

Q1. In the decomposition of 10 g of MgCO_3 , 0.1 mole of CO_2 and 4.0 g of MgO are obtained.

Hence, percentage purity of MgCO_3 is :

- (1) 50%
- (2) 60%
- (3) 40%
- (4) 84%

Q2. Two substances of carbon and oxygen have respectively 72.73% and 47.06% oxygen. Hence, they follow :

- (1) Law of multiple proportions
- (2) Law of reciprocal proportions
- (3) Law of definite proportions
- (4) Law of conservation of mass

Q3. Sodium combines with $^{35}_{17}\text{Cl}_2$ and $^{37}_{17}\text{Cl}_2$ to give two samples of sodium chloride. Their formation follows the law of :

- (1) Gaseous diffusion
- (2) Conservation of mass
- (3) Reciprocal proportion
- (4) None of these

Q4. $^{35}_{17}\text{Cl}$ and $^{37}_{17}\text{Cl}$ are two isotopes of chlorine. If average atomic mass is 35.5, ratio of masses of these two isotopes is :

- (1) 35 : 37
- (2) 1 : 3
- (3) 3 : 1
- (4) 2 : 1

Q5. 1 g CH_4 and 4 g of a compound X have equal number of moles. Molar mass of X is :

- (1) 16 g/mol
- (2) 32 g/mol
- (3) 4 g/mol
- (4) 64 g/mol

Q6. If Avogadro's number were 10^{10} , instead of the present known value, then mass of one H atom would be :

- (1) 1 amu
- (2) 10^{10} amu
- (3) 6 amu

(4) 6×10^{23} amu

Q7. If two compounds have same empirical formula but different molecular formulae, they must have :

- (1) Same viscosity
- (2) Same vapour density
- (3) Different molecular weight
- (4) Different percentage composition

Q8. A hydrocarbon has 3 g carbon per gram of hydrogen. Hence its formula is :

- (1) CH_4
- (2) C_6H_6
- (3) C_3H_8
- (4) CH_2

Q9. Which of the following has maximum number of carbon atoms?

- (1) 4.4 g CO_2
- (2) 3.0 g C_2H_6
- (3) 4.4 g C_3H_8
- (4) 1.3 g C_6H_6

Q10. A sample of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ contains 3.782 g of Cu. How many grams of oxygen are present in this sample (atomic mass of Cu = 63.5)?

- (1) 0.952 g
- (2) 3.80 g
- (3) 4.761 g
- (4) 8.576 g

Q11. One equivalent of magnesium oxide weighs 20 g. Then one equivalent of magnesium chloride weighs :

- (1) 29.75 g
- (2) 47.5 g
- (3) 95.0 g
- (4) 20.0 g

Q12. CO , CO_2 and C_3O_2 follow :

- (1) Law of definite proportions
- (2) Law of multiple proportions
- (3) Law of conservation of mass
- (4) All of the above

Q13. A near UV photon of $\lambda = 300 \text{ nm}$ is absorbed by a gas and then re-emitted as two photons. One photon is red with wavelength 760 nm . Hence, wavelength of the second photon is :

- (1) 460 nm
- (2) 1060 nm
- (3) 496 nm
- (4) 300 nm

Q14. A wavelength of 400 nm corresponds to :

- (1) Frequency = $7.5 \times 10^{14} \text{ Hz}$
- (2) Wave number = $2.5 \times 10^6 \text{ m}^{-1}$
- (3) Momentum = $1.66 \times 10^{-27} \text{ kg m/s}$
- (4) All are correct values

Q15. If in Moseley's equation, $a = b = 1$, and for the frequency = 400 s^{-1} , element will be :

- (1) K
- (2) Na
- (3) Rb
- (4) Cs

Q16. There is a transition in a H atom from $n = 1$ to $n = 2$ and then from $n = 2$ to $n = 3$, then :

- (1) ΔE values as well as frequencies are additive
- (2) Wavelengths as well as frequencies are additive
- (3) ΔE values as well as wavelengths are additive
- (4) All of the above parameters are additive

Q17. Number of waves made by an electron in a Bohr atom in one complete revolution on its fourth orbit is :

- (1) 2
- (2) 3
- (3) 4
- (4) Infinity

Q18. The electron in a H atom in its ground state absorbs 1.50 times as much energy as the minimum energy for its escape (13.6 eV) from the atom. Kinetic energy of the emitted electron is :

- (1) 13.6 eV
- (2) 20.4 eV
- (3) 34.0 eV
- (4) 6.8 eV

Q19. Which of the following electronic transitions requires the greatest quantity of energy to be absorbed by a hydrogen atom ?

- (1) $n = 1$ to $n = 2$
- (2) $n = 2$ to $n = 4$
- (3) $n = 6$ to $n = \text{infinity}$
- (4) $n = 1$ to $n = \text{infinity}$

Q20. Consider the following statements :

- (a) the spin angular momentum of the electron is constant and cannot be changed
- (b) For spin = $+1/2$, spin angular momentum is $\sqrt{3}h/4\pi$
- (c) Spin angular momentum is a vector quantity and can have only two orientations relative to a chosen axis.

Which among them is/are correct ?

- (1) a and b
- (2) b and c
- (3) a and c
- (4) All three

Q21. If angular momentum quantum number can take value of n also (in addition to other possible values) then total number of electrons in first orbit would have been :

- (1) 2
- (2) 6
- (3) 8
- (4) 10

Q22. A standing wave in a string 35 cm long has a total of six nodes (including those at the ends). Hence, wavelength of the standing wave is :

- (1) 14 cm
- (2) 5.826 cm
- (3) 7 cm
- (4) 17.5 cm

Q23. In some region of space around the nucleus $\Phi^2 = 0$, this region is called :

- (1) Nucleus
- (2) Spherical nodes
- (3) Orbital
- (4) Orbit

Q24. If the shortest wavelength of the photon emitted in a Lyman series is x , then longest wavelength of the photon emitted in Balmer series of He^+ is :

- (1) $9x/5$
- (2) $36x/5$
- (3) $x/4$
- (4) $5x/9$

Q25. Which of the following best describes the emission spectrum of atomic hydrogen :

- (1) A discrete series of lines of equal intensity and equally spaced with respect to wavelength
- (2) A series of only four lines
- (3) A continuous emission of radiation of all frequencies
- (4) Several discrete series of lines with both intensity and spacings between lines decreasing within each series.

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