HSE -I

**TRIUMPH**

Time 1 hr
Marks : 25

# ANNUAL INTENSIVE TEST SERIES
# CHEMISTRY
## UNIT 1 A

1. Representation of the orbital with quantum numbers n= 3 l =1 is _____

   (a) 3s (b) 3d (c) 3p (d) 2s

2. The atomic number of the element Ununbium is_____

   (a) 112 (b) 110 (c) 111 (d)114

3. Which is the hybridization of P in $PCl_5$

   (a) $Sp^2$ (b) $Sp^3$ (c)$dsp^2$ (d)$Sp^3d$.

4. Liquid drops assume spherical shape due to _____

**1 Marks**

5. (a) What is Boyle temperature?

   (b) At high altitudes, a pressure cooker is used for cooking food. Why?

6. Dipole moment of water is 1.83 D where as that of $CO_2$ is zero. Explain?

7. Calculate wavelength of an electron moving with a velocity of 2.05 x $10^7 ms^{-1}$.

8. NO and $NO_2$ are two oxides Nitrogen. Which law of chemical combination is illustrated? State the law.

**2 Marks**

9. (a) Write two difference between Sigma and Pi bonds

   (b) Show that $O_2$ is paramagnetic based on Molecular orbital theory.

10. (a) Write 2 limitations of Bohr Model?

    (b) Calculate wave number of second line in Balmer series?

11. (a) Why do real gases deviate from ideal behavior?

    (b) write Vander Waal equation for n moles of a gas.

**3 Marks**

12. A Compound contains 4.07% hydrogen, 24.27% Carbon and 71.65% chlorine. Molecular mass is 98.96.

    What are its empirical formula and molecular formula?

**4 Marks**

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# ANNUAL INTENSIVE TEST SERIES
## CHEMISTRY
### UNIT 1 B

1. The geometry of $SF_6$ molecule is
   (a) Tetrahedral (b) Planar
   (c) Octahedral (d) Trigonal bipyramidal.
2. How many spherical nodes are possible for 4S orbital
   (a) 1 (b) 2
   (c) 3 (d) 4
3. Element with atomic number 117 is called_____
   (a) Un nil hexium (b) Un nil septium
   (c) Un Un hexium (d) Un Un septium
4. 27 g $H_2O$ contains _____moles
   (a) 1 (b) 1.5
   (c) 2 (d) 3

**1 Mark**

5. Calculate number of moles of $O_2$ required to produce 240 g of Mgo by burning Mg.
6. Bohr Model contradicts dual behavior of matter and Heisenberg Uncertainity principal. Justify.
7. Electron gain enthalpy of F is less negative than Cl. Why?
8. Dipole moment of $NF_3$ is less than $NH_3$. Why?

**2 Marks**

9. (a) State the principle, which describe the number of electrons in an orbital.
   (b) Give the possible values of n, l, m for the electron in a 3d orbital.
   (c) State Heisenberg uncertainty principle.
10. Explain the hybridization in Ethane ($C_2H_6$).
11. (a) Write 4 postulates of kinetic theory of gases.
    (b) $Co_2$ cannot be liquefied above $31.10^0$c. Why?

**3 Marks**

12. (a) Calculate number of moles (a) 11g $CO_2$ (b) 56ml $CO_2$ at STP
    (b) Calculate molality of a solution of NaOH containing 20g. of NaOH in 400gm solution.

**4 Marks**

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# ANNUAL INTENSIVE TEST SERIES
## CHEMISTRY
### UNIT II A

1. Oxidation state of Mn in $KMnO_4$ is _____
2. Select Ionic Hydride
   (a) $NH_3$ (b)NaH (c)$SCH_2$ (d)$H_2O$
3. Slaked lime is _____
   (a) $Ca(OH)_2$ (b) CaO (c)$CaCO_3$ (d) $CaCl_2$
4. The metal present in chlorophyll is _____

**1 Marks**

5. State Hess's Law . Give illustration of Hess'S law?
6. Sodium acetate is added to acetic acid, concentration of unionized acetic acid increases. What is the phenomenon involved? Explain?
7. (a) On passing $CO_2$ through lime water, it turns milky. Why?
   (b) What happens when more $CO_2$ is passed to milky solution. Why?
8. What is heavy water? Mention one use of heavy water.

**2 Marks**

9. Explain (a) Free energy
   (b) Gibbs Helmoltz equation
   (c) Condition for spontaneous process based on G, $\Delta$ H,$\triangle$ S$\triangle$
10. (a) What is the reason for Hardness of water?
    (b) What are the two types of hardness?
    (c )Suggest one method for removing each hardness?
11. Balance the redox reaction using oxidation number method?
    $Cu + NO_3^- \rightarrow NO_2 + Cu^{2+}$( Acidic) **3 Marks**
12. (a) Derive the relation between solubility and solubility product of $BaSO_4$
    (b) The solubility of $CaF_2$ is $3.5 \times 10^{-4}$ $mol^{-1}$ at 298K. Calculate solubility product? **4 Marks**

HSE -I

**TRIUMPH**

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# ANNUAL INTENSIVE TEST SERIES
## CHEMISTRY
### UNIT II B

1. Oxidation state of Cr in $K_2Cr_2O_7$ is _____
2. Preparation of Dalda, Vanaspathi is called _____
3. Li is diagonally related with _____
   (a) Na (b) Mg
   (c) K (d) Be
4. Select intensive property
   (a) Mass (b) Enthalpy
   (c) Temperature (d) Volume

**1 Mark**

5. Explain Born- Haber cycle of NaCl
6. with the help of Lechatlier principle, predict the favourable conditions to get good yield of $SO_3$.
   $2\,SO_2 + O_2 \rightleftharpoons 2SO_3 \quad \triangle H = -198KJ$
7. What is the meant by disproportionation reaction?
   Give one example?
8. Explain Electron deficient and electron rich hybrids.

**2 marks**

9. (a) What is meant by autoprotolysis of water?
   What is its significance?
10. Balance the redox reaction using Half reaction method
    $Fe^{2+} + Cr_2O7^{2-} \longrightarrow Fe^{3+} + Cr^{3+}$ (Acidic)
11. (a) Under what conditions entropy of a substance can be zero?
    (b) State first law of Thermodynamics?
    (c) What do you mean by isolated system? Give an example?

**3 Marks**

12. (a) Select Lewis acids $NH_3$, $OH^-$, $BCl_3$, $Cl^-$
    (b) What is buffer solution? Give one example?

**4 Marks**

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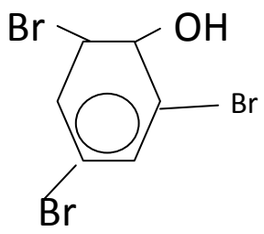
# ANNUAL INTENSIVE TEST SERIES
## CHEMISTRY
### UNIT III A

1. Thermodynamically, the most stable Allotrope of Carbon is _____
   a) Diamond b) Graphite c) Fullerene d) Lonsdaleite
2. _____ are formed by Homolytic fission ?
   a) Carbocations b) Carbanions c) free radicals d) Nucleophiles
3. Ozonolysis of Ethene gives _____
   a) Acetaldehyde b) formaldehyde c) Acetone d) Acetic acid
4. Inorganic Benzene is _____

**1 Mark**

5. a) Explain $CCl_4$ does not undergo Hydrolysis. But $SiCl_4$ undergoes Hydrolysis.
   b) Diamond has very High melting point.
6. Give IUPAC name a) $CH_3\text{-}CH_2\text{-}CH_2\text{-}C(=O)\text{-}CH_3$

b) 


7) Represent Newman Projection formula of staggered and eclipsed conformation of ethane.
8) Explain the causes and harmful effects of Acidrain.

**2 Marks**

9) a) What are the major gases which contribute towards global warming?
   b) What can we do to reduce global warming.
10) Complete the following.
   a) $CH_3\text{-}Br + Na \xrightarrow{\text{dry ether}}$ _____
   b) $CaC_2 + H_2o \longrightarrow$ _____
   c) _____ + Zn → ⬡ Zn O
11) **Explain**
   a) Inductive effect b) Meta merism c) Electrophiles

**3 Marks**

12. **Explain** a) Borax Bead Test b) Catenation
   c) Green house effect d) Eutrophication **4 Marks**

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# ANNUAL INTENSIVE TEST SERIES
# CHEMISTRY
## UNIT III B

**1 Mark**

1. The hybrid state of diborane molecule is
   a) $dsp^2$ b) $sp^2$ c) $sp^3$ d) sp
2. Syn gas is a mixture of
   a) $Co_2+H_2$ b) $Co+H_2$ c) $Co+Co_2$ d) $Co+N_2$
3. Aniline is separated from Aniline – water mixture by
   a) Crystallisation b) Steam distillation
   c) Sublimation d) Chromatography
4. $3\ C_2H_2 \xrightarrow{\text{Red hot tube}}$ _____

**2 Marks**

5. Write any 2 differences between classical smog and photo chemical smog.
6. Explain geometrical isomerism in 2-Butene.
7. Define Hyper conjugation? Why it is called no bond resonance?
8. What are Zeolites? What is its use?

**3 Marks**

9. a) Illustrate Marko Vnikov's rule taking the example of propene.
   b) What are the conditions for aromaticity based on Huckel's rule.
10. a) What are the major gases which contribute towards global warming ?
    b) What can we do to reduce global warming ?
11. Discuss the chemistry of lassaign's test for Nitrogen and Halogens ?

**4 Marks**

12. **Explain** : a) Inductive effect b) Homologous series
    c) Nucleophiles d) functional isomerism