Mark schemes

Q1.

(a) the old model cannot explain new observations

1

(b) **Level 2:** Scientifically relevant features are identified; the way(s) in which they are similar / different is made clear and (where appropriate) the magnitude of the similarity / difference is noted.

3-4

Level 1: Relevant features are identified and differences noted.

1-2

No relevant content.

0

Indicative content

Similarities
in both models:
- the orbits of the Moon and / or planets are circular / elliptical
- the Moon orbits the Earth
- there is one star / Sun

Differences
In the current model:
- the planets orbit the Sun, whereas in the old model the planets orbit the Earth
- there are (two) more planets
- there are also dwarf planets, whereas no dwarf planets are shown in the old model
- other planets have moons, whereas other planets have no moons shown in the old model

(c) it increases

1

(d) three bars drawn correctly

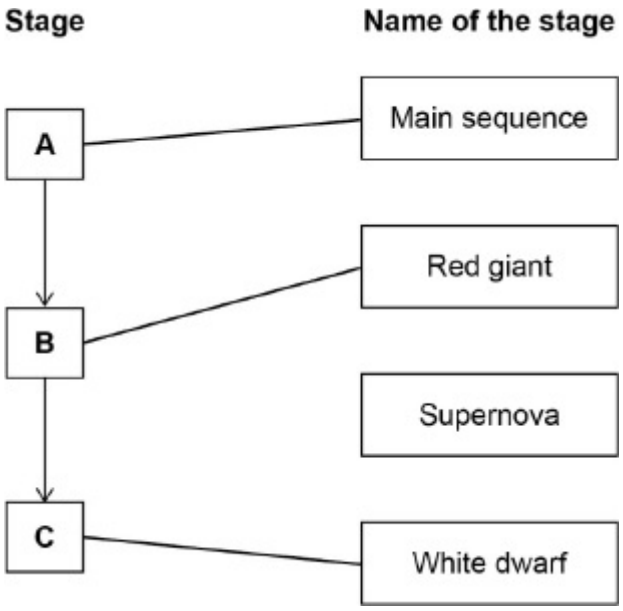
allow tolerance of half a small square

1

three bars correctly labelled

1

(e)



2 marks for all lines correct
1 mark for 2 lines correct

additional line from a box on the left negates the mark for that box

2

[10]

Q2.

(a) a satellite

1

(b) arrow drawn towards the centre of the Earth from the Hubble Space Telescope

1

(c) any correct change in distance with the correct change in time

e.g. 38 (km) and 5 (s)

1

a correct substitution of a correct pair of values

e.g. $v = \frac{38}{5}$

1

a correctly calculated answer

e.g. v = 7.6 (km/s)

1

[5]

Q3.

(a) a star

1

(b) Milky Way

1

(c) natural satellite (that orbits a planet)

1

(d) Charon is smaller than the (largest) dwarf planet

1

Ganymede / Titan is larger than the (smallest) planet

*allow **1** mark for some are bigger than the smallest planet **or** some are smaller than dwarf planets*

1

(e) similarity: circular orbit

1

difference: (orbital) period
or
(orbital) height

allow (orbital) speed

1

[7]