Step-by-Step Solutions & Marking Scheme

CBSE Class 8 Science (Curiosity) — Chapter 5: Exploring Forces

Quick answer key — Section A: 1-(d) 2-(b) 3-(b) 4-(a) 5-(b) 6-(b) 7-(A) 8-(D)

SECTION A — Multiple Choice Questions

1. (d) Change in its mass

A force can make an object move from rest, change its speed, change its direction of motion or change its shape. It cannot change the amount of matter in the object, i.e. its mass.

Marking: 1 mark.

2. Fig. 1 → **(b) 3.4 N**

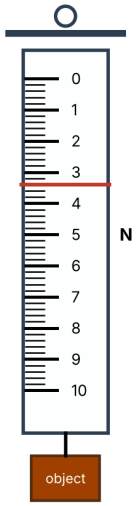


Fig. 1: A spring balance

Step 1: Difference between two bigger marks = 1 N, with 5 small divisions between them.

Step 2: One small division = 1 ÷ 5 = 0.2 N (the least count).

Step 3: The pointer is 2 small divisions after the 3 N mark → 3 + 2 × 0.2 = **3.4 N**.

Marking: 1 mark.

3. Fig. 2 → **(b)**

Step 1: X and Y float in the water (X partly out of the water, Y inside it, not touching the bottom).

Step 2: When an object floats, the gravitational force on it equals the buoyant force of the liquid → (b).

Step 3: Z has sunk, so its gravitational force is *more* than the buoyant force, which rules out (a). Buoyant force acts on every immersed object, so (c) is wrong. Nothing in the figure shows equal weights, so (d) is wrong.

Marking: 1 mark.

4. (a) Muscular force and frictional force

Muscular force and friction act only when there is contact. Magnetic, gravitational and electrostatic forces act without contact, so options (b), (c) and (d) each contain a non-contact force.

Marking: 1 mark.

5. (b)

Mass is the amount of matter in an object and is the same everywhere (60 kg). Weight is the pull of the Earth or Moon on the object; the Moon pulls less, so his weight becomes less.

Marking: 1 mark.

6. (b)

Friction opposes the motion (or the attempt to move) of an object over a surface, so it acts in the direction opposite to that in which the object moves or tries to move.

Marking: 1 mark.

7. Assertion–Reason → **(A)**

Step 1: A: a rolling ball stops on its own — true.

Step 2: R: friction acts opposite to the motion — true.

Step 3: It is this opposing friction that slows and stops the ball, so R explains A → (A).

Marking: 1 mark.

8. Assertion–Reason → **(D) A is false but R is true.**

Step 1: A is false: weight is different on the Earth and the Moon (e.g. 1 kg weighs 10 N on the Earth but 1.6 N on the Moon).

Step 2: R is true: weight is the gravitational pull of the body on the object, and that pull differs from body to body.

Step 3: A false, R true → (D).

Marking: 1 mark.

SECTION B — Short Answer Questions

9. Ring magnets (Fig. 3)

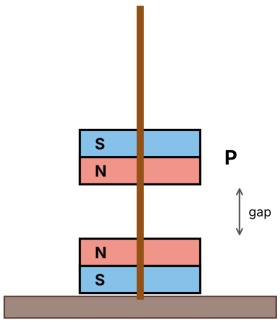


Fig. 3: Two ring magnets on a stick

(a) Magnetic force. It is a **non-contact** force (the magnets do not touch).

(b) P would not float; it would be pulled down and stick to the lower magnet. Turning P over puts unlike poles (N and S) face to face, and unlike poles attract.

Marking: (a) ½ + ½; (b) ½ for the result + ½ for the reason.

10. Bottle in water (Fig. 4)

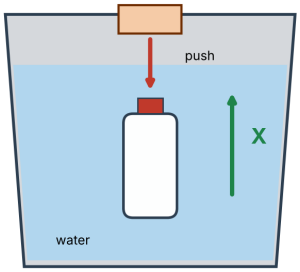


Fig. 4: An empty closed bottle pushed into water

(a) X is the **upthrust** (buoyant force) exerted by the water in the upward direction.

(b) An object sinks if the gravitational force on it (its weight) is more than the buoyant force of the liquid.

Marking: 1 mark for each part.

11. Mass and weight

(a) 1 kg; mass does not change from place to place.

(b) Weight is the gravitational force with which the Earth (or Moon) pulls the object. The Moon's pull is weaker than that of the Earth, so the weight is smaller, whereas the amount of matter (mass) stays the same.

Marking: (a) 1; (b) 1.

SECTION C — Long Answer Questions

12. Friction on different surfaces (Fig. 5)

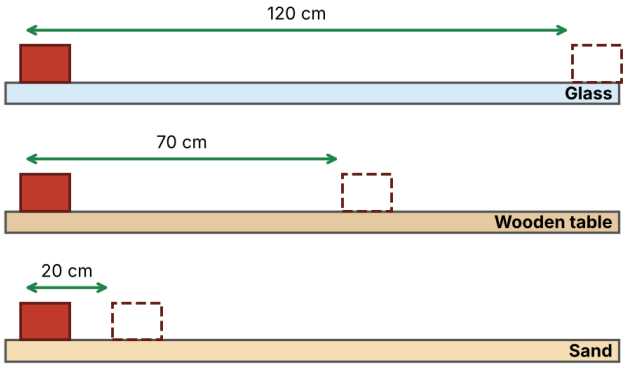


Fig. 5: Same block pushed with the same force on three surfaces

(i) Sand. The block stops after the shortest distance (20 cm), so the opposing force is the greatest.

(ii) Glass < wooden table < sand (the block slides 120 cm, 70 cm and 20 cm respectively).

(iii) Friction acts opposite to the direction in which the block moves.

(iv) Even smooth-looking surfaces have many minute irregularities; when two surfaces touch, these lock into each other and oppose motion.

Marking: 1 mark for each part.

13. Ball thrown upwards (Fig. 6)

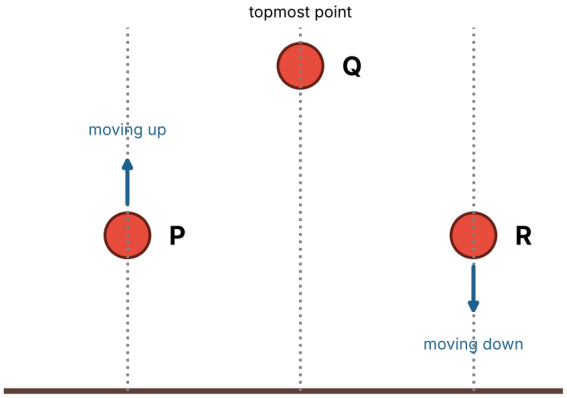


Fig. 6: A ball thrown vertically upwards (air resistance ignored)

(i) The **gravitational force** (force of gravity) of the Earth acts on it, directed **downwards**, towards the Earth, even at the topmost point.

(ii) (a) From P to Q the speed decreases (till it is momentarily zero at Q). (b) From Q to R the speed increases.

(iii) The gravitational force acts downwards, opposite to the upward motion, so the ball slows down.

(iv) It is always an **attractive** force and it is a **non-contact** force.

Marking: 1 mark for each part (½ + ½ in (ii) and (iv)).

14. Contact and non-contact forces

(a) (i) Contact force: a force that acts only when there is physical contact between the objects (direct or indirect). (ii) Non-contact force: a force whose effect can be experienced even when the objects are not in contact.

(b) Contact: muscular force, frictional force. Non-contact: magnetic force, gravitational force, electrostatic force.

Marking: (a) 1 + 1; (b) 2 (½ mark for each correct pair of forces, 1 for all five).

15. Reasons

(i) Friction between the ball and the ground acts opposite to its motion and slows it until it stops.

(ii) A rough road has more irregularities, so there is more friction, which opposes the motion.

(iii) These shapes reduce the force of friction due to the air or water around them.

(iv) A wet floor is more slippery, so there is less friction between the feet and the floor and the feet slip.

Marking: 1 mark for each part.

SECTION D — Case-Based / Practical Questions

16. Weight on different bodies (Fig. 7)

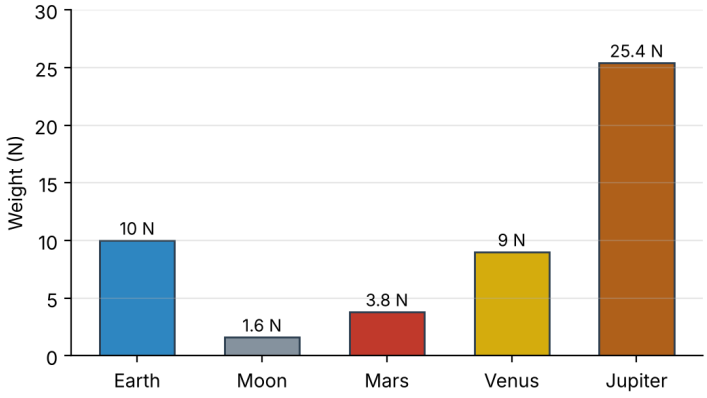


Fig. 7: Weight of the same object (mass 1 kg) on different bodies

(i) Jupiter (25.4 N).

(ii) 1 kg, since mass remains the same everywhere.

(iii) 10 N − 1.6 N = **8.4 N**.

(iv) Weight is the gravitational force exerted by the body on the object, which is different for different bodies; mass is the amount of matter and does not change.

(v) A **spring balance**; the SI unit of weight is the **newton (N)**.

Marking: 1 mark for each part (½ + ½ in (v)).

17. Static charges

(i) Rubbing charged the plastic scale; a charged object attracts small pieces of uncharged paper.

(ii) Electrostatic force; it is a **non-contact** force, as the scale did not touch the paper.

(iii) Both balloons were charged in the same way, so they carry similar (like) charges, and like charges repel.

(iv) The balloon and the woollen cloth acquire opposite kinds of charge on rubbing; unlike charges attract.

(v) Positive and negative charges.

Marking: 1 mark for each part (½ + ½ in (ii)).

Section	A	B	C	D	Total
Marks	8	6	16	10	40

Note: any other correct and relevant answer should be accepted and awarded full marks.