IB Physics
Assessment paper answers: 2 Mechanics

1. A (1)
2. A (1)
3. D (1)
4. C (1)
5. B (1)
6. D (1)
7. D (1)
8. C (1)
9. A (1)
10. B (1)

Total: 10 marks

1. a) 

Mark both together.

$V_h$: horizontal arrows equal in length;

$V_v$: two vertical arrows, the one at 1.0 m noticeably longer than the one at 0.5 m;

If arrows correct, but wrong points award (1) only.

b) curve that goes through all data points;

stops at $y = 1.8$ m as this is the height of the wall;

from graph $d = 1.5 \pm 0.1$ m;
c) travels vertically 1.8 m in 0.6 s /1.25 m in 0.5 s;

\[ g = \frac{2s}{t^2}; \]

to give \( g = 10 (\pm 1) \text{ m s}^{-2}; \)  

Award (2) marks maximum for any time shorter than 0.5 s.

Total: 8 marks

2. a) a straight line; through the origin;  
   b) any straight line; that fits within all the error bars;

2. a) attempt using principle of moments (even if in error);  
   \[ F \times 1.2 = 600 \times 0.4; \]
   therefore \( F = 200 \text{ N}; \)  

(ii) resultant force = zero, therefore reaction = 600 – 200 = 400 N;  
     up;  

Total: 7 marks
**b) (i)** correct use of $F_{\text{horizontal}} = 260 \cos 40$ or $260 \sin 50$;

\[ F_{\text{horizontal}} = 1992 \text{ N} \approx 200 \text{ N} \]  

(2)

(ii) realization that resultant force is zero (constant velocity);

so friction $= F_{\text{horizontal}} \approx 200 \text{ N}$;  

(2)

Total: 9 marks

**4. a)** mass x velocity;  

**b) (i)** momentum before $= 800 \times 5 = 4000 \text{ N s}$;

momentum after $= 2000 \nu$;

conservation of momentum gives $\nu = 2.0 \text{ m s}^{-1}$;  

(3)

(ii) KE before $= 400 \times 25 = 10000 \text{ J}$

KE after $= 1000 \times 4 = 4000 \text{ J}$;

loss in KE $= 6000 \text{ J}$;  

(2)

Total: 6 marks