Astrophysics Past Paper Questions IGCSE Edexcel

1.

1 (a) Diagram 1 shows the orbits of two objects.
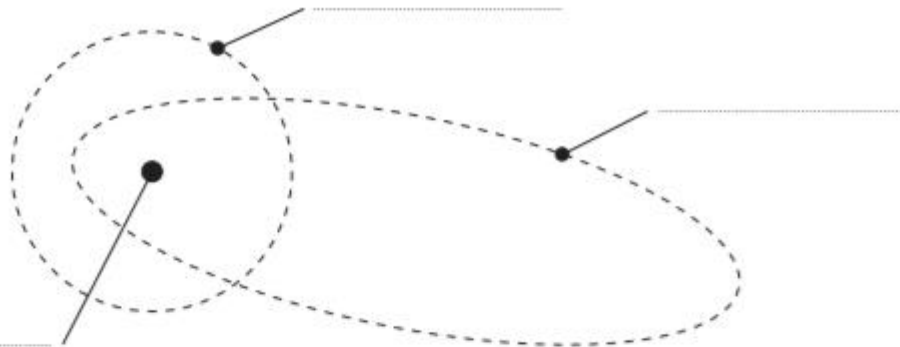

Diagram 1

Select words from the box to add the three missing labels to diagram 1.

(3)

comet	planet	solar system	star

(b) Diagram 2 shows the Moon orbiting the Earth.
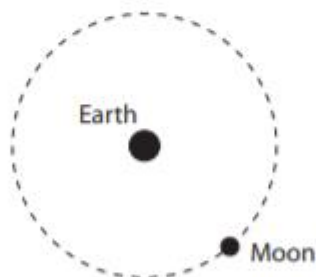

Diagram 2

Draw an arrow on diagram 2 to show the gravitational force acting on the Moon due to the Earth.

(1)

(c) Give a name for a large collection of billions of stars.

(1)

(Total for Question 1 = 5 marks)

2.

2 (a) Diagram 1 shows the orbit of Mercury and the orbit of the Earth.
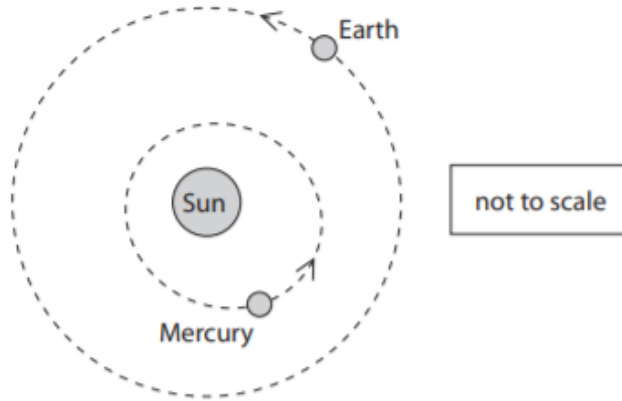
Earth

Sun

not to scale

Mercury

Diagram 1

Describe two differences between the orbit of Mercury and the orbit of the Earth.

Use diagram 1 to help you with your answer.

(2)

1 ....

....

2 ....

....

(b) Diagram 2 shows the orbit of a comet and the orbit of the Earth.
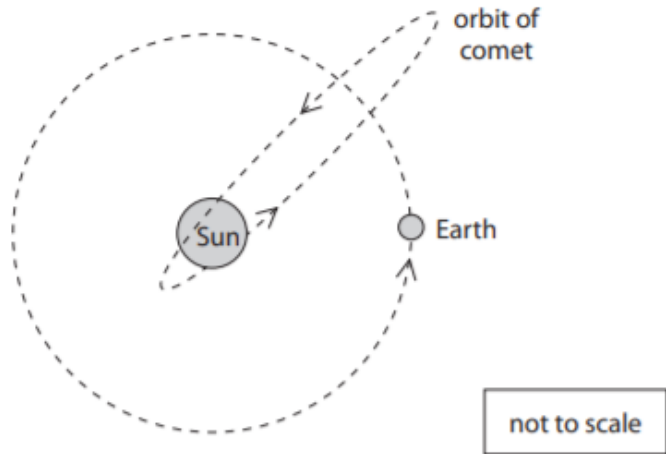

orbit of comet

Sun

Earth

not to scale

Diagram 2

Describe two differences between the orbit of the comet and the orbit of the Earth.

Use diagram 2 to help you with your answer.

(2)

1 ....

....

2 ....

....

(Total for Question 2 = 4 marks)

3.

(a) Describe two differences between the orbits of comets and moons.

(2)

1 ....

....

2 ....

....

(b) An astronaut drops a hammer on the Moon.
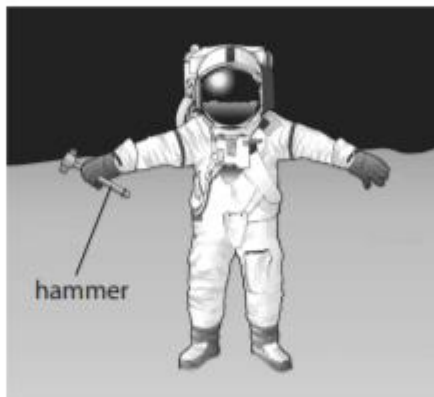
hammer

(i) State the equation linking gravitational potential energy, mass, g and height.

(1)

(ii) The gravitational field strength (g) on the Moon is 1.6 N/kg.

The mass of the hammer is 750 grams. The hammer loses 2.2 J of gravitational potential energy when it falls.

Show that the hammer falls through a height of about 2 m.

(3)

(iii) The astronaut then lifts the hammer back to its original height.

State the amount of work done in lifting the hammer.

(1)

work done = ... J

(iv) Explain why the astronaut would have to do more work to lift the same hammer through the same height on Earth.

(3)

....

....

....

....

(c) Another astronaut is stationed in the International Space Station (ISS).

The ISS orbits the Earth with an orbital radius of 6780 km and an orbital speed of 7.66 km/s.

Calculate the number of orbits the ISS makes in one day.

(4)

number of orbits = ...

4.

(a) The table gives some information about different objects in the universe.

Object	Description
Gliese 832c	Orbits the star Gliese 832 in an almost circular orbit
Hoag's Object	A large collection of billions of stars
Holmes	Orbits the Sun in an elliptical orbit
Io	Orbits the planet Jupiter in an almost circular orbit

(i) Which of these is a comet?

(1)

☐ **A** Gliese 832c

☐ **B** Hoag's Object

☐ **C** Holmes

☐ **D** Io

(ii) Which of these is a galaxy?

(1)

☐ **A** Gliese 832c

☐ **B** Hoag's Object

☐ **C** Holmes

☐ **D** Io

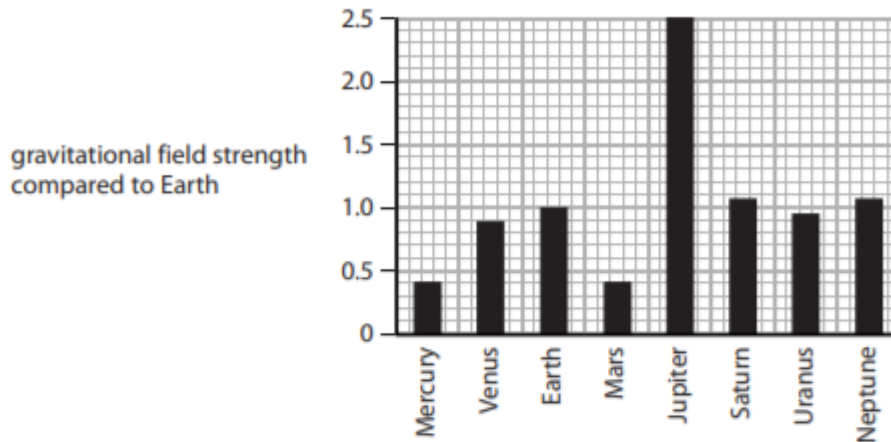(b) Which galaxy is our solar system in?

(1)

☐ **A** Cartwheel

☐ **B** Milky Way

☐ **C** Sombrero

☐ **D** Sunflower

(Total for Question 1 - 3 marks)

5.

This question is about planets in the solar system.

(a) Planets in the solar system have different sizes and masses.

The bar chart shows the gravitational field strength of each planet compared to Earth.

(i) Which of these statements is correct?

(1)

☐ **A** A 1 kg mass would weigh more on Venus than on Neptune

☐ **B** A 1 kg mass would weigh more on Earth than on Uranus

☐ **C** A 1 kg mass would weigh more on Mercury than on Saturn

☐ **D** A 1 kg mass would weigh more on Mars than on Jupiter

(ii) On Earth, the gravitational field strength is 10 N/kg.

Which of these is the value for the gravitational field strength on Mars?

(1)

☐ **A** 0.04 N/kg

☐ **B** 0.4 N/kg

☐ **C** 4 N/kg

☐ **D** 25 N/kg

(b) Deimos is a natural satellite of Mars.

Deimos has an orbital time period of 1820 minutes and an orbital speed of 1350 m/s.

(i) Calculate the orbital radius of Deimos.

(4)

orbital radius = ... m

(ii) The diagram shows Deimos in orbit around Mars.

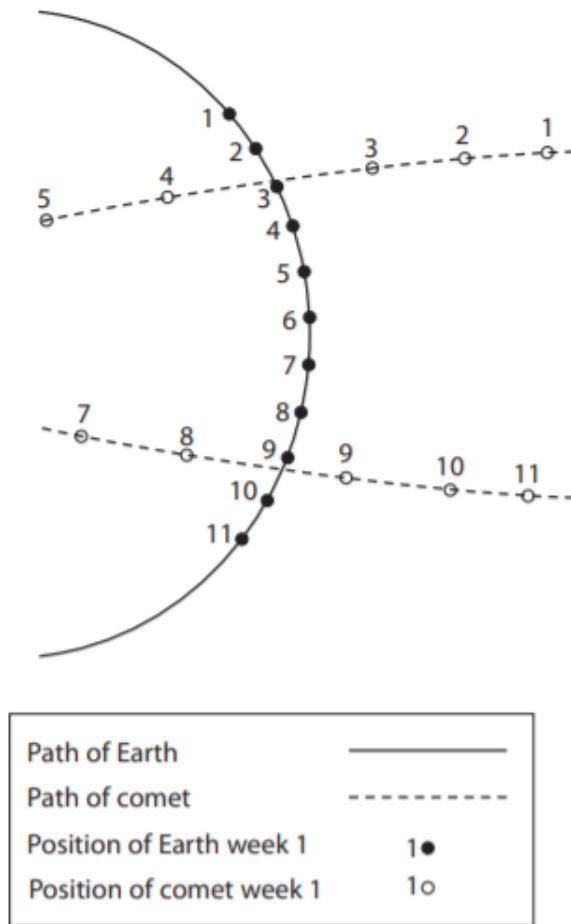Which arrow shows the direction of the force of gravity that Mars exerts on Deimos?

(1)

☐ A

☐ B

☐ C

☐ D

6.

6 A comet passes close to the Earth.

An astronomer observes the position of the comet and the Earth on the same day each week for several weeks.

(a) The diagram shows her observations for weeks 1 to 11.

Path of Earth	———————
Path of comet	- - - - - - - - -
Position of Earth week 1	1●
Position of comet week 1	1○

(i) Complete the path for the comet between week 5 and week 7.

(1)

(ii) Mark an X on the diagram to show the position of the Sun.

(1)

(iii) Suggest why the astronomer did not observe the comet during week 6.

(1)

(iv) The observation showing the comet nearest to the Earth was made during

(1)

☐ **A**   week 7

☐ **B**   week 8

☐ **C**   week 9

☐ **D**   week 10

(v) Explain how the diagram shows that the speed of the comet changes as it moves from position 1 to position 5.

(2)

....

....

....

....

(vi) Suggest why the speed of the comet changes.

(1)

....

....

(b) The Earth orbits the Sun once in 365 days.

The radius of the Earth's orbit is 150 000 000 km.

Calculate the orbital speed of the Earth in kilometres per hour.

(3)

orbital speed = ... kilometres per hour

(Total for Question 6 = 10 marks)

7.

2 (a) These sentences are about astronomy.

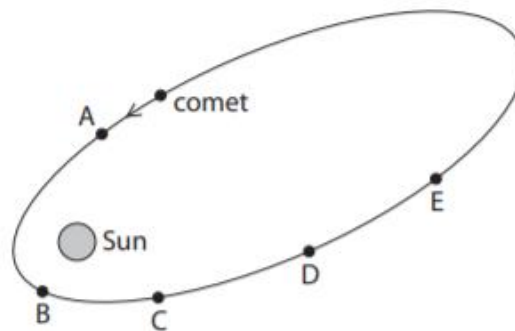Complete the sentences by writing words in the blank spaces.

(4)

The Earth is an astronomical object.

One astronomical object smaller than the Earth is ....

Two astronomical objects larger than the Earth are .... and ....

The Milky Way is the name given to our.. .

   (b) The diagram shows the path followed by a comet as it moves around the Sun.
   A, B, C, D and E are points on the comet's orbit.

   (i) State the name of the force that causes the comet to orbit the Sun.

(1)

....

   (ii) At which of the points shown is the force on the comet greatest?

(1)

....

   (iii) Draw an arrow at point D to show the direction of the force acting on the comet.

(1)

   (iv) At which of the points shown does the comet have the greatest kinetic energy?

(1)