CLASS IX – SCIENCE PRACTICE PAPER (2026-27)

Chapter 6: How Forces Affect Motion

Max. Marks: 40 **Time Allowed: 1 hour 30 minutes**

General Instructions:

(i) This question paper consists of **20 questions** in **5 sections (A to E)**. All questions are compulsory. Internal choice is given in some questions.

(ii) **Section A** has 10 questions of 1 mark each: Q1–8 are Multiple Choice Questions and Q9–10 are Assertion–Reason questions.

(iii) **Section B** has 4 Very Short Answer questions of 2 marks each (about 30–40 words).

(iv) **Section C** has 3 Short Answer questions of 3 marks each (about 50–60 words).

(v) **Section D** has 2 Case-Based questions of 4 marks each.

(vi) **Section E** has 1 Long Answer question of 5 marks with an internal choice.

(vii) Questions are competency-based and application-oriented. Show all steps, with units, in numerical questions. Take $g = 10\ \text{m s}^{-2}$ wherever required, unless stated otherwise.

(viii) **Questions 2, 6, 12, 16, 19 and 20 are figure-based** and refer to Fig. 1 to Fig. 6.

SECTION A – Objective Questions (10 × 1 = 10 marks)

1 One newton is the force that produces: **1**

(A) an acceleration of 1 m s^{-2} in an object of mass 1 g

(B) an acceleration of 1 m s^{-2} in an object of mass 1 kg

(C) a velocity of 1 m s^{-1} in an object of mass 1 kg

(D) an acceleration of 9.8 m s^{-2} in an object of mass 1 kg

2 **[Figure-based]** Fig. 1 shows three blocks P, Q and R on a smooth surface, each acted upon by horizontal forces as marked. In which block is the net force zero, so that a block at rest stays at rest? **1**

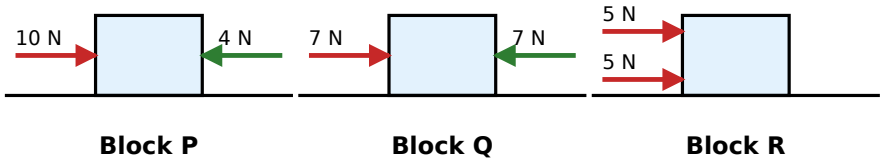


Fig. 1: Forces acting on blocks P, Q and R

(A) P only

(B) Q only

(C) P and R

(D) Q and R

3 When a moving bus stops suddenly, the passengers lurch forward. This is best explained by: **1**

(A) Newton's third law, since the bus pushes the passengers forward

(B) the tendency of the passengers to continue in their state of motion

(C) the force of friction pushing the passengers forward

(D) a force applied on the passengers by the bus in the forward direction

4 A net force of 20 N acts on an object of mass 5 kg. The acceleration produced is: **1**

(A) 0.25 m s^{-2}

(B) 4 m s^{-2}

(C) 25 m s^{-2}

(D) 100 m s^{-2}

5 The gravitational force acting on a person of mass 50 kg near the surface of the Earth (g = 9.8 m s^{-2}) is: **1**

(A) 49 N

(B) 50 N

(C) 490 N

(D) 4900 N

6 **[Figure-based]** Fig. 2 shows the velocity-time graph of a car of mass 1000 kg moving in a straight line. The net force acting on the car between 10 s and 14 s is: **1**

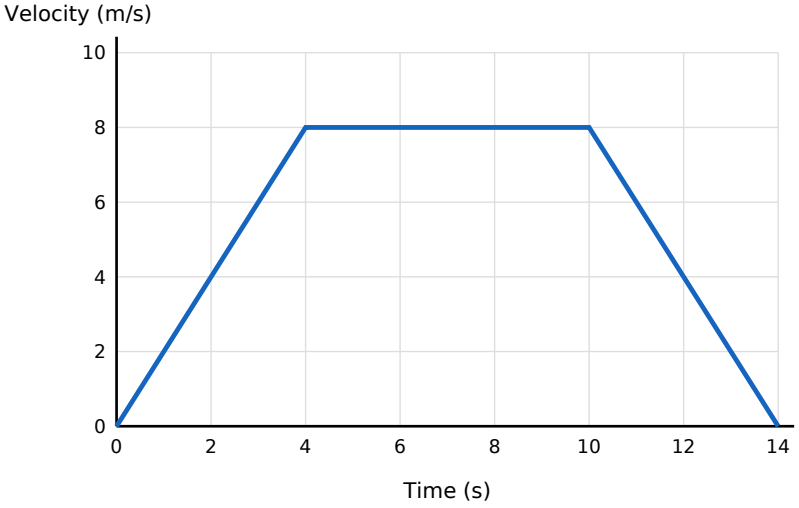


Fig. 2: Velocity-time graph of a car

(A) 2000 N in the direction of motion

(B) 2000 N opposite to the direction of motion

(C) 8000 N opposite to the direction of motion

(D) zero

7 A swimmer pushes the water backwards with her hands and moves forward. The force that moves her forward is the: **1**

(A) force of her hands on the water

(B) force of the water on her hands, directed forward

(C) weight of the swimmer

(D) buoyant force of the water

8 A fielder pulls his hands backwards while catching a fast cricket ball because this: **1**

(A) increases the force on the ball

(B) increases the time in which the ball's velocity becomes zero, so the force is smaller

(C) reduces the mass of the ball

(D) increases the acceleration of the ball

Questions 9 and 10 consist of two statements: Assertion (A) and Reason (R). Choose the correct option:
(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, and R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

9 **Assertion (A):** A heavy stone and a light stone dropped together from the same height reach the ground at the same time (ignoring air resistance). **1**

Reason (R): The acceleration due to gravity does not depend on the mass of the object.

10 **Assertion (A):** The action and reaction forces in Newton's third law do not cancel each other. **1**

Reason (R): The action and reaction forces act on two different objects.

SECTION B – Very Short Answer Questions (4 × 2 = 8 marks)

11 Differentiate between **balanced forces** and **unbalanced forces** on any two points. (1 + 1) **2**

12 **[Figure-based]** Fig. 3 shows two forces P and Q linked with the launch of a rocket. Force P acts on the rocket and force Q acts on the exhaust gases. **2**

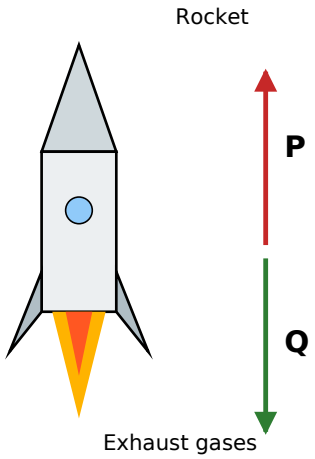


Fig. 3: Forces during a rocket launch

(a) Name the law of motion that explains the launch. (1)

(b) Compare P and Q in magnitude and direction. Why do P and Q not cancel each other? (1)

13 A force of 12 N produces an acceleration of 3 m s^{-2} in an object. Find (i) the mass of the object and (ii) the acceleration produced by a force of 20 N on the same object. (1 + 1) **2**

14 *Attempt either option A or B.* **2**

A. Why is it difficult to walk on a wet, polished floor? Explain using Newton's third law. (2)

OR

B. A gun recoils when a bullet is fired from it. Explain this with Newton's third law and say why the recoil is much slower than the speed of the bullet. (1 + 1)

SECTION C – Short Answer Questions (3 × 3 = 9 marks)

15 (i) Define one newton. (ii) What force is required to give a car of mass 1500 kg an acceleration of 0.8 m s^{-2}? (iii) If the same force acts on a car of mass 3000 kg, what acceleration will it produce? (1 + 1 + 1) **3**

16 **[Figure-based]** A box of mass 20 kg is pushed along a horizontal floor as shown in Fig. 4. A and B are two vertical forces acting on it. The applied force is 50 N and the force of friction is 30 N. **3**

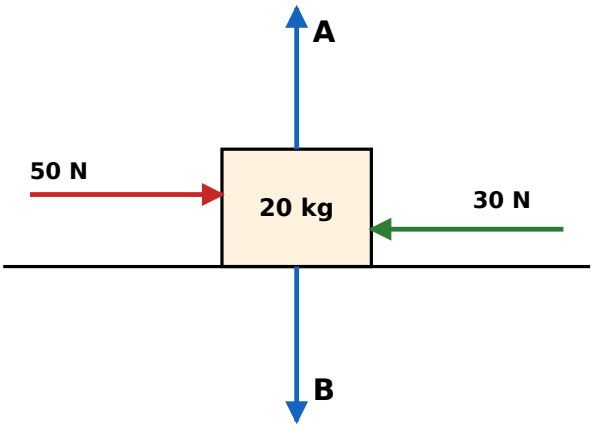


Fig. 4: Forces acting on a box

(i) Name the forces A and B. (1)

(ii) Find the net force on the box and its acceleration. (1)

(iii) What is the net vertical force on the box? Using this, find the magnitude of A. (1)

17 *Attempt either option A or B.* **3**

A. Explain, using Newton's second law, why a cricketer moves his hands backwards while catching a fast ball. (3)

OR

B. Explain, using Newton's second law, how an airbag protects a passenger in a car collision. (3)

SECTION D – Case-Based Questions (2 × 4 = 8 marks)

18 **Case Study: The Stack of Coins** **4**

Neha stacks four coins and presses them against a stretched rubber band on three horizontal surfaces: a wooden table, a laminated table top and a polished tile floor. She pulls the rubber band back to the same mark every time and releases it. After losing contact with the band, the stack travels 18 cm on the wooden table, 30 cm on the laminated table and 55 cm on the tile floor before it stops.

(i) On which surface is the force of friction the largest? Give a reason. (1)

(ii) Which force brings the stack to rest after it leaves the rubber band? (1)

(iii) How would the stack move on an ideal surface where friction is zero? Name the law that explains this. (1)

(iv) Suggest how Neha can measure the force of friction on each surface directly. (1)

19 **Case Study: Two Boxes Pulled Together** **4**

[Figure-based] Two boxes A (4 kg) and B (6 kg) are joined by a light string and kept on a frictionless horizontal surface. A horizontal force of 20 N pulls box B as shown in Fig. 5. Treating both boxes as one system makes the analysis simpler.

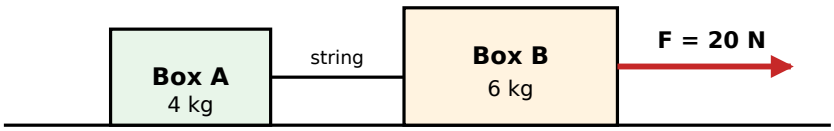


Fig. 5: Two boxes connected by a string

(i) Find the acceleration of the system. (1)

(ii) Find the tension in the string. (1)

(iii) Name one internal force and one external force acting on this system. (1)

(iv) Starting from rest, find the distance travelled by the system in 3 s. (1)

SECTION E – Long Answer Question (1 × 5 = 5 marks)

20 **[Figure-based]** Fig. 6 shows the velocity-time graph of a car of mass 800 kg moving in a straight line along a level road. **5**

Attempt either option A or B.

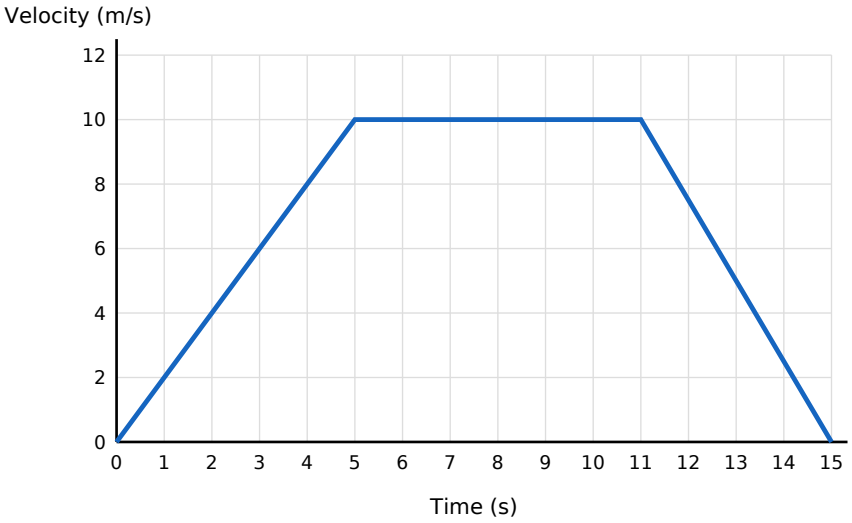


Fig. 6: Velocity-time graph of a car of mass 800 kg

A.

(i) Find the acceleration of the car during the first 5 s. (1)

(ii) Find the net force acting on the car during this time. (1)

(iii) What is the net force from 5 s to 11 s? Which law of motion explains this? (1)

(iv) Find the net force from 11 s to 15 s and state what its sign shows. (1)

(v) If the mass of the car were doubled and the same net force acted during the first 5 s, what would the acceleration be? (1)

OR

B.

(i) Find the distance travelled by the car in the first 5 s. (1)

(ii) Find the distance travelled from 5 s to 11 s. (1)

(iii) Find the distance travelled from 11 s to 15 s. (1)

(iv) Find the total distance travelled and the average speed for the whole 15 s. (1)

(v) Find the net force on the car from 11 s to 15 s and its direction. (1)

***** END OF QUESTION PAPER *****