BCM SCHOOL BASANT AVENUE, DUGRI ROAD, LUDHIANA

CLASS – IX

SCIENCE ASSIGNMENT

CHAPTER – IS MATTER AROUND US PURE (CHEMISTRY)

CHAPTER - FORCE & LAWS OF MOTION (PHYSICS)

ANSWER KEY

MCQ

1. (c) $2A + B \rightarrow A_2B$
   The product A2B is a new compound formed hence, it does not show properties of A and B. The product formed is a compound and not an element.
2. (a) Force

ASSERTION/REASON

1. (c) Assertion (A) is true but reason (R) is false.
2. (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

COMPETENCY BASED QUESTIONS.

1. (a) Milk is a colloid. If a beam of light is put on a milk sample contained in a beaker, the path of light beam is illuminated and becomes visible when seen from the other side. This is because the colloidal particles are big enough to scatter light falling on them. This scattered light enters our eyes and we are able to see the path of light beam.
   The scattering of light by colloidal particles is known as Tyndall effect.
   (b) Salt solution is a true solution. If a beam of light is put on a salt solution kept in a beaker in a dark room, the path of light beam is not visible inside the solution when seen from the other side. This is because salt particles present in it are so small that they cannot scatter light rays falling on them.
   (c) Detergent solution, sulphur solution.
2. a) No, the two solutions have different concentrations.

   b)

Answer: We know

$$\text{Mass \% solution} = \frac{\text{Mass of Solute}}{\text{Mass of Solution}} \times 100$$

For first solution:

Mass of solute = 10 gram

Mass of solution = 100 gram + 10 gram = 110 gram

Hence

$$\text{Mass \% solution} = \frac{10}{110} \times 100 = 9.99\%$$

For second solution:

Mass of solute = 10 gram

Mass of solution = 100 gram

Hence

$$\text{Mass \% solution} = \frac{10}{100} \times 100 = 10\%$$

Mass percent of first solution: Mass percent of second solution = 9.99: 10

3. **Ans: Mass of the ball, m = 150 g = 0.150 kg**

Initial velocity, u = +20 m/s (towards the bat)
Final velocity, v = –30 m/s (opposite direction, since it is returned)
Time of contact, t = 0.02 s
Change in momentum = –7.5 kg·m/s
(The negative sign indicates a reversal in direction)

Magnitude of change in momentum = 7.5 kg·m/s
➡ Force = –375 N
(Negative sign: force is opposite to initial motion)
Magnitude of force = 375 N

EXPLANATION BASED QUESTION

1. (a) At 313 K 62 g of potassium nitrate dissolved in 100 g of water. So to produce a saturated solution of potassium nitrate in 50 g of water we need 62/100×50=31 *g* of potassium nitrate.
(b) Some soluble potassium chloride will separate out in the form of crystal at room temperature because the solubility of potassium chloride will decrease.
(c) (i) Solubility of Potassium nitrate at 293 K is 32 g.
(ii) Solubility of sodium chloride at 293 K is 36 g.
(iii) Solubility of Potassium chloride at 293 K is 35 g.
(iv) Solubility of Ammonium chloride at 293 K is 37g g.
The solubility of Ammonium chloride is highest at this temperature.

(d)The solubility of salt increases with the increase in temperature.

REASONING BASED QUESTION

1.When the bullet is fired forward, it gains momentum in the forward direction. According to Newton's Third Law of Motion, "For every action, there is an equal and opposite reaction."

So, the forward momentum of the bullet must be balanced by an equal and opposite momentum — hence, the gun moves backward (recoils). This is also in accordance with the Law of Conservation of Momentum, which states that the total momentum of an isolated system remains constant if no external force acts on it.

CASE STUDY

Answers:

1. **These jerks are due to Newton's First Law of Motion, which states that an object at rest or in motion continues in that state unless acted upon by an external force. When the car suddenly starts, the lower part of the body moves with the car, but the upper body tends to remain at rest, causing a backward jerk. Similarly, when the car stops suddenly, the body continues to move forward, causing a forward jerk**

2. **Moving the hands backward while catching the ball increases the time over which the momentum of the ball is reduced to zero. According to Newton's Second Law of Motion (F = ma), increasing time reduces the force experienced by the hands. If the fielder didn't move his hands backward, the ball's momentum would stop more suddenly, exerting a greater force**

and possibly hurting the hands.

3. **Without seat belts, during sudden braking or acceleration, the body tends to continue in its state of motion or rest. This could result in passengers being thrown forward or backward, leading to injuries. Newton's First Law explains this as the body's inertia resisting the change in motion.**

4. **Yes, Rohit's observations relate directly to real-life safety designs. For example, seat belts in cars prevent passengers from moving forward abruptly, and airbags slow down the stopping force during a crash, both based on Newton's Laws. In sports, gloves used in cricket and goalkeeper gloves in football are padded to reduce the impact force by increasing the time of contact, applying Newton's Second Law.**