

GURU HARKRISHAN PUBLIC SCHOOL

First terminal Examination 2014-15

Class XI (1)
Chemistry

Time : 3 hours

MM : 70

General Instruction

- 1 All questions are compulsory.
- 2 Q.No. 1 to 5 are very short answer type questions, each of 1 Mark.
- 3 Q.No. 6 to 10 are short answer type questions, each of 2 Marks.
- 4 Q.No. 11 to 22 are also short answer questions, each of 3 Marks.
- 5 Q.No. 23 carry 4 Marks and Q.No. 24 to 26 are long answer questions of 5 Marks each
- 6 Use log tables, if necessary. Calculators are not permitted.

Q.1 Write the IUPAC name and symbol for the element with atomic numbers 121. (1)

Q.2 Write the correct set of four quantum numbers for the valence electron (outermost electron) of potassium ($Z=19$) (1)

Q.3 Define 'Hydrogen bond'. (1)

Q.4 How is pressure of dry gas related to aqueous tension? (1)

Q.5 State the Law of definite Proportions. (1)

Q.6 Calculate the number of atoms in each of the following: (2)
a) 52u of He b) 52g of He

Q.7 Draw the shapes of $3d_{z^2}$ and $2p_x$ orbitals. (2)

Q.8 Would you expect the second electron gain enthalpy of O as positive, more negative or less negative than the first? Justify your answer. (2)

Q.9 Which hybrid orbitals are used by carbon atoms in the following molecules? (2)
a) $\text{CH}_3 - \text{CH}_3$ b) $\text{CH}_3 - \text{CHO}$

Q.10 At 25 C and 760 mm of Hg pressure a gas occupies 600 ml volume. What will be its pressure at a height where temperature is 10 C and volume of the gas is 640 ml. (2)

'OR'

✓ Density of a gas is found to be 5.46 g/dm^3 at 27°C and at 2 bar pressure. What will be its density at STP?

Q.11 a) Write Vander Waal's equation for 'n' moles of a real gas. (1)

✓ b) Define coefficient of viscosity. Give its S.I. unit. (2)

✓ Q.12 Calculate the temperature of 4.0 moles of a gas occupying 5 dm^3 at 3.32 bar. (3)
($R=0.083 \text{ bar dm}^3 \text{ K}^{-1} \text{ mol}^{-1}$)

Q.13 a) Although geometries of NH_3 and H_2O molecules are distorted tetrahedral, bond angle in water is less than that of ammonia. Discuss. (2)

✓ b) Explain why BeH_2 molecule has a zero dipole moment although the Be-H bonds are polar. (1)

'OR'

✓ a) Distinguish between a sigma bond and a pi bond. (2 points). (2)

✓ b) How is bond length related to bond order of a molecule? (1)

Q.14 a) Which element do you think would have been named by (2)
i) Lawrence Berkeley Laboratory
ii) Seaborg's group?

✓ b) Arrange the following in increasing order of ionic radii: (2)
 N^{3-} , O^{2-} , F^- , Na^+ , Mg^{2+} and Al^{3+} .

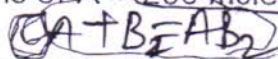
✓ Q.15 Calculate the wavelength, frequency and wave number of a light whose period is $2.0 \times 10^{-10} \text{ s}$. (2)

Q.16 a) What is a limiting reagent? (1)

✓ b) Identify the limiting reagent, if any, in the following reaction mixtures:

✓ i) $2 \text{ mol A} + 3 \text{ mol B}$. (1)

✓ ii) 300 atoms of A + 200 molecules of B (1)



✓ Q.17 Write general outer electronic configuration of s-, p- and d- block elements? (3)

✓ Q.18 Describe the hybridisation in case of PCl_5 . Why are the axial bonds in PCl_5 are longer as compared to equatorial bonds? (3)

Q.19 ✓ What were the three observations of the Rutherford's Nuclear Model of Atom? (3)

Q.20 a) Express the following in scientific notation : (1)
i) 0.0048 ii) 236,000

b) Round upto three significant figures: (1)
i) 34.216 ii) 0.04597

c) Name two life saving drugs which are effective in cancer therapy. (1)

Q.21 a) ✓ How is classical smog different from photochemical smog? (2)
(Any 2 points)

b) ✓ What are the major gaseous pollutants present in the troposphere? (1)

Q.22 a) ✓ What are pesticides and ~~herbicides~~ Explain giving examples. (2)

b) ✓ What do you mean by Biochemical Oxygen demand (BOD)? (1)

Q.23 Rohit and Mohit were returning home after attending the coaching class. There was a traffic jam on the road. Their car A.C. was not working. So they had to lower the door glass to let fresh air in. Forget the fresh air, there was not even pure air. Both the friends started coughing heavily. They also felt dizziness. This showed that the air that was entering their car was polluted.

a) ✓ Which factors were responsible for causing atmospheric pollution? (2)

b) ✓ What remedial measures can be taken to check atmospheric pollution? (2)

Q.24 a) ✓ Give reason : Bond order in N_2^{2+} is 3 whereas it is 2.5 in NO. (3)

b) ✓ What type of hybridisation is involved in SF_6 ? (1)

✓ What orbitals can overlap to form a σ -bond? (1)

'OR'

✓ Write any two favourable factors for the formation of ionic bond. (2)

✓ Write the resonance structures of CO_3^{2-} ion. (2)

c) What is the formula for calculating formal charge of an atom in a polyatomic molecule or ion. (1)

Q25 a) What do you mean by Absolute zero? (1)

b) What would be the S.I. unit for the quantity pv^2T^2/n ? (1)

c) Why do gases deviate from the ideal behaviour? (2)

d) Show that at a constant temperature, pressure is directly proportional to the density of a fixed mass of the gas. (1)

'OR'

a) Gases possess characteristic critical temperature which depends upon the magnitude of intermolecular forces between the gas particles. Critical temperatures of ammonia and carbondioxide are 405.5 K and 304.10 K respectively. Which of these gases will liquify first when you start cooling for 500K to their critical temperature and why? (2)

b) On a ship sailing in pacific ocean where temperature is 23.4°C , a balloon is filled with 2L air. What will be the volume of the balloon when the ship reaches Indian ocean, where the temperature is 26.1°C ? (2)

c) What is the value of the Avogadro Constant? (1)

Q26 a) Give the statement of the following: (3)

- Aufbau Principle
- Pauli Exclusion Principle
- Hund's Rule of Maximum Multiplicity

b) Write down the actual value of charge and mass of an electron? (2)

'OR'

a) What is the physical significance of ψ^2 ? (1)

b) How many neutrons are present in ${}_{92}\text{U}^{238}$? (1)

c) Which series of lines of the hydrogen spectrum lie in the visible region? (1)

d) An element with mass number 81 contains 31.7% more neutrons as compared to protons. Assign the atomic symbol. (2)

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