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QUESTION PAPER
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School: delhi public school
Teacher: atul singh
Grade: Grade 11
Subject: Physics
Chapter: Motion
Topic: Laws of motion
Subtopic: third law of motion

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Q1: A 2 kg ball and a 5 kg ball are dropped simultaneously from the same height. Which of the following statements is MOST accurate regarding the forces they exert on the Earth, according to Newton's Third Law, *before* they hit the ground (assuming negligible air resistance)?

Difficulty: HARD
Type: MCQ
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1. The 5 kg ball exerts a greater force on the Earth.
2. Both balls exert the same force on the Earth.
3. The 2 kg ball exerts a greater force on the Earth.
4. Neither ball exerts any force on the Earth until impact.
Correct Answer: The 5 kg ball exerts a greater force on the Earth.

Q2: A rocket accelerates upwards by expelling hot gases downwards. What is the primary reason the rocket *initially* accelerates upwards, according to Newton's Third Law?

Difficulty: HARD
Type: MCQ
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1. The hot gases exert a downward force on the air, and the air pushes the rocket upwards.
2. The rocket exerts an upward force on the hot gases, and the gases push back on the rocket with an equal and opposite force.
3. The hot gases exert a downward force on the rocket, and the rocket pushes back on the gases with an equal and opposite force.
4. The rocket exerts a downward force on the hot gases, and the gases push back on the rocket with an equal and opposite force.
Correct Answer: The rocket exerts a downward force on the hot gases, and the gases push back on the rocket with an equal and opposite force.

Q3: A mosquito hits the windshield of a fast-moving car. According to Newton's Third Law, which statement is correct concerning the forces between the mosquito and the car?

Difficulty: HARD
Type: MCQ
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1. The force exerted by the mosquito on the car is greater than the force exerted by the car on the mosquito.
2. The force exerted by the car on the mosquito is greater than the force exerted by the mosquito on the car.
3. The force exerted by the car on the mosquito is equal to the force exerted by the mosquito on the car.
4. The car exerts a force, but the mosquito doesn't because it's so small.
Correct Answer: The force exerted by the car on the mosquito is equal to the force exerted by the mosquito on the car.

Q4: A person is standing on a skateboard holding a heavy medicine ball. The person throws the medicine ball forward. Which of the following statements BEST describes the motion of the person and the skateboard *immediately* after the ball is released, according to Newton's Third Law?

Difficulty: HARD
Type: MCQ
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1. The person and skateboard will remain stationary.
2. The person and skateboard will move forward with a greater velocity than the ball.
3. The person and skateboard will move backward with a velocity proportional to the mass of the ball and the combined mass of the person and skateboard.
4. The person and skateboard will move forward with a velocity proportional to the mass of the ball and the combined mass of the person and skateboard.
Correct Answer: The person and skateboard will move backward with a velocity proportional to the mass of the ball and the combined mass of the person and skateboard.

Q5: Consider two ice skaters, A and B, standing on frictionless ice. Skater A pushes skater B. Which of the following statements is MOST accurate concerning the subsequent motion and forces, adhering strictly to Newton's Third Law?

Difficulty: HARD
Type: MCQ
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1. Skater B will move, but Skater A will remain stationary because Skater A initiated the force.
2. Skater B will move and Skater A will also move in the same direction, but at different speeds.
3. Skater B will move and Skater A will also move in the opposite direction; the forces are equal, but the skater with the smaller mass will experience a larger acceleration.
4. Skater B will move and Skater A will also move in the opposite direction; the skater with the larger mass will experience a larger acceleration.

Correct Answer: Skater B will move and Skater A will also move in the opposite direction; the forces are equal, but the skater with the smaller mass will experience a larger acceleration.