

ST. GEORGE'S SCHOOL, ALAKNANDA
MID TERM EXAMINATION-2017-18
SUBJECT: CHEMISTRY
CLASS - XI

DATE: 23.9.17
TIME: 3 HRS

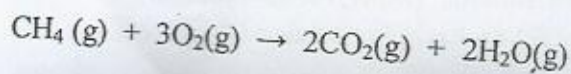
MAX. MARKS : 70
NO. OF PAGES : 4

GENERAL INSTRUCTIONS

- (i) Attempt all questions.
- (ii) Question No. 1 to 5 carry 1 mark each. They are to be answered in one word or one sentence each.
- (iii) Question No. 6 to 10 carry 2 marks each. They are to be answered in about 30 words each.
- (iv) Question No. 11 to 22 carry 3 marks each. They are to be answered in about 50 words each.
- (v) Question No. 23 is a value based questions and carry 4 mark.
- (vi) Question No. 24 to 26 carry 5 marks each. They are to be answered in about 70 words each.

Q1. Identify the type of force acting between NaCl and water molecules. 1

Q2. Find the value of change in the no. of moles for the following reaction :



Q3. Which of the following are iso-electronic in nature ?

- (i) O^{2-} (ii) Na (iii) Mg^{2+} (iv) Al^{3+}
- 1

Q4. Find the number of significant figures in the following numbers

- (i) 62.4 (ii) 8.8674
- 1

Q5. Which of the following species will have the largest and the smallest size ?

- Mg, Mg^{2+} , Al, Al^{3+}
- 1

Q6. KClO_3 on heating decomposes to give KCl and O_2 . What is the volume of O_2 at NTP liberated by

0.1 mole of KClO_3 ? (K = 39, Cl = 35.5)

2

Q7. Write the main difference between VSEPR theory and valence bond theory

Although carbon oxygen bond is polar yet CO_2 molecule is non-polar. Why ?

2

Q8. What is photoelectric effect? On what factors does it depend ?

2

Q9. Write the general electronic configuration of lanthanoids and actinoids.

2

Q10. When would wavelength associated with an electron become equal to the wavelength associated with a proton? (mass of $e^- = 9.1095 \times 10^{-28}$ g and mass of proton = 1.6725×10^{-24} g) 2

Q11. (a) Define isobars. Give one example.

(a) The atomic number of an element is 5 and mass number is 11. Find the number of electrons, protons and neutrons present in an atom of it. How can this element be represented? 3

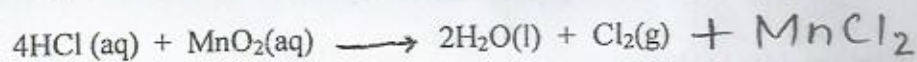
Q12. Write a brief note on the following environmental terms :

(a) Global warming

(b) Greenhouse effect

(c) Ozone hole. 3

Q13. Chlorine is prepared in the laboratory by treating manganese dioxide (MnO_2) with aqueous Hydrochloric acid according to the reaction



How many grams of HCl react with 5.0 g of manganese dioxide? 3

Q14. (a) Define hydrogen bond.

(b) Is hydrogen bond stronger or weaker than the van der Waals' forces?

(c) What is the significance of hydrogen bond in our lives? 3

Q15. (a) What is an isotherm?

(b) 10 dm^3 of hydrogen under 1 bar pressure are contained in a cylinder which has a movable piston. The piston is moved in until the same mass of gas occupies 2 dm^3 at the same temperature. Find the pressure in the cylinder.

OR

(a) In terms of Charles's law explain why -273°C is the lowest temperature.

(b) Calculate the total pressure in a mixture of 8g of oxygen and 4g of hydrogen, confined in a vessel of 1 dm^3 at 27°C . $R = 0.083 \text{ bar dm}^3 \text{ K}^{-1} \text{ mol}^{-1}$. 3

Q16. (a) Write the relationship between azimuthal quantum number (l) and principal quantum no. (n)

(b) Write the electronic configuration of Fe^{+3} . (Atomic number of Fe = 26) 3

(c) What is the net effect of screening effect?

Q17. Give a brief account of the following :

(a) Alkali metals do not form dipositive ions.

(b) Nitrogen has higher ionization enthalpy than oxygen.

(c) Fluorine has ^{lower} negative electron gain enthalpy than chlorine. 3

Q18. In a hydrogen atom, an electron jumps from third orbit to the first orbit. Find out the frequency of the spectral line. ($R_H = 109677 \text{ cm}^{-1}$) ? 3

Q19. (a) Write the name of an element with five electrons in the outermost shell.

(b) Write the name of an element that would tend to lose two electrons.

(c) Name the block which contains metals, non metals, liquid as well as gas at the room temperature. 3

Q20. The density of 3 M solution of NaCl is 1.25 g/ml. Calculate molality of the solution. (At. mass of Na = 23, Cl = 35.5) 3

Q21. What is hybridization? Why the bond angle and shape of methane molecule are different from that of ammonia molecule? 3

Q22. Write the limitations of Octet Rule or Octet Theory. 3

Q23. Taj mahal is regarded as the eighth wonder of the world. Millions of people in India and from abroad visit this great historic monument every year but over the years it has faced immense pollution problem. It has lost lustre due to the presence of traces of H_2S and other pollutants present in air.

(a) What is the main reason for the damage done to Taj mahal and other historical monuments

(b) How is damage actually caused?

(c) Suggest some ways to check the pollution. 4

Q24. (a) From the following sets of quantum numbers, state which is possible.

(i) $n=0, l=0, m=0, s = +1/2$

(a) $n=1, l=0, m=0, s=+1/2$

(b) What is meant by the term maximum multiplicity in Hund's Rule of maximum multiplicity.

(c) Write the four quantum numbers for 21st electron of Sc ($Z=21$)

5

Q25.(a) state Hess's law.

(b) Give a brief note on the following thermodynamic terms :

(i) Standard enthalpy of combustion.

(ii) Standard enthalpy of formation.

(d) For the reaction :



$$\Delta U^\circ = -10.5 \text{ kJ and } \Delta S^\circ = -44.1 \text{ J K}^{-1} \text{ mol}^{-1}$$

Calculate ΔG for the reaction and predict whether the reaction may occur spontaneously.

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Q26.(a) On the basis of molecular orbital theory,

(a) Write the electronic configuration of N_2 molecule (At. No. of N=7)

(b) Predict its magnetic nature

(c) Find its bond order and comment on the type of bond present between N atoms in N_2 molecule

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