Roll Number			

INDIAN SCHOOL MUSCAT
FIRST TERM EXAMINATION
CHEMISTRY

CLASS: XI   Sub. Code: 042   Time Allotted: 3 Hrs

16.09.2018   Max. Marks: 70

General Instructions:

- All questions are compulsory
- Marks for each question are indicated against it.
- Question numbers 1 to 5 are very short answer questions and carry one mark each.
- Question numbers 6 to 12 are short answer questions and carry two marks each.
- Question numbers 13 to 24 are short answer questions and carry three marks each.
- Question numbers 25 to 27 are long answer questions and carry five marks each.

1. Define atomicity. 1

2. Name the nature of electromagnetic radiation that explains the following types of experimental phenomenon shown by it : 1

    a) Interference   b) Photoelectric emission

3. Consider the ground state electronic configuration of a few elements given below and arrange them in the increasing order of their ionisation enthalpy. 1

    P: $1s^2, 2s^2, 2p^5$ Q: $1s^2, 2s^2, 2p^4$ R: $1s^2, 2s^1$ S: $1s^2, 2s^2, 2p^6, 3s^1$ T: $1s^2, 2s^2, 2p^6$

4. Draw the Lewis structure of $HClO_4$ 1

5. What do you mean by Eutrophication? 1

6. Differentiate between molarity and molality. (Two points of difference) 2

7. Calculate the wave number for the longest wavelength transition in the Lyman series of atomic hydrogen.   (R_H=109677 cm^{-1}) 2

8. What are iso electronic species? State one species which is isoelectronic with Ca^{2+} and write down its electronic configuration. 2

                                    OR

    Discuss the different factors affecting ionisation enthalpy of an element.

9. a) Using IUPAC nomenclature, write the symbol and name of the element with atomic number 104. 2

    b) In terms of period and group, where would you locate the element with atomic number 21?

10. Calculate the formal charge on various atoms in $NO_2{}^-$ 2

11. What do you mean by green chemistry? How will it help to decrease environmental pollution?   2

12. What are the harmful effects of photochemical smog and how can it be controlled?   2

13. a) State law of multiple proportion.   3

    b) Hydrogen and oxygen forms two compounds. The hydrogen content in one of the compound is 5.9% while in the other is 11.2%. Show that these data illustrate the law of multiple proportion.

14. Calculate the number of moles in each of the following   3

    a) 392 g of H_2SO_4

    b) 44.8 litres of SO_2 at STP

    c) 9.033×10^{23} atoms of S   (RAM of H=1u, S=32u, O=16u &Ca=40u)

OR

    a) An organic compound on analysis was found to contain 93.7%Carbon and 6.3% hydrogen. Deduce its empirical formula.   (RAM of C=12)

    b) An aqueous solution of glucose is 10 % by mass. Express the concentration of the solution in ppm.

15. Account for the following;   3

    a) Electronic energy is negative in hydrogen atom.

    b) Although hydrogen atom has one electron, hydrogen spectrum has many lines.

    c) Bohr's orbits are called stationary states.

16. a) Calculate the number of radial nodes in 5f orbital.   3

    b) Draw the shape of orbitals with $l=0$ & $l=2$.

    c) Find the total number of electrons in Calcium with quantum numbers, $l=0$ and $m_s=+\frac{1}{2}$

                                             (Z=20)

17. Define   3

    a) Photo electric work function

    b) Emission spectrum

    c) Degenerate orbitals

18. a) Show that circumference of the Bohr orbit for hydrogen atom is an integral multiple of the de Broglie wavelength associated with the electron moving around the orbit.   3

    b) Calculate the radius associated with the first orbit of Li^{2+}. (Z of Li=3)

19. a) What are d-block elements?   3

    b) Write their general outer electronic configuration.

    c) Write any two properties of d-block elements?

20. Which one of the following has greater property mentioned? Why?   3
    a) O^- or O^{2-} (Ionic radius)

    b) Mg or Al (First ionisation energy)

    c) F or Cl (Electronegativity)

21. Account for the following   3

    a) Noble gases have positive electron gain enthalpies.

    b) f block elements are placed in separate rows at the bottom of the periodic table.

    c) Lithium shows anomalous properties.

22. Write short note on   3

    a) Biochemical oxygen demand (BOD)

    b) Global warming

    c) Herbicides

23. Account for the following   3

    a) The bond angle in PH_3 is smaller than NH_3.

    b) ClF_3 is T shaped.

    c) OCS has greater dipole moment than CS_2.

24. Discuss the shape of the following using VSEPR theory.   3

    a) SF_4 b) H_3O^+

25. a) State   5

    (i) Pauli's exclusion principle.   (ii) Aufbau principle

    b) When electromagnetic radiation of wavelength 200 nm falls on the surface of a metal, electrons are emitted with a kinetic energy of 246 KJ mol^{-1}.

       (i)   What is the minimum energy needed to remove an electron from the metal?

       (ii)   What is the maximum wavelength that will cause a photoelectron to be emitted?

                        (h = 6.63 x 10^{-34} Js)

OR

a) Mn^{2+} is more stable than Mn^{3+} .Why?   (Z of Mn=25)

b) The three electrons present in 2p sub shell of nitrogen remain unpaired and have parallel spins why?

c) State Heisenberg's uncertainty principle.

d) Show that Heisenberg uncertainty Principle is insignificant for the motion of an object of mass 25mg.

26. a) Define   5

        (i)   Bond angle

        (ii)   Lattice enthalpy

        (iii)   Dipole moment

  b) Arrange the following in the increasing order of bond angle.

$$CO_2, SO_2, BCl_3, CH_4$$
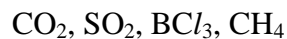
  c) Write any two factors which affect ionic bond formation

OR

a) Define the term resonance.

b) Draw the resonating structures of CO_3^{2-}

c) Write any two limitations of octet rule with examples.

d) Bond angle in NH_3 is less than tetrahedral angle ,Account.

27. a) Relative atomic masses of some elements are in fractions . Account.   5

  b) Write the empirical formula of the following;

      (i) CH_3COOH (ii) H_3PO_4

  c) If 4 g of NaOH is dissolved in 36 g of water, and density of the solution is 1 g/ml

    Calculate the

      (i)   mole fraction of each component in the solution.

      (ii)   molarity of the solution.   (RAM of Na=23 u)

OR

a) State

        (i)   Avogadro hypothesis.

        (ii)   Gay Lussac's law

b) 2.3 g of metallic sodium reacts with 10 g of water.

      (i) Calculate the mass of sodium hydroxide formed

      (ii) Volume of hydrogen evolved at STP

      (iii)Which is the limiting reagent?

End of the Question Paper