

JUN 1995

Course and assignment number:

## Computer Marked Assignment

**S281 43**

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

Covering: **Block 3**

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.

Cut-off date:

**Friday 1 September 1995**

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

### PART A

This part relates to Book 3 Chapters 1 and 2, and carries 50% of the marks for this assignment.

**Q1** The key lists various statements about stellar populations and star clusters in our galaxy (i.e. the Galaxy, or the Milky Way). Which *one* statement is false? Pencil across *one* cell in row 1.

KEY for Q1

- A A typical open cluster contains no population II stars because such a cluster is not old enough. ~~X~~
- B Open clusters are concentrated into the disc of the Galaxy, particularly into its spiral arms. ~~X~~
- C Among population I stars there are *no* massive main sequence stars. ~~X~~
- D The globular clusters form a roughly spherical distribution in the halo, concentrated towards the Galactic centre. ✓
- E Some globular clusters are composed of stars with metallicities significantly larger than 0.8%. ✓
- F Main sequence stars in globular clusters are usually of low mass. ✓

**Q2** The key lists various statements about the spiral arms in our galaxy. Which *one* statement is false? Pencil across *one* cell in row 2.

KEY for Q2

- A Evidence that the disc of our galaxy has spiral arms comes largely from mapping various sorts of interstellar clouds.
- B The spiral arms are delineated by a concentration of O and B stars, and HII regions.
- C The spiral arms nearer to the Galactic centre complete one revolution around the centre in the same time as the arms further out.
- D In the inner regions of the Galactic disc the stars and interstellar matter complete one revolution of the Galactic centre in a shorter time than the spiral arms in the same region.
- E As stars pass through a spiral arm, their orbital motion is unaffected.
- F Spiral density wave theory is a theory based on gravitational forces, whereas sequential star formation is a theory based on shock waves.

**Q3** The key lists various statements about the central regions of our galaxy. Which *one* statement is false? Pencil across *one* cell in row 3.

KEY for Q3

- A Studies of other spiral galaxies have been of use in exploring the nature of the nuclear bulge of our galaxy.
- B Radio waves have been of particular importance in exploring the nuclear bulge of our galaxy.
- C The nuclear disc has a diameter about one-fifth that of the nuclear bulge.
- D Within about 300 pc of the Galactic centre, the predominant motion in the Galactic plane is infall towards the centre.
- E There is evidence for star formation in the inner regions of the nuclear bulge.
- F Sagittarius A\* might include a massive black hole.

**Q4** Which *one* of the following types of data, or laws, is used to obtain the mass of a galaxy for a wide variety of Hubble classes? Pencil across *one* cell in row 4.

KEY for Q4

- A Rotation curves
- B Hubble's law
- C Velocity dispersion within a single galaxy
- D Supernova brightnesses
- E Tully-Fisher relation
- F X-rays from galactic halos
- G Orbital motions of binary galaxies.