

(i) Identify the stage of meiosis 1 shown in the cell labelled A. **Prophase I** [1]

(ii) Based only on your observations of Fig.1.2, state **two** reasons for your answer in (b)(i). [2]

Chromosomes condensed and visible
Nucleolus is not visible.

(iii) Another stage of meiosis is metaphase 1.

Explain how the organisation of homologous chromosomes during metaphase [3]

1 increases genetic variation.

During metaphase I, homologous chromosomes line up along the equator. The chromosomes are positioned randomly so that the maternal or paternal chromosomes may face either cell pole. This leads to independent assortment during anaphase I which increases genetic variation.

(c) The use of stem cells is being evaluated for the treatment of certain human diseases.

Name **two** potential sources of human stem cells and for **one** source, describe an ethical issue associated with the use of stem cells. [4]

Pluripotent stem cells removed from embryos grown in vitro. Following this, the embryo is destroyed. This is seen as immoral and equivalent to murder by some individuals.

Multipotent adult stem cells collected from bone marrow.

Total Marks for Question Set 1: 12

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