

1 (a) The Moon that orbits the Earth is

(1)

- A a comet
- B a dwarf planet
- C a natural satellite
- D an asteroid

(b) The value of  $g$  (gravitational field strength) on Earth is 10 N/kg.

On the Moon  $g$  is 1.6 N/kg.

An object weighs 10N on Earth.

What would it weigh on the Moon?

(1)

- A 0.16 N
- B 1.6 N
- C 16 N
- D 60 N

(c) Figure 1 is a table showing the distance from the Sun of the orbit of some planets.

The distances are in AU (astronomical units).

1 AU = 150 000 000 km

planet	distance of orbit from the Sun in AU
Mercury	0.39
Earth	1
Mars	1.5
Jupiter	5.2
Neptune	30.1

**Figure 1**

(i) State the distance of Earth from the Sun in kilometres.

(1)

distance of Earth from the Sun = ..... km

- (ii) One of the planets in the table orbits the Sun between the orbits of Earth and Jupiter.

Calculate the distance from the Sun to this planet in kilometres.

(2)

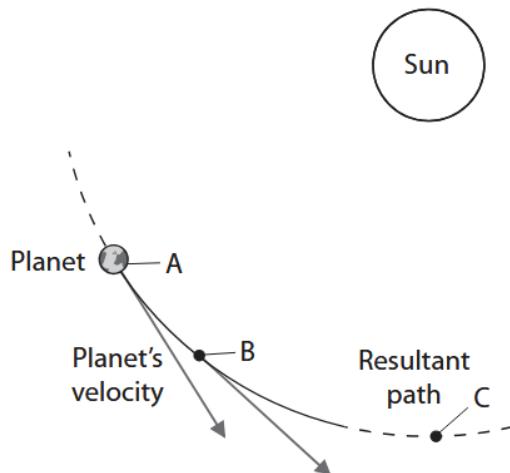
..... km

- (d) Explain why Mercury orbits the Sun in a much shorter time than Neptune orbits the Sun.

(2)

.....  
.....  
.....  
.....

- (e) Figure 2 shows part of the circular orbit of a planet around the Sun.



**Figure 2**

- (i) Give the name of the force that keeps the planet moving in a circular orbit.

(1)

.....

- (ii) The direction of the velocity of the planet at points A and B is shown by the arrowed lines.

Add an arrowed line to the diagram to show the direction of the velocity at C.

(1)

**(Total for Question 1 = 9 marks)**

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<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
<b>1(a)</b>	C natural satellite	<b>(1)</b>

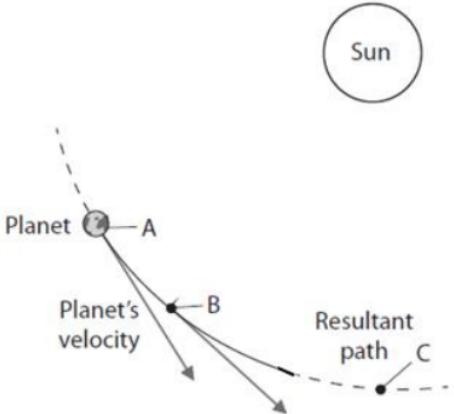
<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
<b>1(b)</b>	B 1.6 N	<b>(1)</b>

<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
<b>1(c)(i)</b>	150 000 000 (km)	<b>(1)</b>

<b>Question number</b>	<b>Answer</b>	<b>Additional guidance</b>	<b>Mark</b>
<b>1(c)(ii)</b>	<p>substitution (1)  <math>1.5 \times 150\,000\,000</math></p> <p>evaluation (1)  <math>225\,000\,000</math> (km)</p>	<p>sight of 1.5 or Mars named gains 1 mark</p> <p>full marks will be awarded for correct numerical answer without working</p>	<b>(2)</b>

<b>Question number</b>	<b>Answer</b>	<b>Additional guidance</b>	<b>Mark</b>
<b>1(d)</b>	<p>An explanation that combines identification - understanding (1 mark) and reasoning/justification - understanding (1 mark):</p> <p>radius of (circular) orbit smaller (1)</p> <p>length of the orbit of Mercury is smaller (1)</p>	<p>Mercury is closer to the Sun</p> <p>Mercury travels faster</p>	<b>(2)</b>

<b>Question number</b>	<b>Answer</b>	<b>Additional guidance</b>	<b>Mark</b>
<b>1(e)(i)</b>	(force of) gravity/ gravitation		<b>(1)</b>

Question number	Answer	Additional guidance	Mark
1(e)(ii)	 <p>The diagram shows the Sun as a large circle at the top right. A planet is represented by a small circle at point A, moving towards the Sun along a dashed path. At point B, a solid line labeled "Planet's velocity" points away from the Sun. From point C, a dashed line labeled "Resultant path" extends further outwards. A horizontal dashed line with an arrow pointing to the right passes through point C.</p> <p style="text-align: center;"><b>Figure 2</b></p>	<p>Judge by eye. Horizontal line with arrow to the right from C</p>	(1)