

..... SCHOOL, TIRUVALLA  
SECOND TERMINAL EXAMINATION DEC 2019-20  
CHEMISTRY

PAPER - 1

MARKS : 70

Class: XI

Time: 3 hours

(Candidates are allowed additional 15 minutes for only reading the paper.  
They must NOT start writing during this time.)

All questions are compulsory.

Question 1 is of 20 marks having four sub parts, all of which are compulsory.

Question numbers 2 to 8 carry 2 marks each..

Question numbers 9 to 15 carry 3 marks each

Question numbers 16 to 18 carry 5 marks each.

QUESTION -1

(a) Fill in the blanks:

- (i) Ozonolysis of 2- methyl but -2- ene shall give ----- and -----
- (ii) Formic acid is ----- acidic than acetic acid due to ----- effect.
- (iii) Solution of sodium acetate is ----- in nature due to ----- hydrolysis.
- (iv) Ammonia is ----- hybridised with ----- shape.

(b) Choose the correct option:

- (i) Nucleophiles are  
(a) Lewis acid (b) Lewis base (c) amphoteric (d) none of these
- (ii) The reaction  $\text{CH}_3\text{Br} + \text{OH}^- \rightarrow \text{CH}_3\text{OH} + \text{Br}^-$  follows  
(a)  $\text{S}_\text{N}1$  Mechanism (b)  $\text{S}_\text{N}2$  Mechanism (c) Either of the above two (d) None
- (iii) For the reaction  $\text{CO}_{(\text{g})} + \text{Cl}_{2(\text{g})} \leftrightarrow \text{COCl}_{2(\text{g})}$   $K_\text{p}/K_\text{c}$  is equal to  
(a)  $\sqrt{RT}$  (b)  $RT$  (c)  $1/RT$  (d) 1
- (iv) The conjugate base of  $\text{OH}^-$  is  
(a)  $\text{O}^{2-}$  (b)  $\text{O}^-$  (c)  $\text{H}_2\text{O}$  (d)  $\text{O}_2$

- (i) Huckels rule
- (ii) Kharasch effect
- (iii) Phenolphthalein
- (iv) Methyl orange

Weak base against strong acid  
 Aromaticity  
 organic peroxide  
 Weak acid against strong base

(c) Answer the following:

- (i) Write the balanced chemical equation for the following name reaction:
  - (a) Friedal craft alkylation
  - (b) Sulphonation of benzene
- (ii) (a) Cis 2-butene has lower melting point than trans - 2-butene. Explain  
 (b) Draw the structure of an alkene X which on reductive ozonolysis gave propan-2-one and ethanol
- (iii) State Le Chatliers principle. For the reaction  $N_2 + 3H_2 \rightleftharpoons 2NH_3 + \Delta$ . How is the equilibrium affected when
  - (a) Temperature is decreased
  - (b) Addition of nitrogen gas at constant pressure
- (iv) Give reasons for the following:
  - (a) O- nitro phenol is volatile but P- nitro phenol is not
  - (b) AgI is more covalent in character than AgCl

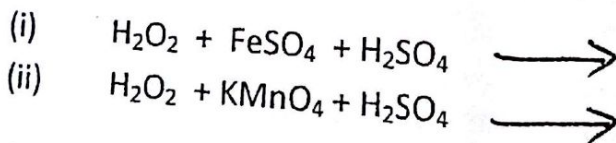
PART - II

QUESTION - 2

Write the balanced chemical equations to show water acts as oxidising as well as Reducing agent

QUESTION - 3

Complete and balance the following equation:



QUESTION - 4

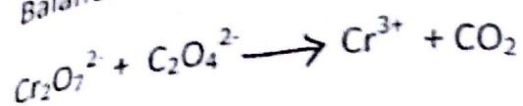
Give balanced equation for the following conversions:

- (i) Phenol to benzene
- (ii) Ethene to ethylene glycol

QUESTION - 5

- (a) Give two differences between sigma and pi bonding
- (b) On the basis of molecular orbital theory which is more stable  $O_2^-$  or  $N_2^+$

Balance the following redox reaction in acidic medium



### QUESTION - 7

- State VSEPR theory
- What is the hybridisation and geometry of sulphur in  $\text{SF}_6$

### QUESTION - 8

(a) A, B, C, D are four elements with atomic numbers  $Z-1$ ,  $Z$ ,  $Z+1$ ,  $Z+2$ . B is a noble gas. Predict (a) Which element possesses lowest electron affinity

(b) Whose carbonate is stable towards heat

(b) The correct electronic configuration of nitrogen is  $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$  and not  $1s^2 2s^2 2p_x^2 2p_y^1$ . State the rule behind this.

### QUESTION - 9

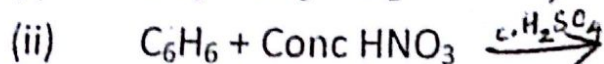
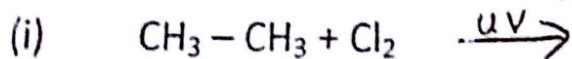
Draw the resonating structures of aniline and explain its directive influence on second substitution

### QUESTION - 10

Which is the major product obtained when 2-bromo butane is treated with alcoholic KOH? Write the balanced chemical equation and state the rule involved

### QUESTION - 11

- Write the differences between  $S_N1$  and  $S_N2$  reaction
- Write the type of reagent and type of reaction for the following:



### QUESTION - 12

Calculate the solubility of  $\text{Ni}(\text{OH})_2$  in water and in 0.10 M NaOH solution. The

$K_{sp}$  of  $\text{Ni}(\text{OH})_2$  is  $2 \times 10^{-15}$ . Comment on your result.

**QUESTION – 13**

Calculate the degree of hydrolysis, hydrolysis constant, and PH of 0.01 M solution of  $\text{NH}_4\text{CN}$ .  $K_a$  for HCN is  $6.2 \times 10^{-10}$   $K_b$  for  $\text{NH}_3$  is  $1.6 \times 10^{-5}$

**QUESTION -14**

- (a) Define ionic radius. Arrange the following in decreasing ionic radius  $\text{Li}^{2+}$ ,  $\text{He}^+$ ,  $\text{Be}^+$
- (b) What are representative elements?

**QUESTION -15**

Explain why:

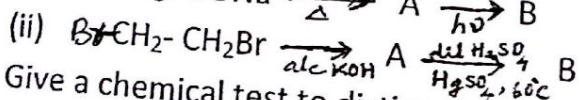
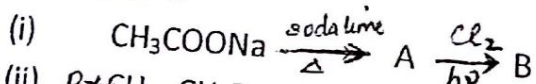
- (a) Benzene ring contains alternate double and single bonds yet all C-C bond lengths are same.
- (b) Water is a liquid and hydrogen sulphide is a gas though both oxygen and sulphur are in the same group.
- (c) In  $\text{PCl}_5$  the axial and equatorial bonds are not of equal lengths.

**QUESTION – 16**

- (a) What is hard water? What is the cause of hardness of water? How is the hardness of water removed?
- (b) Calculate the strength in g/L and normality of '20 volume' hydrogen peroxide solution.

**QUESTION -17**

(a) Find A and B



(b) Give a chemical test to distinguish between

- (i) Ethene and Ethane
- (ii) Ethyne and Ethene

(c) State Markownikoffs rule

**QUESTION -18**

- (a) What is buffer solution?
- (b) How much of sodium acetate must be added to one litre of 0.01 M acetic acid to make a buffer of PH 4.1.  $K_a$  for acetic acid is  $1.8 \times 10^{-5}$
- (c) What is the effect of catalyst on a reversible reaction
- (d) Explain why second group cations are not precipitating out as sulphides in fourth group.

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