

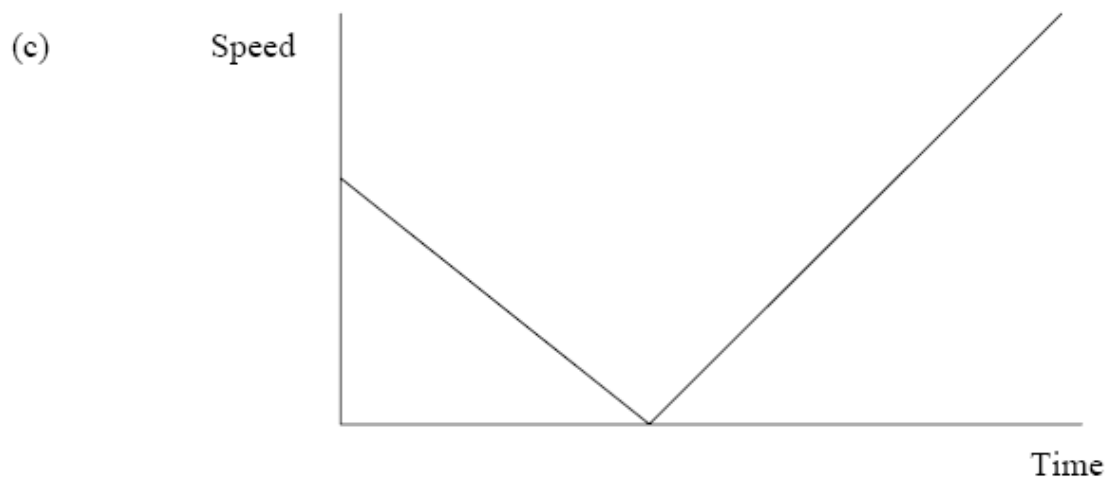
## 2IB Physics SL + HL. Test 29-5-2008 TM – *Answers*

1. M02 S1: 1 - B
2. M02 S1: 2, H1: 1 - C
3. M02 H1: 8 - B
4. M02 S1: 4, H1: 3 - B
5. M02 S1: 13 - C
6. M02 S1: 5, H1: 5 - C
7. M02 S1: 6 - B
8. M02 H1: 4 - D
9. M02 S1: 8 - A
10. M02 S1: 9, H1: 10 - B
11. M02 H1: 9 - D
12. M02 S1: 10 – A+B
13. M02 H1: 7 – D
14. M02 S1: 11, H1: 11 - B
15. M02 S1: 12 - B
16. M02 H1: 12 - C
17. M02 H1: 13 - C
18. M02 H1: 15 - C
19. M02 S1: 15, H1: 18 – B (no heat transf. to iron, if much iron and time: D)
20. M02 S1: 16 - C

## 2IB Physics SL + HL. Test 29-5-2008 TM – Answers

21. M02 S2: A2. Marks: 9.

- (a) use  $v^2 = 2gh$   
to give  $h = 7.2$  m;  
above sea-level = 37.2 m;
- (b) use  $v = u + gt$  to find time to reach maximum height;  
 $t = 1.2$  s;  
use  $v^2 = u^2 + 2gh$  to find the speed with which stone hits the sea  
gives  $v = 27.3 \text{ m s}^{-1}$ ;  
use  $v = u + gt$  to give  $t = 1.52$  s;  
total time =  $1.52 + 2.4 = 3.9$  s;  
*or* they might use  $-30 = 12t - 5t^2$ ;



same slopes;  
greater final speed at sea;  
if velocity-time drawn then;

22. Marks: 6.

- (a) 287 s = 4.78 min  
(b) No heat exchange with surroundings. No heat transferred to kettle.

## 2IB Physics SL + HL. Test 29-5-2008 TM – *Answers*

23. M02 S2: B1. Marks: 25.

- (a)  $t_1 = 0.6 \text{ s}$  position;  
 $t_2 = 0.7 \text{ s}$  position;

- (b) (i)  $g = \text{slope of graph};$   
 $\text{slope of graph} = \frac{6.0}{0.6};$   
 $= 10.0(\pm 0.3) \text{ m s}^{-2};$

- (ii)  $h = \frac{v^2}{2g};$   
 $= \frac{16}{(2 \times 10.0)};$   
 $= 0.8 \text{ m};$   
*or* from the graph time to reach maximum height of rebound = 0.4 s;  
 $h = \frac{1}{2}gt^2;$   
 $\frac{1}{2} \times 10.0 \times 0.16 = 0.8 \text{ m};$

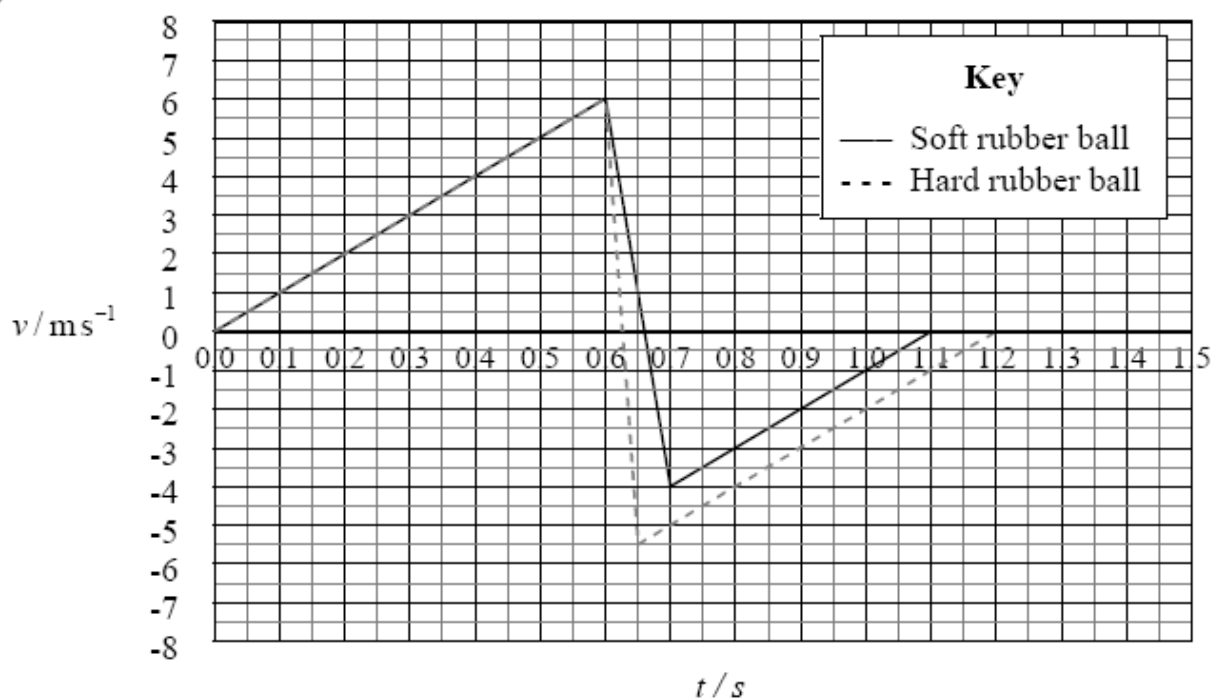
- (c) momentum at  $t_1 = 0.2 \times 6.0 = 1.2 \text{ N s};$   
 momentum at  $t_2 = 0.2 \times -4.0 = -0.8 \text{ N s};$   
 change in momentum = 2.0 N s;

- (d)  $F = \text{rate of change of momentum};$   
 from the graph time = 0.1 s;  
 therefore  $F = \frac{2.0}{0.1};$   
 $= 20 \text{ N};$   
 (ECF  $\Delta p = 0.4 \text{ N s}$   $F = 4 \text{ N}$ )

- (e) Look for an answer which shows that they understand that it is the system comprising the ball and the Earth in which momentum is conserved. If they recognise that the collision is inelastic but can get no further award *[1]*.

- (f) equal;  
 Newton 3;  
 states forces are equal (and opposite);  
*OWTTE*  
*Look for an appreciation of Newton 3*

(g)



$0 \rightarrow 0.6\text{ s}$  is the same;  
 shorter contact time;  
 speed greater leaving floor;  
 same slope for rebound;  
 longer time to reach max rebound height;