Tutor Marked Assignment

Make sure you know how to complete and send in your TMA and PT3 form: detailed instructions are given in your student handbook (or supplement).

Course and assignment number:
S281 02

Covering: **Block 1, Chapters 3 and 4, and Block 2, Chapters 1–3**
Cut-off date:
Friday 3 June 1994

This assignment consists of four questions.

You are strongly advised to do Questions 1 and 2 before you embark on your study of Block 2.

Question 1

This question relates mainly to Block 1, Chapters 3 and 4, and carries 20% of the marks for this assignment.

(a) *(12 marks)* In no more than *about 150 words*, outline the ways in which elements *more massive than helium* are created in stars:

- state the name and the effect of each nuclear reaction/reaction sequence,
- in any *three* cases write down the reaction(s),
- in *all* cases state in which type(s) of star the reaction(s) occur(s).

(b) *(2 marks)* *Name* the process by which the products of nucleosynthesis are brought to a star's surface, and *name* three phenomena by which the products are dispersed into the interstellar medium.

Note: Six words can earn full marks!

(c) *(6 marks)* Carbon is found in the interstellar medium in several forms. One of these is as graphite grains, formed in the outer atmospheres of giants and supergiants. Radiation pressure acting on graphite grains near an O-type supergiant gives the grains an acceleration of $0.2\,\mathrm{km\,s^{-2}}$. Taking the mass of the supergiant to be $24\,M_\odot$ and its radius to be $100\,R_\odot$, show that this acceleration is approximately 300 times that due to the gravitational attraction of the supergiant. As a consequence, will the grains accelerate outwards?

Question 2

This question relates to the project work, and carries 50% of the marks available for this assignment.

This question is centred on project write-up. It is most important that you follow the advice given in Section 2.5 of the *Project file*, including the organization of a write-up into sections, and the suggested lengths of each section. *The total length of your write-up should not exceed about 1 200 words, plus sketches and graphs.*

There are three options—**CHOOSE ONLY ONE OF THEM.**

Option 1

Present your write-up of the project *The difference in length between the sidereal day and the mean solar day.*

Option 2

Present your write-up of the project *The luminosity of the Sun.*

Option 3

Present *brief* write-ups of the two projects:

- *In and around Orion,*
- *Limiting visual stellar magnitudes.*

(In this third option, each write-up should not exceed *about 600 words*, plus sketches. The marks are divided equally between the two write-ups.)

If you choose option 1 or option 2, and your write-up is based on data that we supplied to you on your request, rather than on your own observations, then please be reassured that all marks are still available to you. Your write-up should then include a description of any observational efforts of your own, and your reasons for resorting to our data.

If you did not obtain our data, yet have insufficient data of your own for a full write-up, then proceed as far as possible—some marks will still be available.