INTERNATIONAL INDIAN SCHOOL DAMMAM
FIRST TERMINAL EXAMINATION-2012

SET-A.

Class: XI.

Subject: CHEMISTRY

Time: 3 hrs.

Max. Marks: 70.

General Instructions.

1. *All questions are compulsory.*
2. *Questions 1 to 8 are very short answer questions and carry one mark.*
3. *Questions 9 to18 are short answer questions and carry two marks.*
4. *Questions 19 to 27 are short answer questions and carry three marks.*
5. *Questions 28,29 & 30 are long answer questions and carry five marks.*
6. *Use log tables if necessary.*

7. Calculate the amount of Carbon dioxide that could be produced when one mole of carbon is burnt in 16 g of dioxygen.

2. 1 M or 1m solution, which is more concentrated? Why?

3. What is photoelectric effect?

4. How many electrons in an atom may have the following quantum numbers?
   (a) $n = 4$, $m_s = -\frac{1}{2}$ (b) $n = 1$, $l = 0$

5. State modern periodic law.

6. Draw the Lewis dot structure of CO.

7. Write the general outer electronic configuration of f- Block elements.

8. Define lattice Enthalpy.

9. State and illustrate the law of multiple proportion.

10. (a) Boron has two isotopes, the relative abundance of 10B is 20% and that of 11B is 80%. Find the average atomic mass of Boron.
    (b) How many significant figures are present in the following.(1) 0.0025 (2) 208

11. (a) write the mathematical expression of Heisenberg's uncertainty principle.
    (b) State Pauli Exclusion principle.

12. Calculate the energy associated with the first orbit of He.
    What is the radius of this orbit.

(1)

13. (a) Give any two properties of cathode rays.
    (b) What are the limitations of Bohr's model for hydrogen atom.

14. Concentrated $HzSO_4$ is 98% by weight and density 1.84 *gf cc*. What volume of conc. acid is required to make 5.0 L of 0.50 M. $HzSO_4$.

15. (a) On the basis of quantum numbers, justify that the sixth period of the periodic table should have 32 elements.
    (b) write the electronic configuration of Cu (atomic number 29).

16. Discuss the shape of the following molecules using the VSEPR model.
    (a) BCb (b) $AsFs$ (c) $SF6$ (d) $SF4$.

17. Define electronegativity. How does it differ from electron gain enthalpy?

                                     OR

    Explain the formation of Hz molecule on the basis of valence bond theory.

18. (a) What is meant by hybridisation of atomic orbitals?
    (b) Which hybrid orbitals are used by carbon atoms in the following molecules?
    (i) CH3CHO   (ii) CH3COOH

19. How much magnesium sulphide can be obtained from 2.00 g of magnesium and 2.00 g of sulphur by the reaction $Mg+S \sim MgS$. ? Which is the limiting reagent? Calculate the amount of one of the reactants which remains unreacted? (Mg = 24 u, S = 32 u)

20. An organic compound on analysis gave the following data: C = 57.82%, H=3.6% and the rest is Oxygen. Its molecular mass is 166. Find its empirical and molecular formula. (H=lu, C=12u, 0=16u).

21. (a) State de Broglie relation.
    (b) State Hund's rule of maximum multiplicity.
    (c) Draw the shape of dz^Z orbital.

22. (a) Write IUPAC name and symbol of an element with atomic number 117.
    (b) How would you explain the fact that the first ionization enthalpy of sodium is lower than that of magnesium but its second ionization enthalpy is higher than that of magnesium?

23. Describe the hybridisation in case of PCls. Why are the axial bonds longer as compared to equatorial bonds?

24. (a) Which out of $^{NH}3$ **and** NF3 has higher dipole moment and Why.?
    (b) Give any two limitations of the octet rule.

(2)

25. (a) What are the frequency and wave length of a photon emitted during a
    transition from n=5 state to the n=2 state in the hydrogen atom?
    (h=6.626x 10^{-34} Js)
    (b) Write Rydberg equation for Balmer series.

OR

(a) The threshold frequency V_a. for a metal is 7.0 x $10^{14} S^{-1}$. Calculate the
        kinetic energy of an electron emitted when radiation of frequency
        V= 1.0x $10^{15} S^{-1}$ hits the metal.
(b) An electron is in one of the *3d* orbitals. Give the possible values of n, *l* and mi
        for this electron.

26. (a) Consider the following species:
    N3- ,0^{2-} , F--, Nat , Mgz+ and A_{l}^{3+} .
    (i) What is common in them?
    (ii) Arrange them in the order of increasing ionic radii.

    (b) Would you expect the first ionization enthalpies for two isotopes of the same
    element to be the same or different? Justify your answer.

27. Compare the relative stabilities of the following species and indicate the
    magnetic properties of 0z . 0z", Draw the Molecular Orbital diagram of 0z
    molecule.

28. (a) Yellow light emitted from a sodium lamp has a wave length of 580 nm.
    Calculate the frequency and wave number of the yellow light.
 tb) Showthat the circumference of the Bohrorbit for the hydrogen atom is an
        integral multiple of the de Broglie wavelength associated with the electron
        revolving around the orbit.
    (c) Explain why atoms in the half filled and completely filled orbitals have extra
    stability.
    (d) What is Bohr's frequency rule?

OR

    (a) Calculate the wave length, frequency and wave number of a light whose
        period is 2.0x$10^{-1}0$s.
    (b) Which has higher energy *5d* or 65 orbital? Explain your answer.
    (c) What is Planck's quantum theory?
    (d) What is Bohr's radius? Give its value.

29. Give reason:
    (a) Electron gain enthalpy of sulphur is greater than oxygen.
    (b) Ionization enthalpy of beryllium is greater than boron.
    (c) Noble gases show positive electron gain enthalpy.
    (d) Identify the position of the element with electronic configuration
    (i) ns^2 np+ (n =3)   (ii) (n - 1) d^2 ns-' (n=4) .

(3)

<div align="center">OR</div>

(a) The first ionization enthalpy values (in kl/rnol] of group 13 elements are:

B	AI	Ca	In	TI
801	577	579	558	589

How would you explain this deviation from the general trend?

(b) Which of the following will have the most negative electron gain enthalpy and which the least negative?

P, 5, Cl, F. Explain your answer.

(c) Why do elements in the same group have similar physical and chemical properties?

30. (a) Write the resonance structures for carbonate ion. How resonance is related to stability of the molecules?

(b) Although both CO_2 and H_2O are triatomic molecules, the shape of H_2O molecule is bent while that of CO_2 is linear. Explain this on the basis of dipole moment.

(c) Define Hydrogen bond.

<div align="center">OR</div>

(a) Apart from tetrahedral geometry, another possible geometry for CH_4 is square planar. Explain why GH_4 is not square planar?

(b) Although geometries of NH_3 and H_2O molecules are distorted tetrahedral, bond angle in water is less than that of ammonia. Discuss.

(c) Arrange the bonds in order of increasing ionic character in the molecules: LiF, K_2O, N_2, SO_2 and $e1F_3$.

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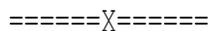
INTERNATIONAL INDIAN SCHOOL DAMMAM
FIRST TERMINAL EXAMINATION-20l2

SET-B.

Class: XI.

Subject: CHEMISTRY

Time: 3 hrs.

Max. Marks: 70.

General Instructions.

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4. *Questions 19 to 27 are short answer questions and carry three marks.*
5. *Questions 28,29 & 30 are long answer questions and carry five marks.*
6. *Use log tables if necessary.*

7. Calculate the amount of Carbon dioxide that could be produced when one mole of carbon is burnt in 8 g of dioxygen.

2. 1 M or 1m solution, which is less concentrated? Why?

3. What is threshold frequency?

4. How many electrons in an atom may have the following quantum numbers?
   (a) n= 3, ms= -1fz (b) n=4, 1= O.

5. State Mendeleev's periodic law.

6. Draw the Lewis dot structure of CO_2.

7. Write the general outer electronic configuration of f- Block elements.

8. Define Bond Enthalpy.

9. Calculate the energy associated with the first orbit of He.
   What is the radius of this orbit.

10. (a) Chlorine has two isotopes, the relative abundance of 35CI is 75.77% and that of 37CI is 24.23%. Find the average atomic mass of Chlorine.
    (b) How many significant figures are present in the following
     (1) 0.0035 (2) 408

11. (a) write the mathematical expression of Heisenberg's uncertainty principle.
    (b) State Pauli Exclusion principle.

12. State and illustrate the law of multiple proportion

13. (a) Give any two properties of canal rays.
    (b) What are the limitations of Bohr's model for hydrogen atom.

14. (a) What is meant by hybridisation of atomic orbitals?
    (b) Which hybrid orbitals are used by carbon atoms in the following molecules?
    (i) CH3CHO   (ii) CH3COOH

15. (a) On the basis of quantum numbers, justify that the sixth period of the
       periodic table should have 32 elements.
    (b) write the electronic configuration of Cr (atomic number 24).

16. Discuss the shape of the following molecules using the VSEPR model.
    (a) BCh (b) AsFs (c) SF6 (d) SF4.

17. Define electronegativity. How does it differ from electron gain enthalpy?
                              OR
    Explain the formation of H2 molecule on the basis of valence bond theory.

18. Concentrated H2S04 is 98% by weight and density 1.84 *gf cc.* What volume of
    cone. acid is required to make 5.0 L of 0.50 M. H2S04.

19. (a) State de Broglie relation.
    (b) State Hund's rule of maximum multiplicity.
    (c) Draw the shape of $d(x^2_{-y}2)$ orbital.

20. (a) Which out ofNH3 and NF3has higher dipole moment and Why.?
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21. How much magnesium sulphide can be obtained from 2.00 g of magnesium
    and 2.00 g of sulphur by the reaction Mg+S -7 MgS. ? Which is the limiting
    reagent? Calculate the amount of one of the reactants which remains unreacted?
    (Mg = 24 u, S = 32 u)

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    (h=6.626x 10^{-34} [s)
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OR

(a) The threshold frequency v_e for a metal is 7.0 x 10^{14}s-1. Calculate the
                    kinetic energy of an electron emitted when radiation of frequency
                    v= 1.0x 10^{15}S-1 hits the metal.
(b) An electron is in one of the *3d* orbitals. Give the possible values of n, *l*
                    and m, for this electron.

26. Compare the relative stabilities of the following species and indicate the
    magnetic properties of O_2, O_2+. Draw the Molecular Orbital diagram of O_2
    molecule.

27. (a) Consider the following species:
    N3- ,O^{2-} , F--, Na+. Mg2+ and AJ3+ .
    (i) What is common in them?
    .. (ii) Arrange them in the order of increasing ionic radii.
    '(b) Would you expect the first ionization enthalpies for two isotopes of the
        same element to be the same or different? Justify your answer,

28.-(a) Yellow light emitted from a sodium lamp has a wave length of 580 nm.
    Calculate the frequency and wave number of the yellow light.
    (b-)-Show that the ci-rcumference of the Bohr orbit for-the-hydrogen atom is an-
    integral multiple of the de Broglie wavelength associated with the electron
    revolving around the orbit.
    (c) Explain why atoms in the half filled and completely filled orbitals have extra
    stability,
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    (a) Calculate the wave length, frequency and wave number of a light whose
        period is 2.0x10^{-1}0s,
    (b) Which has higher energy Sd or 65 orbital? Explain your answer.
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(c) Why do elements in the same group have similar physical and chemical properties?

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(b) Although geometries of NH3 and H20 molecules are distorted tetrahedral, bond angle in water is less than that of ammonia. Discuss.

(c) Arrange the bonds in order of increasing ionic character in the molecules.

LiF, K20, N2, S02 and CIF3.

(a) Write the resonance structures for carbonate ion. How resonance is related to stability of the molecules?

{b] Although bothCu, and Hzu are triatomic molecules.the shape QLH20 molecule is bent while that of C02 is linear. Explain this on the basis of dipole moment.

ec) Define Hydrogen bond.

======X======