

Tutor Marked Assignment

S281 04

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).

Covering: Blocks 3 and 4

Cut-off date:

Friday 16 September 1994

This assignment consists of four questions.

Question 1

This question relates to Book 3, Chapter 1, and carries 25% of the marks for this assignment.

Outline the evidence that supports each of the statements (a)–(g) about the Milky Way. Include sketches and graphs where they help your answer.

- (a) The Milky Way has a disc, and the disc has a bulge at its centre.
- (b) The disc rotates differentially.
- (c) The disc contains spiral arms. *2 km line*
- (d) The spiral pattern moves relative to the matter in the disc. *formal stability*
- (e) The halo is a very old and relatively inactive part of the Milky Way. *metallicity*
- (f) There may be a massive black hole at the centre of the Milky Way.
- (g) The Milky Way contains a significant amount of dark matter. *rotation curve*

Your answer should not be more than about 400 words in total, plus sketches and graphs. Each of parts (a)–(g) carries approximately equal marks.

Question 2

This question relates to Book 3, Chapter 2, and carries 25% of the marks for this assignment.

(a) (9 marks) Write three short paragraphs (no more than about four sentences each) outlining how each of the following physical properties of an elliptical galaxy at a known distance could be determined:

- (i) mass (choose one suitable method). *td*
- (ii) luminosity, and *standard*
- (iii) stellar composition.

(b) (12 marks) Summarize, in no more than about 250 words, the case in favour of the current view that galaxies do *not* evolve from one Hubble class to another. Your answer should refer to the following physical properties of galaxies and should explain briefly how their values support the case: mass; age; angular momentum; fraction of mass in the interstellar medium.

(c) (4 marks) It is thought that mergers between two interacting spiral galaxies might produce an elliptical galaxy. In not more than about 60 words, outline the evidence for this belief.

Question 3

This question relates to Book 3, Chapter 3 and carries 15% of the marks for this assignment.

- (a) (4 marks) List the radio observations that characterize all, or most, radio galaxies.
- (b) (8 marks) Show, with the aid of a labelled sketch, how a model including an active galactic nucleus can account for the observations that you listed in part (a), and explain why not all active galaxies are radio galaxies.
- (c) (3 marks) Discuss which of these observations (if any) depend on the direction from which the model is viewed.

Your answer should not exceed about 250 words plus the sketch in part (b).

Question 4

This question relates to Book 4, and carries 35% of the marks for this assignment: 23% of the marks are for the audiotape exercise, and the remaining 12% for the written outline.

You are asked to prepare a brief written outline of a half-hour talk about the Big Bang aimed at a general audience. In addition, you are to record on an audio cassette the first FIVE MINUTES (no more!!) of the talk.

Full instructions are provided in audio band 4, which also includes useful hints as to how you might set about this latest exercise in developing your communication skills.

Please note the following points:

- Use the BEGINNING of one side of the cassette, and check that your talk was successfully recorded.
- Start your recording with your name and student number. These should also be written on the cassette.