

Notes for valuers

- Value points are given for descriptive answers; accept the same ideas in the student's own words.
- Diagrams: neat diagram half the marks, correct labels the other half.

SECTION – A**10 × 1 = 10**

1. C) 373 K
2. B) surface phenomenon
3. C) water
4. B) centrifugation
5. C) zero
6. B) distance travelled
7. B) mass × velocity
8. B) two different bodies
9. B) $6.67 \times 10^{-11} \text{ N m}^2/\text{kg}^2$
10. C) 98 N

SECTION – B**3 × 2 = 6**

11. On a hot, dry day the air has low humidity, so water evaporates faster from the cooler pads. Faster evaporation takes away more heat, so the cooler cools better.
12. A solution in which no more solute can be dissolved at a given temperature is a saturated solution. By heating it (raising the temperature), more solute can be dissolved.
13. $p = mv = 2 \times 3 = 6 \text{ kg m/s}$
If velocity is doubled: $p = 2 \times 6 = 12 \text{ kg m/s}$

SECTION – C**2 × 4 = 8**

14. Any four differences:

Property	True solution	Colloid	Suspension
Nature	Homogeneous	Appears homogeneous, actually heterogeneous	Heterogeneous
Particle size	Less than 1 nm	1 to 100 nm	More than 100 nm
Tyndall effect	Not shown	Shown	May be shown
Settling / filtration	Does not settle, passes through filter paper	Does not settle, passes through filter paper	Settles; can be separated by filtration

15. At maximum height $v = 0$; $u = 19.6 \text{ m/s}$, $g = 9.8 \text{ m/s}^2$ (acting downward) [2 + 2]
 (i) $v^2 = u^2 - 2gh \rightarrow 0 = (19.6)^2 - 2 \times 9.8 \times h \rightarrow h = 384.16/19.6 = 19.6 \text{ m}$
 (ii) $v = u - gt \rightarrow 0 = 19.6 - 9.8t \rightarrow t = 2 \text{ s}$

- 16. A)** Every object in the universe attracts every other object with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between them.

$F = G m_1 m_2 / d^2$, where m_1, m_2 are the masses, d is the distance between their centres, $G = 6.67 \times 10^{-11} \text{ N m}^2/\text{kg}^2$.

Phenomena explained (any four): the force that binds us to the Earth; motion of the Moon around the Earth; motion of planets around the Sun; tides due to the Moon and the Sun; falling of objects to the Earth.

Marks: statement 2, formula & terms 2, phenomena 4.

- 16. B)** Law: the total momentum of two objects is unchanged (conserved) before and after collision, if no external force acts.

Proof: A (mass m_A) and B (mass m_B) collide for time t . Force by A on B: $F_{AB} = m_B(v_B - u_B)/t$; force by B on A: $F_{BA} = m_A(v_A - u_A)/t$.

By the third law $F_{AB} = -F_{BA} \rightarrow m_A u_A + m_B u_B = m_A v_A + m_B v_B$.

Recoil of a gun: before firing, total momentum is zero. The bullet moves forward with momentum mv , so the gun moves backward with equal momentum Mv' — the gun recoils.

Marks: law 2, proof 4, gun example 2.

- 17. A)** 1. Particles of matter have space between them — dissolve sugar in water; the level does not rise noticeably.
2. Particles are continuously moving — smell of incense spreads; a drop of ink spreads in water (diffusion).
3. Particles attract each other — it is hard to break an iron nail, easier to break chalk; a stream of water from a tap does not break.
4. Particles are very small — a few crystals of potassium permanganate colour a large amount of water even after repeated dilution.

Marks: 2 for each characteristic with activity.

- 17. B)** Distillation: put the mixture of acetone and water in a distillation flask fitted with a thermometer; heat slowly; acetone (boiling point 56°C) vaporises first, condenses in the condenser and is collected; water remains in the flask.

Labelled diagram: distillation flask, thermometer, condenser (water in/out), receiver, burner.

Physical changes (any two): melting of ice, dissolving sugar in water, breaking glass, boiling water.

Chemical changes (any two): burning of paper/candle, rusting of iron, cooking food, curdling of milk.

Marks: procedure 3, diagram 3, examples 2.

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