



## Question 6

[Book 2 (sub)sections are given.]

(a) (i) It would have a dark, glassy fusion crust, formed by melting at the surface during infall. [8.2.2]

(ii) The meteorite would be named after the place where it was found. [8.2.1]

(b) (i) Purines and amino acids are organic compounds and, if not terrestrial contaminants, are found only in carbonaceous chondrites. It is thus likely to be a carbonaceous chondrite. [8.3]

(ii) A meteorite of this type will also contain

- calcium-aluminium-rich inclusions (CAIs)
- rounded globules of silicates known as chondrules
- a dark, fine-grained matrix
- hydrated minerals
- water-soluble salts such as carbonates or sulphates
- pre-solar grains such as diamond or silicon carbide

[8.3]

[For full marks, the first three constituents and any one of the remaining three would be required.]

(c) Minerals such as corundum and perovskite are predicted to form at elevated temperatures during condensation in the solar nebula.

The measurements are of the stable isotope composition of oxygen. In particular, a graph is plotted of  $\delta^{17}\text{O}$  versus  $\delta^{18}\text{O}$  for the minerals. From such graphs we learn that

- the solar nebula was not completely homogenized before condensation began
- the young solar nebula contained only two major reservoirs, a gas reservoir and a dust reservoir, that underwent isotope exchange.

[8.3.2]

[Notice here how the answer is sectioned in the same manner as the question: you are strongly advised always to do this.]