

MAR THOMA RESIDENTIAL SCHOOL TIRUVALLA
FIRST TERMINAL EXAMINATION 2019- 20

Class XI

CHEMISTRY
PAPER- 1 [THEORY]

[MARKS: 70]

[TIME: THREE 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 all of which are compulsory

QUESTION numbers from 2 to 8 is of two marks each.

QUESTION numbers from 9 to 15 is of three marks each.

QUESTION numbers from 16 to 18 is of five marks each.

All working including rough work should be done on the same sheet as and adjacent to the rest of the answer. The intended marks for questions are given in brackets []. Balanced equation must be given wherever possible and diagrams where they are helpful. When solving numerical problems all essential working or must be shown. For solving numericals the following data can be used

1 Faraday = 96500 coulombs , $h = 6.626 \times 10^{-34} \text{ Kg m}^2 \text{ s}^{-1}$, $R_H = 10967 \text{ cm}^{-1}$

$R = 8.314 \text{ J/K/mol}$, $0.0821 \text{ Latm/K/mol}$, 0.083 Lbar/K/mol , 1.987 cal/K/mol

avogadros number = 6.022×10^{23}

QUESTION -1

[4]

(a) Fill in the blanks:

1. The number of unpaired electrons in chromium [Z= 24] is -----
and it exhibits ----- character
2. ----- orbitals are non directional with ----- shape .

3. 2 – methyl butane contain ----- primary carbon atom and ----- Tertiary carbon atom.

4. The IUPAC name of formic acid is ----- and acetone is -----

(b) Choose the correct alternative:

- [4]
- In sodium fusion test of organic compound, the nitrogen of an organic compound is converted to
(a) Sodamide (b) sodium cyanide (c) sodium nitrite (d) sodium – nitrate
 - The carbon and hydrogen are estimated by
(a) Liebigs method (b) Carius method (c) Dumas method
(b) Kjeldahls method
 - The correct set of quantum numbers for the unpaired electron of chlorine atom is
(a) 2,0,0,+1/2 (b) 2,1,-1, +1/2 (c) 3,1,1,+1/2 (d) 3,0,0,+1/2
 - 4gram of copper was dissolved in concentrated nitric acid .The copper nitrate on strong heating gave 5 gram of its oxide. The equivalent weight of copper is
(a) 23 (b) 32 (c) 12 (d) 20

(c) Match the following :

[4]

- | | |
|--------------------------|--------------|
| 1. Optical isomerism | alkene |
| 2. Paschen series | ultra violet |
| 3. Geometrical isomerism | lactic acid |
| 4. Lyman series | Infra red |

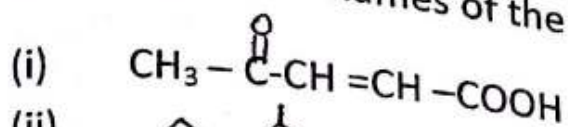
(d) Answer the following :

[8]

- 1 litre of a gas at STP weighs 1.97 gram. What is the volume of the gas
- 500 cm³ of 0.250 M Na₂SO₄ added to aqueous solution of 15 gram of Barium chloride. Which is the limiting reagent .How many grams of Barium sulphate is formed [Ba= 137 , S= 32, O= 16,Na= 23,Cl= 35.5]
- Define optical activity and chirality
- Give an example each for ring chain isomerism and geometrical isomerism for the formula C₅H₁₀

QUESTION - 2

Write the IUPAC names of the following:



QUESTION - 3

Represent butan - 2- ol by four different formulae

QUESTION - 4

Select the principal functional group when the following groups are present in a molecule, and give its suffix name

- Cl , - OH , -NH₂ , -CN , - C= O

Also arrange the above groups in decreasing priority

QUESTION - 5

Define specific rotation. Write the conditions required for optical isomerism

QUESTION - 6

Give four differences between orbit and orbital

QUESTION - 7

If uncertainty in position of a particle of 25 gram in space is 10^{-5} m. What is uncertainty in velocity

QUESTION - 8

In a hydrogen atom electron undergoes transition third orbit to ground state. Calculate the wavelength and frequency of the spectral line

QUESTION – 9

Density of 90% sulphuric acid solution is 1.80 g/ml. Calculate its molality, molarity and normality [H=1, S=32, O=16]

QUESTION -10

A compound on analysis gave the following data:

C = 62.1% , H =10.34% , O =27.56%

What is the empirical and molecular formula of the following compound if the vapour density is 29 .Name the compound

QUESTION -11

- (a) Differentiate between meso compound and racemic mixture
- (b) Draw the different forms of tartaric acid

QUESTION -12

How is lassaigues solution prepared? Give the test for nitrogen and sulphur

QUESTION -13

- (a) Write the principle involved in kjeldahls method
- (b) For the estimation of nitrogen, 2.8 gram of an organic compound digested by kjeldahls method and the evolved ammonia was absorbed in 60 ml of M/10 sulphuric acid. The unreacted acid required 20ml of M/10 sodium hydroxide for the complete neutralization .Find the percentage of nitrogen in the compound.

QUESTION -14

- (a) 0.36 gram of an organic compound were analysed by Liebig's method. The increase in the mass of u- tube and the potash bulb at the end of the experiment were found to be 0.27 gram and 0.66 gram respectively. Calculate the percentage of carbon and hydrogen in it.

- (b) 6.2 gram of an organic compound in a quantitative determination of phosphorus gave 2.22 gram of magnesium pyrophosphate. Calculate the percentage of phosphorus in the compound [atwt of Mg = 24, P = 31, O = 16]

QUESTION -15

- (a) State Hund's rule of maximum multiplicity. Why is it called rule of maximum multiplicity? Explain with an example
- (b) What is the name given to the orbitals of a given subshell and why is it so called?

QUESTION -16

- (a) In Victor Meyer's determination of molecular mass 0.15 gram of volatile substance displaced 31.64 ml of dry air at 25°C and 755 mm pressure. Calculate the molecular mass of the substance.
- (b) A current of 3 ampere was passed through silver nitrate solution for 125 seconds. The amount of silver deposited at cathode was 0.42 gram. Calculate the equivalent mass of silver. State the law which helped you to solve this.

QUESTION -17

- (a) Write the electronic configuration of copper ($Z = 29$) and Fe^{3+} (Z of Fe = 26)
- (b) What is Stark effect
- (c) What is the radius of the third orbit in centimeter. Also find the energy of electron in second orbit in KJ/mol

QUESTION - 18

- (a) State photo electric effect
- (b) A photon of wavelength $4 \times 10^{-7} \text{ m}$ strikes on metal surface, the work function of the metal being 2.13 eV. Calculate the
- (i) Energy of the photon in eV (ii) kinetic energy of the emission
- (c) A 25 watt bulb emits yellow light of wavelength of $0.57 \mu\text{m}$. Calculate the number of quanta emitted per second.