

GCSE Physics B (Twenty First Century Science)
J259/03 Depth in physics (Higher Tier)

Question Set 30

1 Planets outside our solar system have been discovered orbiting a star called Kepler-106.

Table 4.1 shows the properties of these planets. Assume that the planets move in **circular** orbits.

Planet	Radius of orbit (km)	Time to complete one orbit (s)	Speed (m / s)	Mass (kg)
1	9.87×10^6	5.36×10^5	116 000	2.73×10^{24}
2	1.66×10^7	1.18×10^6	89 000	6.26×10^{25}
3	3.59×10^7	3.80×10^6	59 000	3.87×10^{25}

Table 4.1

(a) Calculate the momentum of planet 1.

Momentum = kg m/s [3]

(b) Eve and Kai look at the information in **Table 4.1**.



Eve

Each planet has a constant speed but a changing velocity.

(i) Explain why Eve is correct.

[2]

Kai

As the radius of the orbit increases, the speed decreases.



(ii) Suggest why Kai is correct.

[2]

Total Marks for Question Set 30: 7

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