

Question 9

parts a to d, 2%

each

part e, 1%

part f, 2%

part g, 1%

If the Universe is open it will expand for ever. For an open Universe:

- (a) Describe the changes you would expect to occur in the interstellar medium on a very long time-scale;
- (b) What effect, if any, will there be on the formation of new stars?
- (c) What will happen to existing stars?
- (d) What will galaxies look like, and what will they contain, in the distant future in such a Universe?
- (e) What is the geometry of an open Universe?
- (f) What size is an open Universe, and how does this change with time?
- (g) What is the key physical quantity that determines whether the Universe is open or not, and what value does it take in an open Universe?

[END OF QUESTION PAPER]

$$\rho < \frac{3c^2 H^2}{8\pi G} \quad \text{or} \quad H^2 > \frac{8\pi G \rho}{3c^2}$$

