

Question 2

part a, 4%

part b, 4%

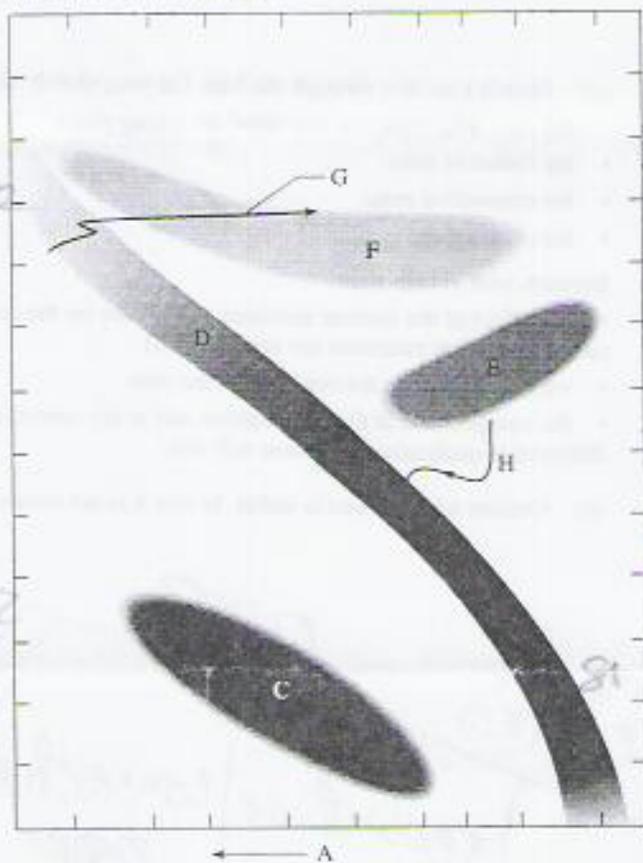
part c, 4%

(a) Figure 1 shows a Hertzsprung–Russell diagram. Without reproducing this diagram, state what each letter represents.

(b) Outline two methods of measuring the photospheric temperature of a star.

(c) The photospheric temperature of the star Canopus is 6 900 K, and its luminosity is 5.4×10^{29} W. Calculate the radius of Canopus, expressing your answer in solar radii. Show all details of your working.

G - star leaving main sequence to become S/G
 D Main sequence
 C - White dwarf
 A - temperature
 B - Luminosity
 F - S/Gs
 E - Giants
 H - Hayashi track
 Young star join main sequence



photometric - assume star black body. Fit radiation fluxes at two wavelengths to black body curve.
 spectrometric - measure spectral absorption lines for different elements
 H He C+

Figure 1 A Hertzsprung–Russell diagram for use with Question 2 part a.

Question 3

part a, 3%

part b, 6%

part c, 3%

(a) Outline two sorts of observational evidence that stars form in dense clouds.

(b) Given that a certain dense cloud is not contracting,

(i) name three external influences on the cloud that could initiate contraction, stating why contraction is initiated, and SN / Density wave / star birth
 (ii) describe why a cluster of stars is likely to form, rather than a single massive star.

(c) A protostar is shrouded in a dusty shell, and infrared observations indicate that the peak of the spectrum is at a wavelength of $5.8 \mu\text{m}$.

(i) Estimate the temperature of the dusty shell. Show all details of your working.

(ii) State qualitatively how the temperature of the dusty shell compares with typical temperatures of dense clouds, and of protostars.