MAHAVIR SENIOR MODEL SCHOOL

SUBJECT-SCIENCE

CLASS-IX

COMPETENCY BASED QUESTIONS(MCQS)

Q1. n grams of substance X reacts with m grams of substance Y to form p gram of substance *R* and *q gram* of substance *S*. This reaction can be represented as, X + Y = R + S. The relation which can be established in the amounts of the reactants and the products will be

(a) n – m = p – q
(b) n + m = p + q
(c) n = m
(d) p = q

Q2. In the following diagram the least count is

(a) 2 gwt
(b) -2 gwt
(c) 5 gwt
(d) -5 gwt.

Q3. To hear a distinct echo each time interval between the original sound and the reflected sound must be:

(a) 0.2 s
(b) 1s
(c) 2s
(d) 0.1 s

Q4. A wave in slinky travelled to and fro in 5 sec. The length of the slinky is 5m. What is the velocity of wave?

(a) 10m.s
(b) 5m/s
(c) 2m/s
(d) 25m/s

Q5. The distance which compression or a rarefaction travels per unit of time gives

(a) The density of sound wave
(b) Speed of sound
(c) Wavelength of sound
(d) Frequency of sound

Q6. When a body vibrates, it compresses the air surrounding and forms a high-density area known as-

(a) Refraction
(b) Reflection
(c) Rarefaction
(d) Compression

Q7. Sound waves in air is an example of which type of wave?

(a) Longitudinal wave
(b) Transverse wave
(c) Electromagnetic wave
(d) None of the options

Q8. Two atoms are said to be Isobars if ————

(a) They have same atomic number but different mass number

(b) They have same number of electrons but different number of neutrons
(c) They have the same number of neutrons but different numbers of electrons.
(d) None of the above

Q9. An alpha particle is also known as ————
(a) subatomic particle
(b) An unionised helium atom
(c) a neutral particle
(d) a doubly-charged helium ion

Q10. The nucleons are
(a) Protons and electrons
(b) Neutrons and electrons
(c) Protons and neutrons
(d) None of these

Q11.The isotope deuterium of hydrogen has-
(a) No neutrons and one proton
(b) One neutron and two protons
(c) One electron and two neutrons
(d) One proton and one neutron

Q12.The electrons present in the outermost shell are called--
(a) Valency electrons
(b) Octate electrons
(c) Duplet electrons
(d)Valence electrons

Q13. All noble gas molecules are-
(a) Monoatomic
(b) Diatomic
(c) Triatomic
(d) Polyatomic

Q14. The formula of ethanol is $C_2H_5 – OH$. What will be its molecular mass?
(a) 46u
(b) 30u
(c) 57u
(d) 66u

Q15. The atomicity of $K_2Cr_2O_7$ is-
(a) 7
(b) 8
(c) 9
(d) 3

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COMPETENCY BASED QUESTIONS

(ASSERTION AND REASON)

Direction: In each of the following questions, a statement of Assertion is given followed by a corresponding statement of Reason. Of the statements, mark the correct answer as
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Assertion is false but reason is true

Q1. **Assertion**: Atoms always combine to form molecule and ions.
Reason: Atoms of most element are not able to exist independently.

Q2. **Assertion**: Atomicity of ozone is three while that of oxygen is two.
Reason: Atomicity is the number of atoms constituting a molecule.

Q3. **Assertion**: On burning magnesium in oxygen, the mass of magnesium oxide formed is equal to the total mass of magnesium and oxygen
Reason: In a chemical substance, the elements are always present in a definite proportion.

Q4. **Assertion**: Molecular weight of oxygen is 16.
Reason: Atomic weight of oxygen is 16.

Q5. **Assertion:** For noble gases, valency is zero.
Reason: Noble gases have 8 valence electrons.

Q6. **Assertion:** Thomson's atomic model is known as 'raisin pudding' model.
Reason: The atom is visualized as a pudding of positive charge with electrons (raisins) embedded in it.

Q7. **Assertion:** Isotopes are electrically neutral.
Reason: Isotopes of an element have equal number of protons and electrons.

Q8. **Assertion:** The flash of lightening is seen before the sound of thunder is heard.
Reason: Speed of sound is greater than speed of light.

Q9. **Assertion:** Echo is produced when sound is incident on hard and polished surface.
Reason: Sound energy can be totally reflected by objects with soft and loose texture.

Q10. **Assertion:** Compression and rarefaction involve changes in density and pressure.
Reason : When particles are compressed, density of medium increases and when they are rarefied, density of medium decreases.

Q11. **Assertion:** The matter or substance through which sound is transmitted is called a medium
Reason: Sound moves through a medium from the point of generation to the listener.

Q12. **Assertion:** Weight of a body is equal to the force with which the body is attracted towards the earth.
Reason: Weight of a body is independent of the mass of the body.

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CLASS-IX

COMPETENCY BASED QUESTIONS

(CASE BASED QUESTIONS AND DIAGRAMS)

CASE-1

A moving object can do work. An object moving faster can do more work than an identical object moving relatively slow. A moving bullet, blowing wind, a rotating wheel, a speeding stone can do work. How does a bullet pierce the target? How does the wind move the blades of a windmill? Objects in motion possess energy. We call this energy kinetic energy.
Thus, the kinetic energy possessed by an object of mass, m and moving with a uniform velocity, v is
$KE = ½ *mv^2$
The energy possessed by an object is thus measured in terms of its capacity of doing work. The unit of energy is, therefore, the same as that of work, that is, joule (J).

Q1. What are the factors on which kinetic energy depends?
Q2. How will the kinetic energy change when mass of the object is doubled and when velocity of the object is halved?
Q3. Define Kinetic energy.
Q4. If the mass of an object is 10 kg and the velocity of the object is 4m/s then calculate the kinetic energy of the object.

CASE-2

Sound is produced by vibrating objects. The matter or substance through which sound is transmitted is called a medium. It can be solid, liquid or gas. Sound moves through a medium from the point of generation to the listener. When an object vibrates, it sets the particles of the medium around it vibrating. The particles do not travel all the way from the vibrating object to the ear. Sound waves are characterized by the motion of particles in the medium and are called mechanical waves. When a vibrating object moves forward, it pushes and compresses the air in front of it creating a region of high pressure; this region is called a compression(C).When the vibrating object moves backwards, it creates a region of low pressure called rarefaction (R). Hence sound is longitudinal wave.

Q1. What is wave?
Q2. State two differences between mechanical and non-mechanical waves.
Q3. Why is sound wave a longitudinal wave?
Q4. How is sound propagated?

CASE-3

Protons are present in the nucleus of an atom. It is the number of protons of an atom, which determines its atomic number. It is denoted by 'Z'. All atoms of an element have the same atomic number, Z. In fact, elements are defined by the number of protons they possess. For hydrogen, Z = 1, because in hydrogen atom have only one proton is present in the nucleus. Therefore, the atomic number is defined as the total number of protons present in the nucleus of an atom.
The mass of an atom is practically due to protons and neutrons alone. These are present in the nucleus of an atom. Hence protons and neutrons are also called nucleons. Therefore, the mass of an atom resides in its nucleus. For example, mass of carbon is 12 u because it has 6 protons and 6 neutrons, 6 u + 6 u = 12 u. Similarly, the mass of aluminium is 27 u (13 protons+14 neutrons). The mass number is defined as the sum of the total number of protons and neutrons present in the nucleus of an atom. It is denoted by 'A'.

Q1. How does atomic number help to find the valency?
Q2. What is valency? Find the valency of Sulphur and potassium.
Q3. Who discovered protons, electrons and neutrons? Write their masses.
Q4. Which sub-atomic particles are present in the nucleus and what is their charge?

Well labelled diagrams to be drawn for the following-

(a) Oscillating pendulum showing conservation of energy
(b) Graphical representation of Longitudinal and Transverse wave
(c) Rutherford's Model of an atom
(d) Atomic structure of Calcium and Phosphorus