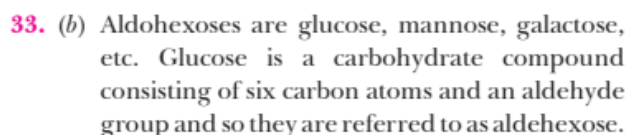




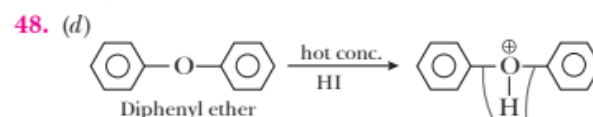
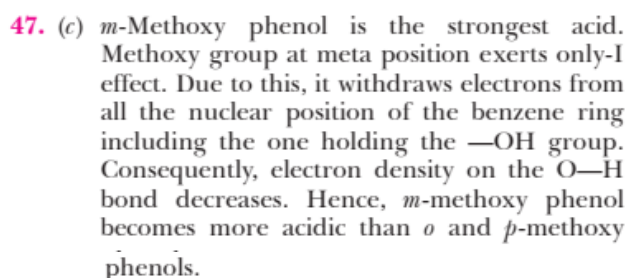
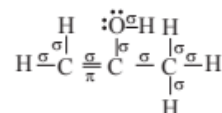
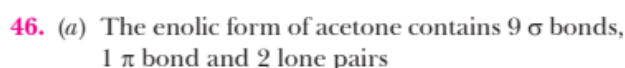
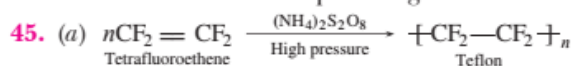
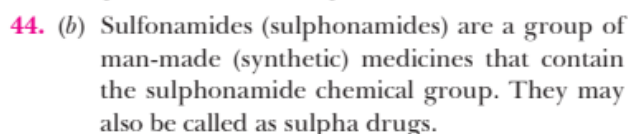
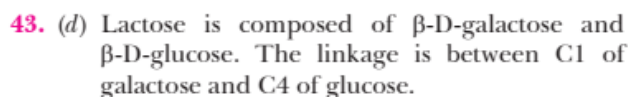
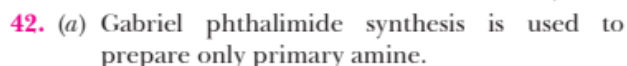
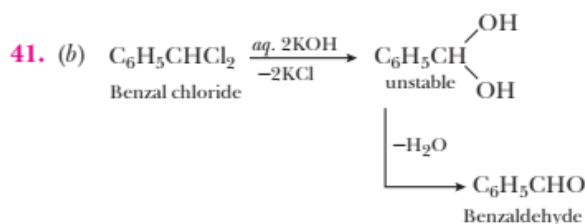
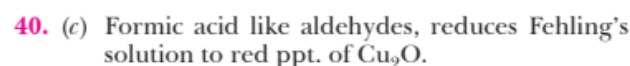
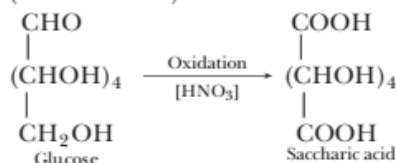
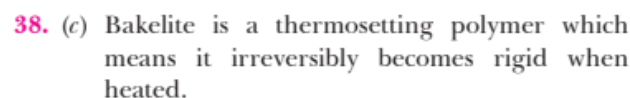
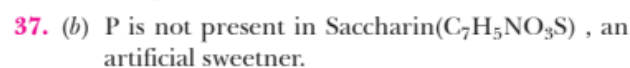
Sulphur precipitate is formed, when SO_2 is passed through the solution of H_2S .



Phenols and alcohols do not give this test.



Asymmetric carbon atom so optically active compound



Not break this bond due to double bond character because of resonance between the lone pair of electrons on the O atom and the C atom of the aryl group.

