INDIAN SCHOOL SOHAR
FIRST TERM EXAM 2015-2016
CHEMISTRY

STD: XI **MARKS: 70**
Date:20-09-2015 **TIME: 3Hrs**

Instructions:

1. *All questions are compulsory.*
2. *Question nos. 1-5 are very short answer questions and carry 1 mark each.*
3. *Question nos. 6-10are short answer questions and carry 2 marks each.*
4. *Question nos11-22 are short answer questions and carry 3 marks each.*
5. *Question no. 23 is short answer questions and carry 4marks.*
6. *Question nos. 24-26 are long answer questions and carry 5 marks each.*
7. *Write serial no. of the question before attempting it.*
8. *Use log tables for calculations.*

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1. Write the IUPAC name and symbol for the element with atomic number 115.

2. What is meant by absolute zero?

3. Write the values of four quantum numbers for the last electron in potassium. (Z=19)

4. Write the bond line formula for 3-methylbut-1-ene

5. Explain why He_2 does not exist?

6. Elements X, Y and Z have 4, 5 and 7 valence electrons respectively.
   a) Write the molecular formula of the compounds formed by each of these elements with hydrogen.
   b) Which of these compounds will have the highest dipole moment?

7. A balloon is filled with hydrogen at room temperature. It will burst if pressure exceeds 0.2 bar. If at 1 bar pressure, the gas occupies 2.27 L, up to what volume can the balloon be expanded?

8. Concentrated H_2SO_4 is 98% by mass and has density 1.84 g/cc. What volume of concentrated acid is required to make 5 L of 0.25M H_2SO_4 solution? (At. mass of H=1, O=16, S=32)

9. Using the equation of state PV = nRT, show that at a given temperature, the density of the gas is proportional to the gas pressure P.

   OR

   Derive the expression $P_i = \chi_i P_{total}$

10. What are carbocations? Why are tertiary carbocations more stable than primary carbocations?

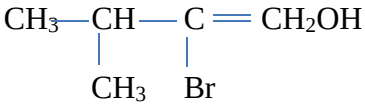
11. a) Which of the given ions is smallest and why? N^{-3}, O^{-2} or F^-
    b) Why is 2^{nd} ionization enthalpy of group 1 elements higher than group 2 elements?
    c) An element belongs to 3^{rd} period and group 13 of the periodic table. Identify the element and give its atomic number.

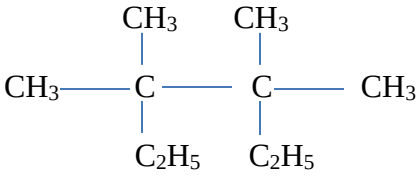
12. Write the structural formula of the following compounds:

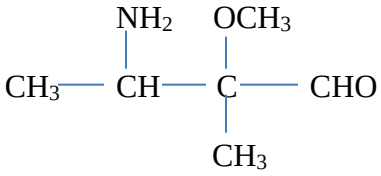
a) 2-methylcyclohexanone b) 3-hydroxy-4-methylhex-2enoic acid

c) 3-Ethyl-4-methylpenta-1,3-diene

13. Write the IUPAC name of the following compounds:

a) 

b) 

c) 

14.a) Account for the following:

i) The expected electronic configuration of copper is $[Ar]3d^9 4s^2$ but it is $[Ar]3d^{10} 4s^1$.

ii) In building up of atoms, the filling of 4s orbitals occurs before 3d orbitals.

b) Write the electronic configuration of Fe^{3+} and predict the number of unpaired electrons (Z = 26)

15. Account for the following:

a) NF_3 is pyramidal while BF_3 is triangular planar.

b) Bond angle in NH_3 is more than in H_2O.

c) Dipole moment of NH_3 is more than NF_3.

16.a) Write the electronic configuration of O_2^- and O_2^{2-}.Calculate their bond order and predict their magnetic behavior.

b) Why are bonding molecular orbitals more stable than antibonding molecular orbitals.

17.a) State Dalton's law of partial pressure.

b) Total pressure of gaseous mixture containing 2.8g of N_2, 3.2g of O_2 and 0.5g of H_2 is 4.5atm. Calculate the partial pressure of each gas. (At. wt. of N=14, O=16, H=1)

18.a) Why do group 17 elements have maximum negative electron gain enthalpy?

b) State the group and period to which elements having following electronic configuration belong to:

i) $[Ar]\ 4s^2 3d^1$ ii) $[Kr]\ 5s^1$ iii) $[Ar]\ 4s^2 3d^{10} 4p^5$ iv) $[Ar]\ 4s^1 3d^{10}$

19.a) If 10 volumes of dihydrogen gas reacts with 5 volumes of dioxygen gas, how many volumes of water vapour should be obtained?

b) In the reaction $2A + 4B \longrightarrow 3C + 4D$, when 5 moles of A react with 6 moles of B, then

i) Which is the limiting reagent? ii) Calculate the amount of 'C' formed.

20. a) How many σ and π bonds are present in $CH_2{=}CH{-}C{\equiv}CH$?

b) Explain why repulsions between lone pair of electrons is stronger than bond pairs of electrons.

c) Why is the boiling point of NH_3 and H_2O abnormally high?

21. Define a) Mole fraction b) Empirical formula c) Molality

22.a) Identify the kind of isomerism exhibited by the following pairs of compounds:
i) Propanone and propanal ii) n-propyl chloride and isopropylchloride
b) Give an example for cis-trans isomerism.

OR

a) Differentiate between nucleophiles and electrophiles.
b) What are free radicals? How are they produced during organic reactions?

23. Ram uses open container to cook vegetables and pulses at Shimla. Shyam cooks vegetables and pulses in pressure cooker at the same place.
a) Who will cook vegetables faster and why?
b) Why will pulses remain hard in the case of Ram even after cooking?
c) What values are associated with Shyam?
d) Define boiling point.

24.a) Define hybridization.
b) What are the conditions for hybridization to take place?
c) Explain the formation of ethyne (C_2H_2) based on hybridization.

OR

a) What are the postulates of VSEPR theory?
b) Predict the shape of the following molecules based on VSEPR theory:
i) ClF_3 ii)XeF_4 iii) SF_4

25.a) What is an ideal gas?
b) Under what conditions do gases deviate from ideal behavior? Explain.
c) Draw the graph for compressibility factor (Z) versus pressure for H_2, N_2, CH_4 and CO_2.

OR

a) Account for the following:
i) Vapour pressure increases with increase in temperature.
ii) Glycerine is more viscous than water.
iii) Aerated water bottles are kept under water during summer.
iv) Hot air balloons are used in sports and meteorological observations.
v) Liquid drops are spherical in shape.

26.a) Define photoelectric effect.
b) What is the condition for photoelectric effect to take place?
c) When a photon of frequency $10^{15}s^{-1}$ was allowed to hit a metal surface, an electron having 2×10^{-19}J of kinetic energy was emitted. Calculate the threshold frequency of this metal.

OR

a) Calculate the de-Broglie wavelength of a milligram sized object moving with 1% speed of light.
($C=3 \times 10^{8}ms^{-1}$, $h = 6.6 \times 10^{-34}$ J.S)
b) Explain the following with suitable examples:
i) Pauli exclusion principle ii) Aufbau principle iii) Hund's rule.

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