

CHEMISTRY

HSE - I

Model paper 2018

Total No. of question: 30
Time Allotted: 3 hours

Max. Marks: 70
No. of printed pages: 4

LONG ANSWER TYPE (5 X 4)

Q1 Define the term 'Ionization Enthalpy'. Discuss the factors affecting ionization enthalpy and its trends in the periodic table.

OR

What do you mean by 'hydrohalogenation' of alkenes. Discuss Markovnikov's rule in detail with suitable example.

Q2 Define the term 'Hybridization'. Using the concept of hybridization explain the shapes of CH_4 and PCl_5 molecules.

OR

What are s-Block elements? Discuss the following in case of alkali metals:

- Electronic configuration
- Atomic size
- Ionization enthalpy

Q3 State and explain 'Law of Mass Action'. Derive the law of Chemical Equilibrium and hence define 'Equilibrium Constant'

OR

What is 'Allotropy'? Discuss various allotropic forms of Carbon in detail.

Q4 What are 'Reactive Intermediates'? Write a note on 'Carbocations'. Discuss types, formation, structure and stability of Carbocations.

OR

Discuss the 'Directive Influence of substituents and their effect on the reactivity of arenes

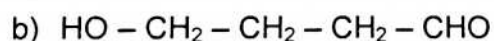
SHORT ANSWER TYPE (3 X 8)

Q5 Why 'Law of Conservation of mass' should better be called as 'Law of conservation of Mass and Energy'?

Q6 Define Boyle's Law. How is it represented mathematically?

Q7 What do symbols ΔH , ΔS , and ΔG signify? How are they inter related? What is the importance of the relation formed?

Q8 Give the IUPAC names of:



Q9 Draw the cis- and trans- isomers of But-2-ene.

Q10 Draw the lewis dot structure of



Q11 Write the Molecular orbital electronic configuration of N_2^+ . Calculate its bond order.

Q12 Calculate the pH of a solution whose H_3O^+ ion concentration is $2.5 \times 10^{-4}\text{M}$

VERY SHORT ANSWER TYPE (2 X 8)

- Q13 What is the relation between Molecular mass and vapour density of a gas?
- Q14 Determine the oxidation state of S in H_2SO_4 and H_2SO_5 .
- Q15 What is 'Water gas'. How is it prepared?
- Q16 What is 'Acid rain'? What is its cause?
- Q17 Give the electronic configuration of following ions:
 a) Mg^{2+}
 b) N^{3-}
- Q18 What is the equation of state for ideal gas of 'n' moles?
- Q19 What is 'Heterolytic cleavage'?
- Q20 What is an amphoteric substance? Give one example.

OBJECTIVE TYPE (1 x 10)

- Q21 Chose the most appropriate option given.
- (i) Dead burnt plaster is
 a) CaSO_4 b) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
 c) $\text{CaSO}_4 \cdot \text{H}_2\text{O}$ d) $\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$
- (ii) Dry ice is
 a) Solid NH_3 b) Solid SO_2
 c) Solid CO_2 d) Solid N_2
- (iii) The best method for separation of naphthalene and benzoic acid from their mixture is
 a) Sublimation b) Chromatography
 c) Crystallization d) Distillation
- (iv) What is the mass percentage of C in CO_2 ?
 a) 0.034% b) 27.27%
 c) 3.4% d) 28.7%
- (v) The set of quantum numbers for the 11th electron of Sodium Na ($Z=11$) are
 a) $n=4, l=0, m=0, s= \frac{1}{2}$ b) $n=3, l=0, m=0, s=- \frac{1}{2}$
 c) $n=3, l=2, m=1, s= \frac{1}{2}$ d) $n=4, l=1, m=0, s= \frac{1}{2}$
- (vi) Which of the following elements can show covalency greater than 4?
 a) Be b) P
 c) S d) B

