

GCSE Physics B (Twenty First Century Science)
J259/02 Depth in physics (Foundation Tier)

Question Set 13

1

Large telescopes, on the Earth and in space, have been used to make exciting discoveries.

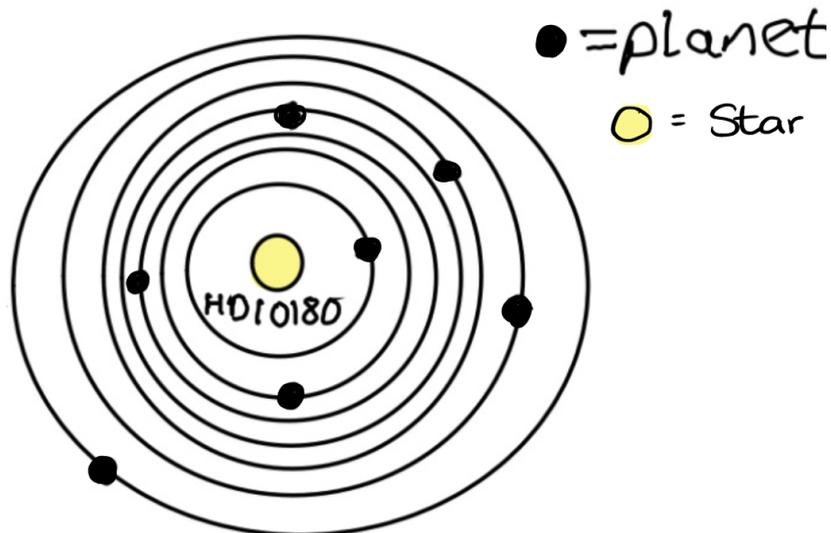
- (a) (i) What is the difference between a planet like the Earth and a star like our Sun? [1]

Star emits light & is hot but a planet does not.

- (ii)* In 2010 the star HD10180 was discovered. It is a yellow-colour star like the Sun and it has at least 7 planets orbiting it to create a planetary system.

Scientists believe the star, HD10180, and the planets orbiting it, were formed in a similar way to our Solar System.

Draw a labelled diagram of the HD10180 planetary system, and describe how the star and its planets may have been formed. [6]



- stars - formed in cold clouds of H gas and dust in stellar nebulae
- gravity causes gas particles to be attracted to each other
 - gravitational force > outward pressure due to particles' kinetic energy leading to gravitational collapse
 - material at centre of cloud heats up where gravitational potential energy changes into thermal energy so becomes hot protostar
 - where more gas & dust accumulate, nuclear fusion occurs becoming a star
- planets - formed from particles in a disk of gas and dust, colliding as they orbit the star and where heavier materials attracted by star's gravity

(b) Galaxy GN-z11 is one of the most distant galaxies discovered.

The table shows the data on two other galaxies much closer to us.

Galaxy	Distance from us (m)	Receding speed (km/s)
Tadpole galaxy	3.8×10^{24}	9400
Cigar galaxy	1.1×10^{23}	200

(i) What conclusion can you draw between the distance of a galaxy and its speed? [1]

The further away it is, the faster it's moving.

(ii) Write a list of the **three** named galaxies above, in order of increasing red-shift.



[2]

Total Marks for Question Set 13: 10

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