Subject - CHEMISTRY

Date - 23-10-2024

Marks - 50

Time - 9.00 a.m. - 11.30 a.m.

Instruction :
1) Use of log table is allowed.   Use of Calculator is not allowed.
2) Figures to the right indicate full marks.
3) The question paper is divided into four sections.
   Section A : Each 1 mark   Section B : Each 2 Marks
   Section C : Each 3 marks   Section D : Each 4 Marks
4) For each multiple choice question it is mandatory to write correct answer along with it's alphabets.
5) Physical constant : $N_A = 6.022 \times 10^{23}$

SECTION - A

Q.1   Select and write the correct answers.   **(7 Marks)**

i)   SI unit of electric current is ....

    (a) volt   (b) ampere
    (c) candela   (d) Newton

ii)   Oxidation number of carbon in H_2CO_3 is ....

    (a) +1   (b) +2   (c) +3   (d) +4

iii) Principal Quantum number describes ....
    (a) shape of orbital   (b) size of the orbital
    (c) spin of electron   (d) orientation of orbital electron cloud

iv)   Which of the following compounds can NOT demonstrate law of multiple proportions ?
    (a) NO, NO_2 (b) CO, CO_2
    (c) H_2O, H_2O_2 (d) Na_2S, NaF

v)   The correct IUPAC name of the compound ⌇⌇⌇⌇ is ....

    (a) Hept-3-ene   (b) 2-Ethylpent-2-ene
    (c) Hex-3-ene   (d) 4-Methylhex-3-ene

vi)   The unstable isotope of hydrogen is ....

    (a) ^1_1H (b) ^2_1D (c) ^3_1T (d) ^4_1H

vii) p-orbitals are .... in shape.
    (a) spherical   (b) dumbell
    (c) double dumbell   (d) triangular

Q.2   Answer the following.   (7 Marks)
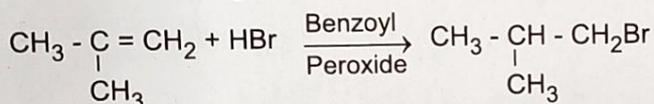
   i)   State : Markonikov's rule

   ii)   Write general outer electronic configuration of Group 1 elements.

   iii) Calculate number of moles of hydrogen in 0.448 litre of hydrogen gas at STP.

   iv)   How many π bonds are present in acetylene molecule.

   v)   Write one example of nucleophile.

   vi)   Define : Oxidizing agent

   vii) Write bond line formula for Pentane.

SECTION - B   (16 Marks)

Attempt any eight.

Q.3   Write balanced chemical reaction for conversion of Propene to Propane.

Q.4   State and explain Law of Multiple Proportion.

Q.5   Explain s-s overlap with example.

Q.6   Draw the shapes of $2p_x$ and 2s orbital.

Q.7   Read the following reaction and answer the questions given below.

$$CH_3 - \underset{\underset{CH_3}{|}}{C} = CH_2 + HBr \xrightarrow[\text{Peroxide}]{\text{Benzoyl}} CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2Br$$

   a)   Write IUPAC name of the product.
   b)   State the rule that governs formation of this product.

Q.8   Calculate the oxidation number of Chromium in $Cr_2O_7^{2-}$

Q.9   Write IUPAC name of the following compounds.

   a) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_3$ b) $CH_3 - CH = CH - CH_3$
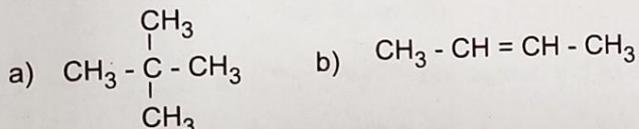
Q.10 What are alkenes ? Write any two uses of alkenes.

Q.11 Define : i) Oxidation number   ii) Reducing agent

Q.12 Write balance chemical equation for action of Br_2 in presentce of U.V. light on
          a) Ethane   b) 2-Methylpropane

Q.13 What is the action of following reagents on ethyl bromide :
          a) alc.KOH   b) Mg metal in presence of dry ether

Attempt any four.

Q.14 What will be the action of air on the following :
a) Li   b) Mg
Draw the structure of $BeCl_2$

Q.15 Write electronic configuration of the following elements.
a) Oxygen (Z=8)   b) Silicon (Z=14)   c) Lithium (Z=3)

Q.16 The natural isotopic abundance of ^{10}B is 19.60% and ^{11}B is 80.40%. The exact isotopic masses are 10.13 and 11.009 respectively. Calculate average atomic mass of boron.

Q.17 Predict the product of following reaction and rewrite balanced chemical reaction.

a) $C_4H_{10} + 13/2\ O_2 \longrightarrow$

b) $CH_3 - \underset{\underset{OH}{|}}{C}H - CH_3 \xrightarrow[373K]{60\%H_2SO_4}$

c) $CH_3 - C \equiv C - CH_3 + H_2 \xrightarrow[quinoline]{Pd-C}$

Q.18 Explain hybridization in methane molecule.

Q.19 Write all the possible products for Pyrolysis of hexane.

Attempt any two.

Q.20 Write stepwise balanced chemical reactions for chlorination of methane in presence of U.V.light.

Q.21 Explain the formation of BF_3 molecule with respect to :

a) hybridization
b) orbital overlap
c) bond angle and geometry
d) diagram

Q.22 State Pauli's exclusion principle. Write orbital notations for electrons in orbitals with following quantum number.
a) n = 2, l = 1   b) n = 4, l = 2   c) n = 3, l = 2

Q.23 Define : Elements and explain the classification of elements in detail.

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