

## PART II

Attempt **TWO** questions in this Part, which carries 24% of the marks for the examination. All of these questions carry equal marks. You are advised to spend about **40 minutes** on this Part. Write your answers to this Part in the **SEPARATE ANSWER BOOK** provided.

Remember to write your name, personal identifier and examination number on your answer book.

### Question 1

part a, 4%

part b, 2%

part c, 4%

part d, 2%

(a) The solar electromagnetic spectrum in the infrared, visible and ultraviolet regions consists of a very broad emission peak with narrow dips due to absorption lines. Explain *briefly* the origin of both the emission peak and the absorption lines.

(b) Which region of the Sun can be studied through X-ray images? Explain why.

(c) The only things reaching us directly from the interior of the Sun are neutrinos. Explain why photons from the interior do not reach the Earth but neutrinos do. What is the origin of the solar neutrinos?

(d) The Balmer absorption line  $H\alpha$  is due to a transition from  $n = 2$  to  $n = 3$  in the hydrogen atom. Why is this line very weak in (i) very hot stars and (ii) stars much cooler than the Sun?

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