F.3 Newton's Laws & Momentum

Practice Worksheet — name: _____ date: _____

FORMULAS FOR THIS TOPIC

MOMENTUM $p = mv$ IMPULSE $F\Delta t = \Delta p$ CONSERVATION OF MOMENTUM $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$

SECTION A — MULTIPLE CHOICE

A1. A 2 kg ball moving at 3 m/s collides with a stationary 1 kg ball. If they stick together, what is their combined velocity?

- (A) $1\,m/s$
- (B) $2\,m/s$
- (C) $3\,m/s$
- (D) $6\,m/s$

A2. Which law explains why a passenger lurches forward when a bus brakes suddenly?

- (A) Newton's First Law
- (B) Newton's Second Law
- (C) Newton's Third Law
- (D) Hooke's Law

SECTION B — SHORT ANSWER

B1. State Newton's Third Law and give an everyday example.

B2. Define momentum and explain why it is a vector quantity.

ANSWER KEY

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Section A

A1: $2\,m/s$

A2: Newton's First Law

Section B

B1: For every action force there is an equal and opposite reaction force. Example: a swimmer pushes water backwards, and the water pushes the swimmer forwards.

B2: Momentum is the product of mass and velocity ($p = mv$). It is a vector because velocity has direction; therefore momentum has the same direction as velocity.