

Computer Marked Assignment

Course and assignment number:

S281 43

Make sure you know how to use the CMA form: detailed instructions are given in your student handbook (or supplement).

You are strongly advised to attempt every question in this assignment.

If you do not wish to answer a question, pencil across the 'don't know' cell ('?').

If you think that a question is unsound in any way, pencil across the 'unsound' cell ('U') in addition to pencilling across either an answer cell or the 'don't know' cell.

Note For each question, you must pencil across either the required number of answer cells or the 'don't know' cell.

Covering: **Block 3**

Cut-off date:

Friday 29 August 1997

PART A

This part relates mainly to Book 3, Chapters 1 and 2, and carries 57% of the marks for this assignment.

Q1 The key lists various statements about stellar populations. Which *one* statement is false?

KEY for Q1

- A Many population I stars occur in the vicinity of gas clouds.
- B Many population II stars are members of open clusters.
- C Population I stars occur in spiral arms and throughout the disc.
- D Population II stars have low metallicity.
- E Population I stars include massive main sequence stars.
- F Population II stars can have large velocities at right angles to the plane of the galaxy.

Pencil across *one* cell in row 1.

Q2 The key lists various statements about spiral arms in our galaxy. Which *two* statements are false?

KEY for Q2

- A Evidence that the disc of our galaxy has spiral arms comes from the rotation curve of the Milky Way.
- B Evidence that the disc of our galaxy has spiral arms comes from mapping the positions of dense interstellar clouds.
- C Evidence that the disc of our galaxy has spiral arms comes from mapping the positions of bright OB stars.
- D Evidence that the disc of our galaxy has spiral arms comes from mapping the positions of ionized hydrogen regions (HII regions).
- E Evidence that the disc of our galaxy has spiral arms comes from mapping the positions of globular clusters.

Pencil across *two* cells in row 2.

Q3 For the stars in a globular cluster which *one* statement is false regarding the H-R diagram (Book 3, Figure 1.23, p. 34)?

KEY for Q3

- A The age of the cluster is determined by the main sequence turn-off point.
- B The main sequence stars are converting hydrogen into helium in their cores by the CNO cycle.
- C The subgiants are converting hydrogen into helium in a shell around the core.
- D The horizontal branch stars are converting hydrogen into helium in a shell around the core.
- E The horizontal branch stars are converting helium into carbon in their cores by the triple alpha (3α) process.

Pencil across *one* cell in row 3.

Q4 The key lists various constituents of the nuclear bulge of the Milky Way. Which *one* statement is false?

KEY for Q4

- A Low metallicity stars occur in the nuclear bulge.
- B High metallicity stars occur in the nuclear bulge.
- C Hot ionized hydrogen occurs in the nuclear bulge.
- D Atomic and molecular hydrogen both occur in the nuclear bulge.
- E Magnetic fields probably occur in the nuclear bulge.
- F Globular clusters occur in the nuclear bulge.
- G A large black hole of mass $10^6 M_\odot$ occurs in the nuclear bulge.

Pencil across *one* cell in row 4.