Note that these are the answers to the numerical and simple expression questions.

1. (a) 85 ms\(^{-1}\); 306 kph  
   (b) 0.71 ms\(^{-2}\)  
   (c) 0.07
   
   (d) (i)  
   (e) \(v A \rho\)  
   (f) 1.22 \(\times 10^4\) N

2. (c) E

3. (a) 4.2 \(\times 10^4\) km  
   (b) 55 ms\(^{-1}\)  
   (c) 2.5 ms\(^{-1}\)
   
   (d) in direction of arrow

4. (a) sum of external torques; time-rate-of-change or angular momentum  
   (c) zero

5. 0.5 ms\(^{-1}\)

6. 0.5

7. (b) 124 m  
   (c) 34 \(\mu\)s  
   (d) 110 km

8. (a) \(v = \sqrt{\frac{2(P_{atm} + \rho g(d - h))}{\rho}}\)  
   (b) (i) 0.5  
   (b) (ii) 2.1 \(\times 10^5\) Pa, 305 mole

9. (a) (i) positive-x  
   (a) (ii) 0.020 m  
   (a) (iii) 9.0 Hz/(2\(\pi\))
   
   (a) (iv) 8\(\pi\) m  
   (a) (v) 36 ms\(^{-1}\)  
   (a) (vi) 26 N
   
   (b) (i) 4  
   (b) (iii) open pipe is longer  
   (c) 26.4 ms\(^{-1}\)

10. Note 2 different initial temperature of ice were given, so there are two sets of possible correct answers.

<table>
<thead>
<tr>
<th>Initial temperature of – 4°C</th>
<th>Initial temperature of – 40°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 3.42 kJ</td>
<td>(a) 4.22 kJ</td>
</tr>
<tr>
<td>(b) 4.09 °C</td>
<td>(b) 5.04 °C</td>
</tr>
<tr>
<td>(c) 20 °C</td>
<td>(c) 19 °C</td>
</tr>
<tr>
<td>(e) 23 °C</td>
<td>(e) 23 °C</td>
</tr>
</tbody>
</table>