Q10 Taking data from Book 3, Chapter 4, calculate the average distance from the centre of one galaxy to the centre of the nearest neighbouring galaxy, in a cluster of galaxies that is borderline between rich and sparse. Express your answer as a multiple of the distance across the disc of the Milky Way (30 kpc). Select from the key the value closest to yours, and pencil across *one* cell in row 10.

KEY for Q10

A 1

B 10

C 10^2

D 10^3

E 10^4

F 10^5

Q11 Here are three types of large structure observed in the distribution of galaxies in space. What is the best description in the key of their comparative *volumes*?

(i) The Great Wall

(ii) A typical supercluster

(iii) A large void

Pencil across *one* cell in row 11.

KEY for Q11

A Typical volumes for all three are about the same to within a factor of two.

B The volume of a supercluster is about ten times that of either a large void or the Great Wall.

C The volume of the Great Wall is within a factor of two of a typical supercluster, but a large void is at least 100 times larger than either.

D The Great Wall is distinctly larger than a large void, and a typical supercluster is about six orders of magnitude smaller than a void.

E The volume of a large void could be within a factor of ten of that of the Great Wall, and the volume of a typical supercluster is less than half that of the Great Wall.

F A large void is over ten times smaller than the Great Wall or a typical supercluster.

Q12 Which two of the statements in the key are *false*? Pencil across *two* cells in row 12.

KEY for Q12

A Large scale motions are a result of the distribution of *all* matter in the Universe, baryonic and non-baryonic.

B Maps showing the spatial distribution of galaxies are of *no* help in establishing the spatial distribution of dark matter.

C The large scale structure of the Universe can be explained if dark matter is included in the theory.

D If *low* energy neutrinos with non-zero mass existed, they would be a component of *cold* dark matter.

E In interpreting three-dimensional surveys of the spatial distribution of galaxies, the value selected for Hubble's constant affects the *scale* of the large-scale structure, but not its form.

F A borehole survey is a partial survey in that it reveals the *directions* to galaxies, without their distances.

PART C: FEEDBACK QUESTIONS — BLOCK 3

(Not assessed)

This Part contains questions designed to help the S281 Course Team evaluate the course. They do not carry any marks for this assignment, but if you can spare a few minutes to answer the following questions, we would be very grateful. The information you provide will help us to improve the course for future years.

Q13 to Q16 The following questions refer to Book 3. Each question refers to the individual chapters of Book 3, and asks about the length of time you took to study them and how interesting you found them.

Q13 Please estimate your total study time for Chapter 1 (including any assignment questions, TV programme 6 and video sequence 9) and select *one* answer from A–E in the key for Q13 to Q16. What was your overall impression of the chapter? Was it interesting? Select *one* answer from F–H in the key. Pencil across *two* cells in row 13.

KEY for Q13–Q16

A Less than 4 hours

B 4–8 hours

C 8–12 hours

D 12–15 hours

E Over 15 hours

F Very interesting

G Fairly interesting

H Not very interesting

Q14 Please estimate your total study time for Chapter 2 (including any assignment questions and video sequence 10) and select *one* answer from A–E in the key for Q13 to Q16. What was your overall impression of the chapter? Was it interesting? Select *one* answer from F–H in the key. Pencil across *two* cells in row 14.

Q15 Please estimate your total study time for Chapter 3 (including any assignment questions, audio band 3 and TV programme 7) and select *one* answer from A–E in the key for Q13 to Q16. What was your overall impression of the chapter? Was it interesting? Select *one* answer from F–H in the key. Pencil across *two* cells in row 15.

Q16 Please estimate your total study time for Chapter 4 (including any assignment questions and video sequences 11 and 12) and select *one* answer from A–E in the key for Q13 to Q16. What was your overall impression of the chapter? Was it interesting? Select *one* answer from F–H in the key. Pencil across *two* cells in row 16.