

Astronomy and Cosmology

Question Paper

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| Level | Pre U |
| Subject | Physics |
| Exam Board | Cambridge International Examinations |
| Topic | Astronomy and Cosmology |
| Booklet | Question Paper |

Time Allowed: 3 minutes

Score: /2

Percentage: /100

Grade Boundaries:

- 1 The electromagnetic radiation emitted by a distant star is detected on Earth.

An astronomer knows the following quantities for the star and the radiation it emits.

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| F | energy flux density of the radiation measured on Earth |
| M_S | mass of the star |
| x | distance of the star from Earth |
| λ_{\max} | wavelength of the most intense radiation emitted |

Which three properties enable the radius of the star to be determined?

- A** F , M_S and x
- B** F , M_S and λ_{\max}
- C** F , x and λ_{\max}
- D** M_S , x and λ_{\max}
- 2 The spectrum of the light produced by a galaxy that is at a distance of 2.72×10^{24} m from Earth is investigated. An absorption line at a wavelength of 601 nm is identified as a sodium line that is found at a wavelength of 589 nm in the spectrum of the Sun.

What is the value of the Hubble constant?

- A** $2.20 \times 10^{-18} \text{ s}^{-1}$
- B** $2.25 \times 10^{-18} \text{ s}^{-1}$
- C** $1.08 \times 10^{-16} \text{ s}^{-1}$
- D** $1.13 \times 10^{-16} \text{ s}^{-1}$

Space for working