OLABISI ONABANJO UNIVERSITY, AGO-IWOYE
DEPARTMENT OF CHEMICAL SCIENCES , FACULTY OF SCIENCE
HARMATTAN SEMESTER EXAMINATION, 2013/2014 SESSION
CHM 201: INORGANIC CHEMISTRY 1

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1. According to Arrhenius theory a base is a compound: (A) Which ionizes in aqueous solution to produce hydroxyl ion. (B) Which ionizes in non- aqueous solution to produce hydroxyl ion. (C) Which ionizes in aqueous solution to produce hydrogen ions. (D) Which ionizes in a non-aqueous solution to produce hzdrogen ions. (E) Answers A to D are correct.

2. Tetrahydrofuran is a cyclic _____ solvent. (A) Polar. (B) Non-polar. (C) High ionizing. (D) Aqueous. (E) None of the above.

3. A conjugate acid is a substance formed by: (A) Loss of a proton from a Bronsted- Lowry base. (B) Addition of electron to a Bronsted-Lowry acid. (C) Addition of a proton to a Bronsted-Lowry acid. (D) Addition of a proton to a Bronsted- Lowry base. (E) Loss of a proton from a Bronsted- Lowry acid.

4. Both liquid NH_3 and H_2O have : (A) Only acidic behaviour. (B) Ambidentate behaviour. (C) Only basic behavour. (D) Amphoteric behaviour. (E) Answers A to D are correct.

5. The following properties determine the utility of solvent except: (A) Dielectric constant. (B) The nature and extent of auto –ionization. (C) The temperature range over which it is liquid. (D) The protonic acidity or basicity. (E) None of the above.

6. In aqueous solution the strongest acid which can exist and will be available for reaction is: (A) H_3PO_4. (B) H_3O^+ . (C) HF. (D) $HClO_4$. (E) HCl.

7. An oxidation reaction can be defined in terms of the following except : (A) Removal of electronegative element. (B) Addition of oxygen or removal of hydrogen. (C) Removal of electropositive element. (D) Increase in oxidation number. (E) None of the above.

8. An atom is said to be reduced when : (A) Its oxidation number is equal to the charge on the compound or ion. (B) There is an increase in its oxidation number. (C) There is a decrease in its oxidation number. (D) Its oxidation number is zero. (E) Answers A to D are correct

9. Polarization mean susceptibility of ion to --------- when it is near a positive center. (A) Dissociation. (B) Dissolution. (C) Distortion (D) Dispersion. (E) None of the above..

10. An ambidentate solvent is a solvent that behaves: (A) As soft bases and hard acid. (B) As soft base and hard base. (C) Neither as soft base nor hard base. (D) As soft base and soft acid. (E) As soft acid and hard acid. .

Acid + Base ⟶ Conjugate acid + Conjugate base
H_2O +

11. Porphyrin molecule takes which of the following shapes (A) Square bipyramidal (B) Trigonal(C) Trigonal planar (D) Octahedral(E) Square planar

12. Which of the following bioinorganic substances functions in methane monooxygenase (A) Haemocyanin (B) Carboxypeptidases (C) Transferins (D) glycoproteins (E)Haemerythrin

13. What is the bond order for a hypothetical Be_2 molecule (A) Zero (B) 1 (C) 1.5 (D) 2.0 (E) 3.0

14. What is the bond order of N_2^{2+} (A) Zero (B) 2.5 (C) 2.0 (D) 3.0 (E) 1.5

15. Which of the following is the appropriate electronic configuration for O_2

16. $KK(\sigma s)^2(\sigma s^*)^2(\sigma x)^2(\pi y)^2(\pi z)^2(\pi y^*)^1(\pi z^*)^1$ (B) $KK(\sigma s)^2(\sigma s^*)^2(\sigma x)^2(\pi y)^2(\pi z)^2(\pi y^*)^2(\pi z^*)^2$ (C) $KK(\sigma s)^2(\sigma s^*)^2(\sigma x)^2(\pi y)^2(\pi z)^2(\pi y^*)^1$ (D) $KK(\sigma s)^2(\sigma s^*)^2(\pi y)^2(\pi z)^2(\sigma x)^2(\pi y^*)^1(\pi z^*)^1$ (E) $KK(\sigma s)^2(\sigma s^*)^2(\pi y)^2(\pi z)^2(\pi y^*)^2(\pi z^*)^2(\sigma x^*)^2$

17. Which of the following is the appropriate electronic configuration for C_2^{2+} (A) $KK(\sigma s)^2(\sigma s^*)(\pi y)^2(\pi z)^2$ (B) $KK(\sigma s)^2(\sigma s^*)^2(\pi y)^2(\pi z)^2(\pi y^*)^1(\pi z^*)^1$ (C) $KK(\sigma s)^2(\sigma s^*)^2(\pi y)^1(\pi z)^1$ (D) $KK(\sigma s)^2(\sigma s^*)(\pi y)^2(\pi z)^2$ (E) $KK(\sigma s)^2(\sigma s^*)^2(\pi y)^1(\pi z)^1(\pi y^*)^1(\pi z^*)^1$

18. Which is the most stable among the following molecules and hypothetical molecules of Nitrogen: (A) N_2, (B) N_2^+, (C) N_2^{2+}, (D) N_2^{2-}, (E) N_2^-

19. Which of the following describes zero overlap of orbitals (A) When two orbitals involved have precisely equal regions of overlap with opposite signs (B) When the orbitals involved have zero contact of their orientations (C) When the concerned orbitals have same sign of positive and negative (D) When the orbitals have opposite signs (E) When electron density cancel out each other

20. When there is neither a repulsive nor an attractive interaction between orbitals, this situation can be described as (A) Nonbonding (B) Negative bonding (C) Positive bonding (D) Zero bonding (E) Molecular orbital.

21. What is the total number of electrons in the antibonding orbitals of F_2^+ (A) 8 (B) 0 (C) 7 (D) 1 (E) 3

22. From the overlap of p orbitals alone, what is the total number of electrons in both the bonding and the antibonding orbitals of hypothetical Ne_2? (A) 20 (B) 10 (C) 12 (D) 0 (E) 6

23. Which of the following processes is used to produce acetaldehyde from ethylene and oxygen? (A) The Wacker process (B) Monsato synthesis (C) insertion and elimination (D) Oxidation and reduction (E) Cracking

24. In hydroformylation reaction, which of the following combines with carbon monoxide and hydrogen to form an aldehyde (A) Alkene (B) Alkyne (C) Alkane (D) Alkanol (E) Alkanone

25. What is the shape of Fe (III) siderophore complexes (A) Trigonal (B) Square bipyramidal (C) Square planar (D) Octahedral (E) Trigonal planar

26. Which of the following group V halides possesses properties similar to CO?

A. PCl_3 B. $AsCl_3$ C. PCl_3 D. PF_5

27. PCl_3 undergo hydrolysis in water to give H_3PO_3, what are the products formed on hydrolysis of NCl_3; A. HCL & NH_3 B. HOCL & NH_3 C. HOCL & HCL D. NO_2 & NH_3

28. Which of the oxides of group V elements undergo sublimation at about 360^oc.

A. N_2O_5 B. N_2O_3 C. P_2O_5 D. P_4O_6