Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic: Mechanics And Materials

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Mark Schemes

Q1.

(a) Attempt to determine area under graph or statement that area under needed or $0.5 \times 15 \times 10^{-3}$ ^{x} 66 ✔

0.495 (N s)✔

condone power of 10 error

2

(b) Momentum before = 0.045 × 7.1 = 0.320 (N s) down✔

Momentum after = 0.045 × 3.9 = 0.175 (N s) upwards✔

Change = 0.495 (N s) ✔

3

(c) Initial KE on impact = $0.5 \times 0.045 \times 7.1^2 = 1.13$ (J) or Ke after impact = 0.342 (J)✔

Fractional change ke after / ke before = 0.30✔

Use of their fractional change cubed✔

Percentage change after 3 bounces = $0.3^3 \times 100$ (%) = 2.7%✔

4

(d) As ball falls momentum of ball toward the Earth (always) = momentum of Earth toward the ball ✔

On impact the momentum of both ball and Earth become zero✔

After impact momentum of ball away from Earth = momentum of Earth in opposite direction✔

3

[12]

Q2.

(a) Vertical velocity = 40 sin 30

= 20 (m s^{-1}) ✔

1

(b) Line vertically downward from point X ✔

Ignore labelling unless two or more arrows drawn

1

Downloaded from www.merit-minds.com

(c) Method leading to a numerical answer

e.g. $v = u + at$ / $0 = 20 - (9.81 \times t)$ gives $t = 2.0(4)$ ✔

total time of flight = 4.08 / 4.1 (s) ✔

Any alternative acceptable method allowed
Need to see one or more dp for final credit

2

(d) Straight line (of positive or negative gradient) ✔

Starting at 20 ms^{-1} (or − 20 ms^{-1}) ✔

Crossing the x axis at 2.0s approximately ✔

*Any single straight line over the 6.0s will score this mark **OR** ecf from part **(a)***
Any line which crosses at 2.0s (and only here) will score this mark

3

(e) Area under graph (between 4s and 6s) ✔

$= (20 \times 2) + \frac{1}{2}(20 \times 2)$ ✔

= 60 m ✔

Alternative to use equation of motion selecting

$s = ut + \frac{1}{2}at^2$ ✔

$s = (20 \times 2) + \frac{1}{2}(9.81 \times 2^2)$ ✔

$s = 59.6$ *m* ✔

(values with 56 − 62 acceptable from graph)

3

(f) ***MAX 2***

reaches lower height than X✔

at an earlier time✔

hits ground closer to cliff base✔

MAX 2

[12]

Downloaded from www.merit-minds.com