

2IB Physics HL only. Test 29-5-2008 TM – *Answers*

1. M02 S1: 3 - A
2. M02 H1: 2 - A
3. M02 H1: 17 - C
4. M02 S1: 7 - B
5. M02 H1: 14 - B
6. M02 S1: 14, H1: 16 - C
7. M02 H1: 23 - C

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8. M02 H2: A2. Marks: 11.

(a) (i) use $v^2 = 2gh$;

with $v = 12 \cos 60 = 6.0 \text{ m s}^{-1}$;

to give $h = 1.8 \text{ m}$;

above sea-level = 31.8 m;

or

$v = 6.0 \text{ m s}^{-1}$;

time to reach maximum height = $\frac{6.0}{10} = 0.6 \text{ s}$;

height reached = $\frac{1}{2}vt = \frac{1}{2}(6.0) \times (0.6) = 1.8 \text{ m}$;

max height above sea = $30 + 1.8 = 32 \text{ m}$;

(ii) use $v^2 = u^2 + 2gh$ to find vertical speed with which stone hits sea with $u = 6.0 \text{ m s}^{-1}$;

gives $v = 25 \text{ m s}^{-1}$;

horizontal speed = $12 \cos 30 = 10 \text{ m s}^{-1}$;

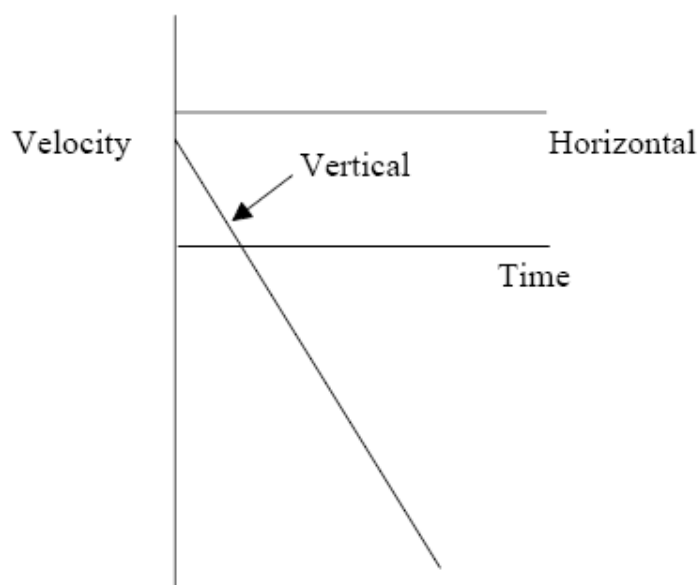
therefore speed = $\{(25)^2 + (10)^2\}^{1/2}$;

= 27 m s^{-1} ;

or they might use $-30 = 12t - 5t^2$;

or energy argument;

(b)



correct vertical;

correct horizontal;

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9. N02 S2: B2p1. (H2: B1p1). Marks: 15.

- (a) sketch rough hyperbola section;
going to double volume and half pressure;
- (b) molecules have further to go before striking a wall;
so collide with walls less frequently, resulting in lower pressure;
OR
there are fewer molecules per unit volume;
so fewer collisions per unit time with walls;
- (c) KE does not change;
since temperature remains constant;
- (d) straight line from origin through and beyond state 2;
to twice the pressure and twice the absolute temperature;
- (e) *Look for at least three of the four aspects listed below.*
heat increases kinetic energy of molecules;
molecules moving faster, so strike walls more often;
and with higher velocity;
both aspects lead to bigger rate of momentum change at wall;
- (f) yes, since the gas is heated, and temperature increases
- (g) initial temperature is 20 °C or 293 K;
stays the same after first process
second process $PV = nRT$, so $T \propto P$ at constant V ;
so T doubles to 586 K or 313 °C;
or they might use $\frac{P_1}{T_1} = \frac{P_2}{T_2}$;