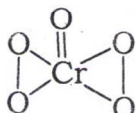
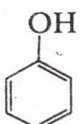
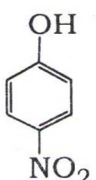


# CHEMISTRY

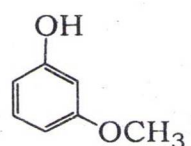
1. The order of reactivity for the following alcohols with halogen is  
 a)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$       b)  $\text{CH}_3\text{CH}_2-\underset{\text{CH}_3}{\text{CH}}-\text{OH}$       c)  $\text{CH}_3\text{CH}_3-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{OH}$   
 A)  $a > b > c$       B)  $c > b > a$       C)  $b > a > c$       D)  $a > c > b$
2.  $\text{CrO}_5$  has structure as shown . The oxidation number of chromium in the above compound is  
 A) 4      B) 5      C) 6      D) 10
3. Of the following, the compound which undergoes self-aldol condensation in the presence of cold dilute alkali is  
 A)  $\text{CH}_2=\text{CH}-\text{CHO}$       B)  $\text{CH}\equiv\text{C}-\text{CHO}$       C)  $\text{C}_6\text{H}_5\text{CHO}$       D)  $\text{CH}_3\text{CH}_2\text{CHO}$
4. Which one of the following is correctly matched?  
 A) Solid sol-cake      B) Aerosol-smoke  
 C) Foam-mist      D) Emulsion-curd
5. In  $(\text{CH}_3)_3\text{N}$ , the state of hybridisation of N atom and the spatial arrangement of methyl groups around it are respectively  
 A)  $\text{sp}^3$ -pyramidal      B)  $\text{sp}^3$ -tetrahedral  
 C)  $\text{sp}^2$ -trigonal planar      D)  $\text{sp}^3$ -trigonal planar.
6. In fructose, the possible optical isomers are  
 A) 12      B) 8      C) 16      D) 4
7. The volume of 10 vol.  $\text{H}_2\text{O}_2$  required to liberate  $500 \text{ cm}^3$  of  $\text{O}_2$  at STP is  
 A) 50 ml      B) 5.0 ml      C) 15 ml      D) 100 ml
8. For a second order reaction of the type  $\text{A} \rightarrow \text{products}$ ,  $\text{rate} = k[\text{A}]^2$ , the plot of  $[\text{A}]_t$  versus  $t$  is linear with  
 A) positive slope and zero intercept  
 B) positive slope and non-zero intercept  
 C) negative slope and zero intercept  
 D) negative slope and non-zero intercept.
9. The chemical formula of plaster of paris is  
 A)  $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$       B)  $\text{CaSO}_4 \cdot \text{H}_2\text{O}$       C)  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$       D)  $\text{CaSO}_4 \cdot 3\text{H}_2\text{O}$
10. The IUPAC name of  $\text{CH}_3-\text{O}-\text{C}_2\text{H}_5$  is  
 A) ethyl methyl ether      B) methyl ethyl ether  
 C) methoxy ethane      D) ethoxy methane
11. Which among the following alkenes is stable?  
 A)  $\text{CH}_3-\text{CH}=\text{CH}_2$       B)  $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$   
 C)  $(\text{CH}_3)_2\text{C}=\text{C}(\text{CH}_3)_2$       D)  $(\text{CH}_3)_2\text{C}=\text{CHCH}_3$
12. Denaturation of proteins  
 A) disrupts the primary or secondary or tertiary structure of protein.  
 B) disrupts the secondary and tertiary structures only.  
 C) disrupts all primary, secondary, tertiary and even the quaternary structure of protein.  
 D) will not affect the original biological activity.

13. In a cell with the reaction  $\text{Zn(s)} + 2\text{H}^+(\text{aq}) \longrightarrow \text{Zn}^{2+}(\text{aq}) + \text{H}_2(\text{g})$  addition of  $\text{H}_2\text{SO}_4$  to cathode compartment will
- lower the E and shift the equilibrium to the left.
  - increase the E and shift the equilibrium to the left.
  - increase the E and shift the equilibrium to the right.
  - lower the E and shift the equilibrium to the right.
14. In DNA, the complimentary bases are
- adenine and thymine; guanine and uracil
  - adenine and guanine; thymine and cytosine
  - uracil and adenine; cytosine and guanine
  - adenine and thymine; guanine and cytosine.
15. In the compounds of the type  $\text{ECl}_3$ , where E = N, P, As or Bi, the angle  $\text{Cl-E-Cl}$  for different E are in the order
- N > P = As = Bi
  - N > P > As > Bi
  - N > P = As = Bi
  - N < P < As < Bi
16. On heating  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ , the gas evolved is x. The same gas is obtained by heating
- $\text{NH}_4\text{NO}_2$
  - $\text{NH}_4\text{NO}_3$
  - $\text{Mg}_3\text{N}_2 + \text{H}_2\text{O}$
  - $\text{Na}_2\text{O}_2 + \text{H}_2\text{O}$
17. Benzophenone is obtained by the reaction of
- benzoyl chloride + benzene +  $\text{AlCl}_3$
  - benzoyl chloride + hydrogen chloride
  - benzoyl chloride + phenyl magnesium chloride
  - benzene + carbon monoxide +  $\text{ZnCl}_2$
18. When temperature of an ideal gas is increased from  $27^\circ\text{C}$  to  $927^\circ\text{C}$ , the kinetic energy will be
- same
  - increased by eight times
  - increased by four times
  - increased by two times.
19. The carboxylic acid which does not undergo Hell-Volhard Zelinsky reaction is
- $\text{CH}_3\text{COOH}$
  - $\text{CH}_3\text{CH}_2\text{COOH}$
  - $(\text{CH}_3)_2\text{CHCOOH}$
  - $(\text{CH}_3)_3\text{CCOOH}$
20. Heat of combustion of C,  $\text{H}_2$  and  $\text{C}_2\text{H}_6$  are  $-x_1$ ,  $-x_2$  and  $-x_3$  respectively. Hence, heat of formation of  $\text{C}_2\text{H}_6$  is
- $-2x_1 - 3x_2 + x_3$
  - $-x_1 - x_2 + x_3$
  - $-x_3 + 2x_1 + 3x_2$
  - $x_1 + x_2 - x_3$
21. The IUPAC name of  $\text{CH}_3-\underset{\text{Cl}}{\text{CH}}-\text{CH}_2-\text{CH}_2-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$  is
- 2-chloro-5 hydroxyhexane
  - 2-hydroxy-5-chlorohexane
  - 5-chlorohexane-2-ol
  - 2-chlorohexane-5-ol
22. The value of k for the reaction  $\text{H}_2 + \text{I}_2 \rightleftharpoons 2 \text{HI}$  is 49. Then the value of k for the reaction  $2\text{HI} \rightleftharpoons \text{H}_2 + \text{I}_2$  will be
- 49
  - $\frac{1}{49}$
  - 7
  - $\frac{1}{7}$
23. The order of acid strength for the following compounds is
- 

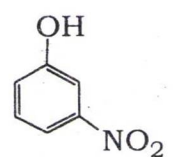
(I)



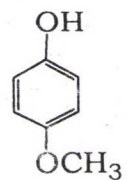
(II)



(III)



(IV)



(V)
- V > IV > II > I > III
  - II > IV > I > III > V
  - IV > V > III > II > I
  - V > IV > III > II > I

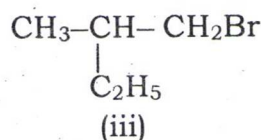
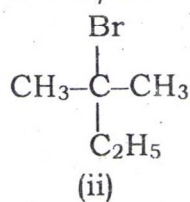
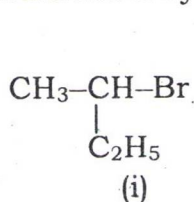


24. The solubility in  $\text{mol dm}^{-3}$  of  $\text{A}_2\text{X}_3$  is  $y$ . Then solubility product is  
 A)  $6y^4$                       B)  $64y^4$                       C)  $36y^5$                       D)  $108y^5$
25. Conc.  $\text{HNO}_3$  oxidises phosphorous to  
 A)  $\text{H}_3\text{PO}_4$                       B)  $\text{P}_2\text{O}_3$                       C)  $\text{H}_3\text{PO}_3$                       D)  $\text{H}_4\text{P}_2\text{O}_7$
26. Substrates which inhibit the catalytic activity of enzymes are called  
 A) competitive inhibitors                      B) non-competitive inhibitors  
 C) inhibitors                      D) non-promoters
27. The percentage of p-character in the orbitals forming p-p bonds in  $\text{P}_4$  is  
 A) 25                      B) 33                      C) 50                      D) 75
28. Which of the following compounds with molecular formula  $\text{C}_5\text{H}_{10}$  yields acetone on ozonolysis?  
 A) 3-methyl-1-butene                      B) cyclopentane  
 C) 2-methyl-1-butene                      D) 2-methyl-2-butene
29. According to Werner's theory, each metal in the co-ordination compound exhibits  
 A) primary valencies satisfied by anions only  
 B) secondary valencies satisfied by donor molecules  
 C) fixed number of secondary valencies  
 D) All of the above.
30. Which one of the following has low heat of fusion?  
 A) a molecular solid                      B) a metallic solid  
 C) an ionic solid                      D) a covalent solid
31. Which of the following does not have a metal-carbon bond?  
 A)  $\text{Al}(\text{OC}_2\text{H}_5)_3$                       B)  $\text{C}_2\text{H}_5\text{MgBr}$   
 C)  $\text{K}[\text{Pt}(\text{C}_2\text{H}_4)\text{Cl}_3]$                       D)  $[\text{Ni}(\text{CO})_4]$
32. Increasing the temperature of an aqueous solution will cause  
 A) decrease in % w/w                      B) decrease in mole fraction  
 C) decrease in molarity                      D) decrease in molality
33. In the silver plating of Cu,  $\text{K}[\text{Ag}(\text{CN})_2]$  is used instead of  $\text{AgNO}_3$ . This is because  
 A) a thin layer of Ag is formed on Cu  
 B) more heat is required  
 C)  $\text{Ag}^+$  ions are completely removed from the solution  
 D) of lower availability of  $\text{Ag}^+$  ion as Cu cannot displace Ag from  $[\text{Ag}(\text{CN})_2]$
34. Which of the following statements is not true for transition metals?  
 A) In the highest oxidation state, the transition metals show basic character and form cationic complexes  
 B) In the highest oxidation state of the first five transition elements (Sc to Mn), all the 4s and 3d electrons are used for bonding.  
 C) Once the  $d^5$  configuration is exceeded, the tendency to involve all the 3d electrons in bonding decreases.  
 D) In addition to the normal oxidation states, the zero oxidation state is also shown by these elements in complexes.
35. A radioactive element gets spilled over the floor of a room. Its half life period is 30 days. If the initial activity is 10 times the permissible value, after how many days will it be safe to enter the room?  
 A) 1000 days                      B) 300 days                      C) 10 days                      D) 100 days
36.  $\text{K}_2\text{Cr}_2\text{O}_7$  reacts with  $\text{NH}_4\text{Cl}$  in presence of conc.  $\text{H}_2\text{SO}_4$ . The product formed is  
 A) chromyl chloride with green colour  
 B) chromous chloride with white colour  
 C) chromous chloride with blue colour  
 D) chromyl chloride with deep red colour.

37. The most common oxidation states shown by Cesium are  
A) +2, +4                      B) +3, +4                      C) +3, +5                      D) +2, +3
38. According to Ellingham's diagram, the oxidation reaction of carbon and carbon monoxide may be used to reduce which one of the following oxides at the lowest temperature?  
A)  $\text{Al}_2\text{O}_3$                       B)  $\text{Cu}_2\text{O}$                       C)  $\text{MgO}$                       D)  $\text{ZnO}$
39. The resistance of 0.1N solution of a salt is found to be  $2.5 \times 10^3$  ohms. The equivalent conductance of the solution is (cell constant =  $1.15 \text{ cm}^{-1}$ ).  
A) 4.6                      B) 5.6                      C) 6.6                      D) 7.6
40. In the electrochemical process for aluminium extraction, the electrolyte used is  
A)  $\text{Al}(\text{OH})_3$  in  $\text{NaOH}$  solution  
B) an aqueous solution of  $\text{Al}_2(\text{SO}_4)_3$   
C) a molten mixture of  $\text{Al}_2\text{O}_3$  and  $\text{Na}_2\text{AlF}_6$   
D) a molten mixture of  $\text{Al}_2\text{O}_3$  and  $\text{Al}(\text{OH})_3$ .
41. The most important property which makes fluorine the strongest oxidizing halogen is  
A) Bond dissociation energy                      B) Ionisation enthalpy  
C) Hydration enthalpy                      D) Electron affinity.
42. The ratio of time for 50% and 90% completion of a first order reaction is  
A) 1:2                      B) 2:3                      C) 3:5                      D) 3:10
43. Which of the following is not the characteristic of interhalogen compounds?  
A) They are more reactive than halogen.  
B) They are quite unstable but none of them is explosive.  
C) They are covalent in nature.  
D) They have low boiling points and are highly volatile.
44. Which one among the following shows anisotropy?  
A) Paper                      B) Wood                      C) Barium chloride                      D) Glass
45. The number of significant figures in 0.0256 is  
A) 5                      B) 3                      C) 4                      D) 2
46. For an ideal binary liquid solution with  $P_A^0 > P_B^0$ , which of the following relations between  $x_A$  (mole fraction of A in liquid phase) and  $y_A$  (mole fraction of A in vapour phase) is correctly represented?  
A)  $x_A$  and  $y_A$  cannot be correlated with each other  
B)  $x_A < y_A$   
C)  $x_A > y_A$   
D)  $x_A = y_A$
47. The ion that is isoelectronic with CO is  
A)  $\text{CN}^-$                       B)  $\text{O}_2^+$                       C)  $\text{O}_2^-$                       D)  $\text{N}_2^+$
48. Which of the following has the largest size?  
A)  $\text{N}^{3-}$                       B)  $\text{O}^{2-}$                       C)  $\text{Na}^+$                       D)  $\text{Mg}^{2+}$
49. Which of the following species exhibits diamagnetic behaviour?  
A)  $\text{O}_2$                       B)  $\text{NO}$                       C)  $\text{O}_2^{2-}$                       D)  $\text{O}_2^+$
50. The complex used as an anti-cancer agent is  
A)  $\text{mer-}[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$                       B)  $\text{cis-}[\text{PtCl}_2(\text{NH}_3)_2]$   
C)  $\text{cis-}[\text{K}_2[\text{PtCl}_2\text{Br}_2]]$                       D)  $\text{Na}_2[\text{CoCl}_4]$
51. A real gas tends to behave more ideally at  
A) low temperature and low pressure  
B) low temperature and high pressure  
C) high temperature and low pressure  
D) high temperature and high pressure



52. Most crystals show good cleavage because their atoms, ions or molecules are  
 A) weakly bonded together  
 B) strongly bonded together  
 C) spherically symmetrical  
 D) arranged in planes.
53. 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)  $\text{NO}_2$
54. A solid dissolves in water if  
 A) dissolution is exothermic  
 B) lattice energy is equal to hydration energy  
 C) lattice energy is less than hydration energy  
 D) lattice energy is greater than hydration energy.
55. Of the following colloids, the one which can be prepared by electrical dispersion method as well as reduction method is  
 A) sulphur sol  
 B) ferric hydroxide sol  
 C) arsenious sulphide sol  
 D) gold sol.
56. The negative sign in the rate of reaction  $-\frac{d[A]}{dt}$  indicates  
 A) decrease in concentration of substance 'A'  
 B) increase in concentration of substance 'A'  
 C) no reaction is occurring  
 D) the rate of reaction is very small.
57. In electrolytic conduction,  
 A) the resistance increases with increasing temperature  
 B) the resistance decreases with increasing temperature  
 C) the flow of current does not generate heat  
 D) the resistance is independent of the length of the conductor.
58. Given  $\text{CH}_3\text{Br} \xrightarrow{\text{KCN}} (\text{A}) \xrightarrow{\text{H}_3\text{O}^+} (\text{B}) \xrightarrow[\text{ether}]{\text{LiAlH}_4} (\text{C})$ . The compound (C) in the above reaction is  
 A) methane  
 B) acetone  
 C) ethyl alcohol  
 D) acetaldehyde
59. Corrosion is  
 A) any reaction in the presence of  $\text{H}_2\text{O}$   
 B) an electrochemical phenomenon  
 C) union between two light metals and a heavy metal  
 D) interaction between  $\text{H}^+$  and  $\text{OH}^-$
60. In the following, the compound(s) which give racemic mixture on nucleophilic substitution by  $\text{OH}^-$  ion is/are



- A) (i) only  
 B) (i), (ii) and (iii)  
 C) (i) and (ii)  
 D) (i) and (iii)

## Answer Key

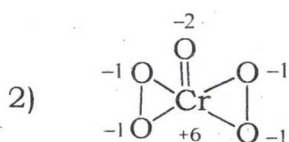
Q.No.	Answer
1.	B
4.	B
7.	A
10.	C
13.	C
16.	A
19.	D
22.	B
25.	A
28.	D
31.	A
34.	A
37.	B
40.	C
43.	D
46.	B
49.	C
52.	D
55.	D
58.	C

Q.No.	Answer
2.	C
5.	A
8.	B
11.	C
14.	D
17.	A
20.	A
23.	B
26.	C
29.	D
32.	C
35.	D
38.	B
41.	C
44.	C
47.	A
50.	B
53.	D
56.	A
59.	B

Q.No.	Answer
3.	D
6.	B
9.	A
12.	B
15.	B
18.	C
21.	C
24.	D
27.	D
30.	A
33.	D
36.	D
39.	A
42.	D
45.	B
48.	A
51.	C
54.	C
57.	B
60.	A

### Answers:

- 1) The order of reactivity of alcohols with a particular halogen acid follows the order:  $3^\circ$  alcohol  $>$   $2^\circ$  alcohol  $>$   $1^\circ$  alcohol.



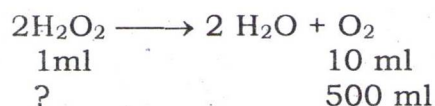
- 3) Aldehydes which contain  $\alpha$ -hydrogen on a saturated carbon i.e.,  $\text{CH}_3\text{CH}_2\text{CHO}$  undergo aldol condensation. Although  $\text{CH}_2=\text{CHCHO}$  contains an  $\alpha$ -H atom, it cannot be easily abstracted by a base to form a carbanion and hence, does not undergo aldol condensation.

- 4) Smoke is an aerosol.

- 5)  $\text{sp}^3$  hybridisation-pyramidal structure.

- 6) Fructose has three chiral centres and hence  $2^3 = 8$  optical isomers are possible.

- 7) 10 vol  $\text{H}_2\text{O}_2$  means



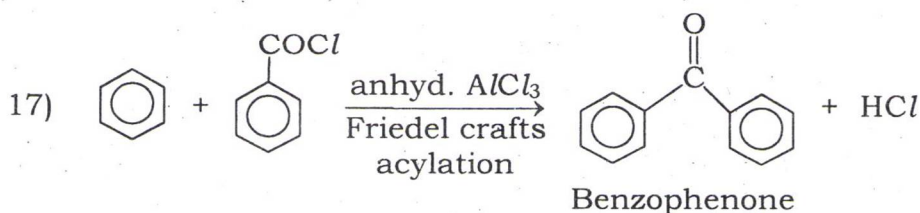
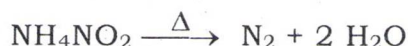
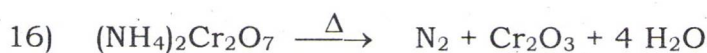
$$\frac{500 \times 1}{10} = 50\text{ ml.}$$



12) On heating or on treatment with mineral acids, the water-soluble globular proteins undergo coagulation or precipitation with the loss of biological activity to give water-insoluble fibrous proteins. This process is called denaturation. During the process, the 2° and 3° structure of the proteins undergo a change while the 1° structure remains intact.

13)  $\text{H}^+$  ions are shown as cathode ions. Increase in concentration of ions increases EMF. Hence EMF of cathode will increase by addition of  $\text{H}_2\text{SO}_4$ . This will increase the EMF of the cell and shift the equilibrium towards the product side i.e., the right side.

15)  $\text{ECl}_3$  is  $\text{sp}^3$  hybridised with one lone pair. The bond angle decreases down the group with increase in the size of E.



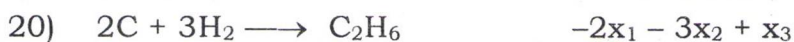
18) Kinetic energy  $\propto T$   $T_1 = 27 + 273 = 300 \text{ K}$   
i.e.,  $\text{KE} \propto T$   $T_2 = 927 + 273 = 1200 \text{ K}$

$$\frac{\text{KE}_1}{\text{KE}_2} = \frac{T_1}{T_2} = \frac{300}{1200} = \frac{1}{4}$$

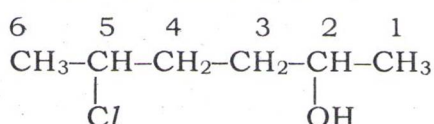
$$\therefore \text{KE}_2 = 4 \times \text{KE}_1.$$

19) Carboxylic acids having an  $\alpha$ -H react with  $\text{Cl}_2/\text{Br}_2$  in the presence of red phosphorus to give  $\alpha$ -chloro or  $\alpha$ -bromo acids. This reaction is called Hell-Volhard-Zelinsky (HVZ) reaction.

$(\text{CH}_3)_3\text{C COOH}$  does not contain  $\alpha$ -H and hence, does not give HVZ reaction.



21) 5-chlorohexane-2-ol



22) The value of K for reverse reaction is equal to inverse of equilibrium constant for forward reaction.

23) Both p-nitrophenol (II) and m-nitrophenol (IV) are stronger acids than phenol (I) due to the presence of the electron-withdrawing  $-\text{NO}_2$  group. However, due to the combined effect of  $-I$  and  $-R$  effect of the  $-\text{NO}_2$  group at the p-position, p-nitrophenol (II) is more acidic than m-nitrophenol which exerts only  $I$  effect at m-position.

Electron-releasing  $-\text{OCH}_3$  group decreases the acidity of phenol but  $-\text{OCH}_3$  group at meta position with respect to the  $-\text{OH}$  group cannot exert  $+R$  effect but can exert only  $-I$  effect. Therefore, m-methoxy phenol (III) is a stronger acid than phenol. In contrast, at p-position,  $-\text{OCH}_3$  group with its  $+R$  effect makes p-methoxy phenol (V) a weaker acid than phenol (I).

$\therefore$  Acid strength order is  $\text{II} > \text{IV} > \text{I} > \text{III} > \text{V}$ .



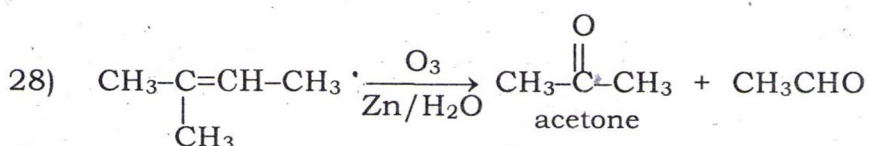
$$K_{\text{SP}} = [\text{A}^{3+}]^2 [\text{X}^{2-}]^3 = (2y)^2 (3y)^3 = 108 y^5.$$



27)  $P_4$  is a tetrahedral molecule. P is  $sp^3$  hybridised.

$sp^3$  – 100%

$p^3$  – 75%.



29) All the four are postulates of Werner's theory.

32) On increasing the temperature, volume of solution increases. Hence, molarity decreases.

33) Electrochemical series.

34) In the highest oxidation state, transition metals say  $\text{Mn}_2\text{O}_7$ ,  $\text{CrO}_3$  show acidic nature. The cationic complexes are however in higher and lower oxidation state.

35) A radioactive disintegration reaction is always of first order.

$$[A]_0 = 10[A] \quad t_{1/2} = 30 \text{ days}$$

$$k = \frac{0.693}{t_{1/2}} = \frac{0.693}{30}$$

$$t = \frac{2.303}{k} \log \frac{[A]_0}{[A]}$$

$$= \frac{2.303}{\frac{0.693}{30}} \log \frac{10[A]}{[A]}$$

$$= \frac{2.303}{0.693} \times 30 \times \log 10$$

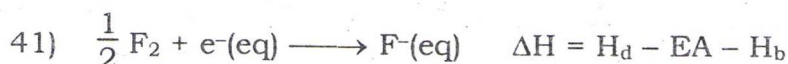
$$= 99.7 \approx 100 \text{ days.}$$

37)  $_{58}\text{Ce} = [\text{Xe}]4f^15d^16s^2$ , i.e., +3 and +4 oxidation states.

39) Specific conductivity = Observed conductivity  $\times$  cell constant

$$= \frac{1}{2.5 \times 10^3} \times 1.15 = 4.6 \times 10^{-4}$$

$$\lambda = \frac{k \times 1000}{\text{Normality}} = \frac{4.6 \times 10^{-4} \times 1000}{0.1} = 4.6 \text{ ohm}^{-1} \text{ cm}^2 \cdot \text{g} \cdot \text{eq}^{-1}$$



Heat of hydration being exothermic and maximum for fluorine because of its smaller size and hence, more negative value for  $\Delta H$  is obtained for reduction of  $\text{F}_2$ . Thus  $\text{F}_2$  is a strong oxidant.

42) 50% completion =  $t_1$ , 90% completion =  $t_2$

$$t_1 = \frac{0.693}{k} = \frac{2.303 \times 0.301}{k} \quad t_2 = \frac{2.303}{k} \log \frac{100}{10} = \frac{2.303}{k}$$

$$t_1 : t_2$$

$$\frac{2.303 \times 0.301}{k} : \frac{2.303}{k} = 0.301 : 1$$

$$= 301 : 1000$$

$$= 3 : 10$$

43) Choices A to C are the characteristics of interhalogen compounds.

45) Zeros to the left of the first non-zero digit in the number are not significant.

46) As  $P_A^0 > P_B^0$ , A is more volatile and hence  $y_A > x_A$  or  $x_A < y_A$ .



47) Isoelectronic species are those which contain the same number of electrons.

$$\text{CO} \quad 6 + 8 = 14$$

$$\text{CN}^- \quad 6 + 7 + 1 = 14$$

$$\text{O}_2^+ \quad 8 \times 2 - 1 = 15$$

$$\text{O}_2^- \quad 8 \times 2 + 1 = 17$$

$$\text{N}_2^+ \quad 7 \times 2 - 1 = 13$$

48) For isoelectronic species, size of cation < neutral < anion. Effective nuclear charge of  $\text{N}^{3-}$  is the highest and its size will be the largest.

49)  $\text{O}_2$ , NO and  $\text{O}_2^+$  contain unpaired electrons in ABMO. Hence paramagnetic.

In  $\text{O}_2^{2-}$  (18 electrons) all electrons are paired in MO. Hence diamagnetic.

50) Cis -  $[\text{Pt Cl}_2(\text{NH}_3)_2]$  called cis-platin.

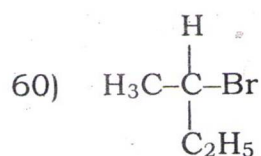
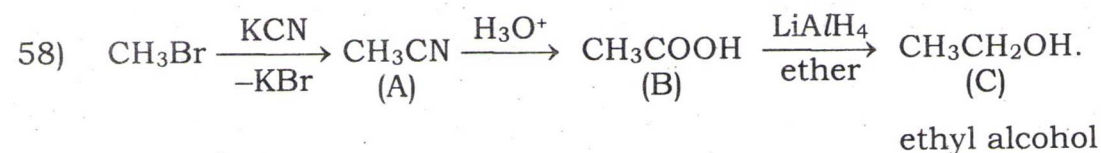
52) Crystals show good cleavage because their constituent particles are arranged in planes.

53)  $\text{NO}_2$  does not contain unpaired electrons as it exists as  $\text{N}_2\text{O}_4$ , a dimer.

54) A solid dissolves in water if lattice energy is less than hydration energy.

55) Gold sol is obtained by Bredig's arc method as well as by reduction of  $\text{AuCl}_3$  with  $\text{SnCl}_2$ .

57) On increasing the temperature, the ions in the solution move faster.



contains a chiral carbon and gives a racemic mixture on nucleophilic substitution ( $\text{S}_\text{N}$ ) by  $\text{OH}^-$  ions.