

## 2IB Physics SL+HL. Training May 2008 TM. Answers.

1. N02 S1: 2, H1: 1 - B
2. N02 H1: 2 - C
3. N02 S1: 1 - D
4. N02 S1: 5 - A
5. N02 S1: 3 - C
6. N02 S1: 4 - A
7. N02 S1: 6, H1: 3 - C
8. N02 H1: 4 - C
9. N02 S1: 7 - C
10. N02 S1: 8, H1: 5 - D
11. N02 H1: 6 - A
12. N02 S1: 9, H1: 7 - D
13. N02 S1: 10, H1: 8 - B
14. N02 S1: 11 - D
15. N02 H1: 9 - C
16. N02 H1: 10 - A
17. N02 S1: 12 - A
18. N02 H1: 11 - D
19. N02 S1: 15, H1: 15 - D
20. N02 S1: 13, H1: 14 - D
21. N02 S1: 16, H1: 19 - A
22. N02 S1: 17, H1: 20 - C
23. N02 H1: 24 - B
24. N02 S1: 18 - A
25. N02 S1: 19, H1: 21 - C

## 2IB Physics SL+HL. Training May 2008 TM. Answers.

26. N02 H1: 22 - C

27. M02 S1: 17 - C

28. M02 S1: 18, H1: 21 - C

29. M02 H1: 20 - C

30. M02 H1: 22 - B

31. M02 S2: B3p1

(a) (i) 10 cm

(ii) 60 cm

(b)  $v = f\lambda = \frac{\lambda}{T};$   
 $= 3.0 \text{ m s}^{-1};$

(c) 0.1 s is half a period;  
therefore wave has moved forward 30 cm;  
therefore -ve sine;  
*i.e. [1] for correct sketch.*

(d) (i)



Undisturbed cord

(ii)  $\lambda = 5.0 \text{ m};$

$$f = \frac{c}{\lambda};$$
$$= 2.0 \text{ Hz};$$

(iii) 4.0 Hz

## 2IB Physics SL+HL. Training May 2008 TM. Answers.

32. N02 S2: B1p2, H2: B1p2

(a) (i)  $\frac{1}{2}m_1v_1^2 = mgh_1;$   
 $v = \sqrt{2gh_1};$

(ii)  $p_{\text{before}} = m_1\sqrt{2gh_1};$   
 $p_{\text{after}} = (m_1 + m_2)v';$   
 $p_{\text{before}} = p_{\text{after}};$   
 to give  $v' = \frac{m_1\sqrt{2gh_1}}{m_1 + m_2};$

(b) conservation of energy;

(c) because the collisions between the balls is inelastic / energy is always lost in the collision between the balls / *OWTTE*;  
 larger mass ascending;

33. N02 S2: B2p2

(a) loss on  $PE = mg\Delta h;$   
 $= 800 \times 10 \times 20 = 1.6 \times 10^5 \text{ J};$   
 gain in  $KE = \frac{1}{2}mv^2 = 400 \times 25 = 10\,000 \text{ J};$   
 loss in energy  $= 1.5 \times 10^5 \text{ J};$   
 $= \text{work done against friction} = Fd;$   
 to give  $F = \frac{(1.5 \times 10^5)}{200} = 750 \text{ N};$

(b) PE at point A:  $mgh = 800 \times 10 \times 50 = 400\,000 \text{ J};$   
 work in traveling 600 m is  $Fd = 750 \times 600 = 450\,000 \text{ J};$   
 thus insufficient energy to do the required work against friction, will not reach the service station;

(c) air resistance;  
 air resistance increases with speed;

## 2IB Physics SL+HL. Training May 2008 TM. Answers.

34. M02 S2: B2

- (a) (i) Award [1] if *measure* is omitted, [1] if *average* is omitted and [1] if *kinetic* is omitted.  
temperature is a measure of the average kinetic energy of the molecules;

Award [1] if *total* is omitted.

internal energy is the total energy of the molecules;

[1]

- (ii) Look for an answer along these lines:

when the molecules collide with the moving piston they rebound with a greater speed;

their KE is therefore increased and since KE measures temperature, the temperature increases / energy is transferred to the molecules by the moving piston *etc.*;

[1]

- (b) (i) longer arrows;  
but not all the same length *or* in the same direction;

.