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PERIODIC TEST-1(2023-24), CHEMISTRY(XI)

MAXI.MARKS-40

TIME-90 MIN

SECTION A[1 MARKS EACH]

Directions : Each of these questions contain two statements,

Assertion and Reason. Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.

(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion

(c) Assertion is correct, reason is incorrect

(d) Assertion is incorrect, reason is correct.

Q.1. Assertion : Equal moles of different substances contain same number of constituent particles.
Reason : Equal weights of different substances contain the same number of constituent particles.

Q.2 Assertion: The compounds NaCl and CaO do not exists as discrete molecules.
Reason: For a substance that does not exist as discrete molecules, the formula weight and the molecular weight are identical.

Q.3 Assertion: 1 mole of sulphuric acid contains 32 g each of sulphur and oxygen element.
Reason: 1 mole of sulphuric acid represents 98 g of the species.

Q.4 Assertion : The radius of the first orbit of hydrogen atom is 0.529Å.
Reason : Radius of each circular orbit (r_n) = 0.529Å (n^2/Z), where n = 1, 2, 3 and Z = atomic number.

Q.5 Assertion (A) : It is impossible to determine the exact position and exact momentum of an electron simultaneously.
Reason (R) : The path of an electron in an atom is clearly defined.

Q.6 If travelling at same speeds, which of the following matter waves have the shortest wavelength?

(a) Electron (b) Alpha particle (He^{2+}) (c) Neutron (d) Proton

Q.7 The pair of ions having same electronic configuration is _____.

(a) Cr^{3+}, Fe^{3+} (b) Fe^{3+}, Mn^{2+} (c) Fe^{3+}, Co^{3+} (d) Sc^{3+}, Cr^{3+}

Q.8 Chlorine exists in two isotopic forms, Cl-37 and Cl-35 but its atomic mass is 35.5. This indicates the ratio of Cl-37 and Cl-35 is approximately

(a) 1:2 (b) 1:1 (c) 1:3 (d) 3:1

Q.9 If 500 mL of a 5M solution is diluted to 1500 mL, what will be the molarity of the solution obtained?

(a) 1.5 M (b) 1.66 M (c) 0.017 M (d) 1.59 M

Q.10 One mole of any substance contains 6.022×10^{23} atoms/molecules. Number of molecules of H_2SO_4 present in 100 mL of 0.02M H_2SO_4 solution is _____.

(i) 12.044×10^{20} molecules

(ii) 6.022×10^{23} molecules

(iii) 1×10^{23} molecules

(iv) 12.044×10^{23} molecules

SECTION B [2 MARKS EACH]

Q.11 Calculate the number of electrons for following set of quantum numbers

(i) n=4 l=2 s=-1/2 (ii) l=1 m=-1 (for phosphorus atom)

Q.12 Write the electronic configuration of the following

(i) Cr^{3+} (ii) O^-

Q.13 Calculate the number of water molecules formed by complete combustion of 3 moles of propane(C_3H_8) .

Q.14 If mole fraction of water is 0.4 in aqueous solution of H2SO4.Calculate the molality of the solution.

Q.15 An electron moves with kinetic energy 3.0×10^{-25} J.Calculate its wave length of matter wave associated with it.(mass of electron =9.1×10^{-28}g).

SECTION C[3 MARKS EACH]

Q.16 (a)Calculate the number of unpaired electron in P^{3-}.

(b)Write the all the quantum numbers associated with 15th electron of Calcium(Z=20).

(C) Arrange the following subshells in increasing order of energy

4s,3d,3f,5s,4p

Q.17 In a sample of 0.006 g of urea (NH2CONH2) find out

(a) Number of nitrogen atoms

(b) Number of proton present in the sample.

Q.18 Calculate the wave length and energy of a light wave whose time period is 5.0×10^{-8}sec.

Q.19 Triethylenemelamine has an empirical formula of $C_3H_4N_2$ and a molar mass of 204 g/mole. What is the correct molecular formula?

Q.20 Calculate the number of atoms in each of the following (i) 52 moles of He (ii) 52 u of He (iii) 52 g of He.

SECTION D [5 MARKS]

PASSAGE BASED QUESTION

The **limiting reagent** (or **limiting reactant** or **limiting agent**) in a chemical reaction is a reactant that is totally consumed when the chemical reaction is completed. The amount of product formed is limited by this reagent, since the reaction cannot continue without it. If one or more other reagents are present in excess of the quantities required to react with the limiting reagent, they are described as *excess reagents* or *excess reactants.*

The limiting reactant (or limiting reagent) is the reactant that gets consumed first in a chemical reaction and therefore limits how much product can be formed.

Answer the following questions related to above passage

Q.21 For the following reaction

$N_2 + 3H_2$----------> $2NH_3$

Find

(i) limiting reagent

(ii) the maximum volume of NH_3 formed if 10 g nitrogen and 10 g hydrogen is allowed to react.

(iii)the amount of reactant left unreacted.