

**Question 20** (3 marks)

A student is investigating inertial and non-inertial frames of reference. The student carries out a series of activities on a boat floating on a large, calm lake. The boat remained level during these activities.

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Each activity and the student’s observed results are recorded in the table.

<i>Activity</i>	<i>Observation</i>
Dropped a ball from a set height	Ball fell vertically with increasing velocity
Rolled a ball from one side of the boat to the other	Ball rolled across the floor with a constant velocity
Rolled a ball from the back of the boat towards the front of the boat	Ball rolled across the floor with a constant velocity

Justify the student’s conclusion that: ‘The boat can be regarded as an inertial frame of reference’.

The boat will stay at rest on the water unless a large force acts upon it, the ball is too small to cause the boat to move on the water.