Oblique impact with a smooth plane

Answers

Further Maths topic practice

This topic online

Q	Answer	Marks
1	**a)** 4.98 m s^{-1}1 **b)** 22.8°	5
2	**a)** e = 0.484 **b)** 3.71 m s^{-1}	5
3	**a)** 1.6√3 = 2.77 N s **b)** 6.4 J	6
4	**a)** tan β = e tan α (shown) **b)** α = 37.9° **c)** 62.9°	7
5	**a)** (5i + 3j) m s^{-1} **b)** 3.5j N s **c)** 1.75 J	7
6	**a)** e = 2/3 **b)** 2 N s **c)** 88.9°	7
7	**a)** sin α = 2/3 (shown) **b)** 24.1°	7
8	**a)** e tan^2 α = 1 (shown) **b)** α = 60° **c)** fraction lost = 2/3 (shown)	8
9	**a)** e = 1/3 (shown) **b)** 7/√3 = 4.04 m s^{-1} **c)** 1.62 N s	8
10	**a)** (-6i + 4j) m s^{-1} **b)** (3i + 4j) m s^{-1} **c)** 3i + 4j = -½(-6i - 8j), so parallel and opposite (shown) **d)** 6.38 J (6.375 J)	9
11	**a)** (3i + 5j) m s^{-1} (shown) **b)** 1.6√2 = 2.26 N s **c)** 50.9°	10
12	**a)** (-1.2i + 1.6j) N s **b)** The wall is smooth, so the impulse is perpendicular to it, and (-1.2i + 1.6j)·(4i + 3j) = 0 **c)** e = 0.6 **d)** 32% **e)** 31.0°	11

Full worked solutions, written out by hand, are on the solutions sheet for this topic.

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