

NAME: ..... SCHOOL: .....



Shrewsbury School

# SHREWSBURY SCHOOL

## SCHOLARSHIP EXAMINATION 2017

### BIOLOGY

(30 minutes)

#### Instructions to candidates:

- Answer all questions in the spaces provided
- There are 20 marks available for this paper.

# Life on an exoplanet

On 22nd February 2017 astronomers announced the discovery of a system of seven Earth-sized planets orbiting a star called TRAPPIST-1, some 40 light-years from Earth.

From NASA's exoplanets website:

“These seven rocky worlds huddle around their small, dim, red star, like a family around a campfire. Any of them could harbour liquid water, but the fourth planet from the star, called **TRAPPIST-1e**, is in the habitable zone, the area around the star where liquid water is most likely to be detected.”

<https://exoplanets.nasa.gov/resources/2159>

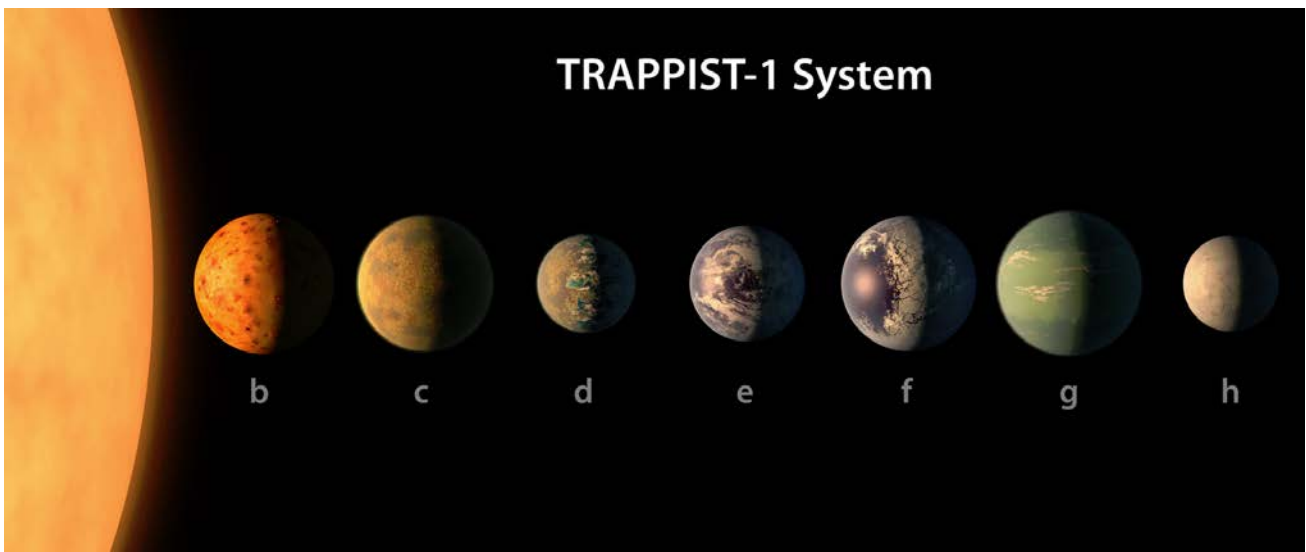


Image credit: NASA/PA

I. The presence of water is taken as an important sign that there might be life on an exoplanet. Suggest **two** reasons why water is important for life.

a) .....

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b) .....

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[2]

2. You are the Chief Exobiologist (someone who studies the possibility of life on other planets) on the first manned mission to this system and you discover what may be life forms on the planet TRAPPIST-1e. Suggest how you could decide if the structures you have found are alive.

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[2]

3. The dwarf star TRAPPIST-1 gives out a dim, red light and is much cooler than our own Sun. Suggest how will this affect the organisms that have evolved on the planet TRAPPIST-1e, explaining your answer.

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[4]



5. TRAPPIST-1e is tidally locked, meaning one side permanently faces its sun while the other side is in permanent darkness.

Could life be possible on the dark side? Give **two** reasons for your answer.

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[2]

6. You decide not to land on any of the planets because you are worried you might harm the life forms there. Suggest what biological reasons are there that human contact might cause harm to life on these planets.

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[2]

**END OF QUESTION PAPER**