Two of the enzymes synthesised by the barley seed are α-amylase and maltase. These are involved in the hydrolysis of the stored starch during seedling formation.

In the food industry, the starch extracted from barley seeds (barley starch) is used in the production of sugar syrups. Fig. 2.2 summarises the reactions catalysed by α-amylase in the production of maltose syrup and by maltase in the production of glucose syrup.

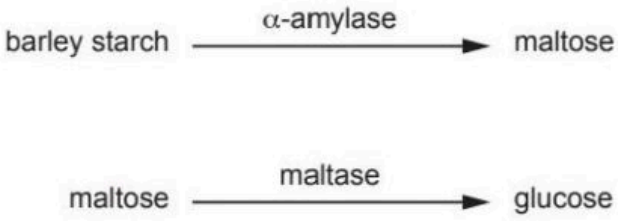

Fig. 2.2

(b) Some of the substances shown in Fig. 2.2 are listed in Table 2.1.

Complete Table 2.1 to identify which of the terms polysaccharide, monosaccharide and macromolecule apply to each of the substances listed.

Use a tick (✓) if the term applies and a cross (✗) if the term does not apply.

Put a tick (✓) or a cross (✗) in every box.

Table 2.1

substance	polysaccharide	monosaccharide	macromolecule
glucose	x	✓	x
[illegible]	x	x	✓
maltose	x	x	x
starch	✓	x	✓

[3]

When producing sugar syrups, there are advantages in using enzymes extracted from microorganisms.

For example, some enzymes extracted from microorganisms are heat stable. Heat-stable enzymes are used to increase productivity because the reactions can be carried out at higher temperatures.

(c) Suggest **one other** advantage of using enzymes obtained from microorganisms, rather than enzymes extracted from barley seeds, in the production of sugar syrups.

easier to extract or

active over a greater temperature range [1]

5 Each meristem cell in a leaf bud is able to grow and divide by mitosis to produce two daughter cells that are genetically identical to each other and to the original dividing cell.

(a) Fig. 5.1 lists the stages in the mitotic cell cycle of a meristem cell.

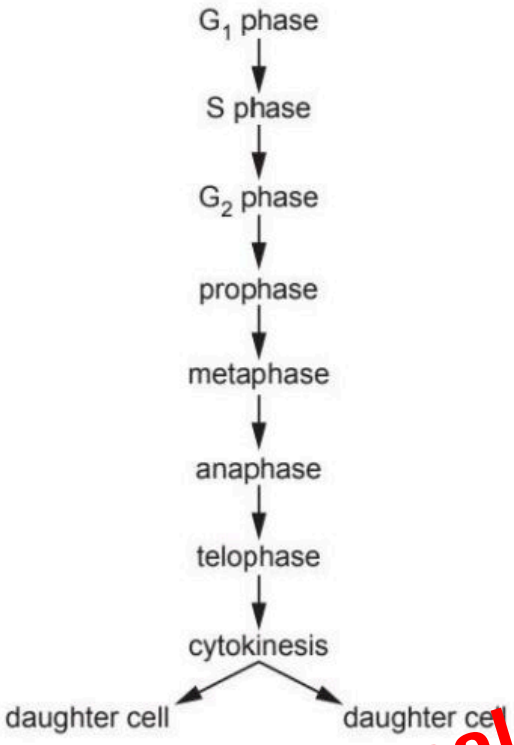

Fig. 5.1

(i) Outline **and** explain the events occurring during S phase, metaphase and anaphase of the mitotic cell cycle that are important in the production of genetically identical daughter cells.

S phase DNA replication

produces two genetically identical, DNA molecules (one for each daughter cell ;

A (sister) chromatids for DNA molecules

A description of semi-conservative replication

metaphase A metaphase plate for equator

(chhromosomes / pairs of sister chromatids align / orientate at (spindle) equator)

chromosomes orientated so that sister chromatids will be shared out to

daughter cells

anaphase centromere splits / spindle fibres shorten

so that daughter chromosomes / sister chromatids / identical chromatids,

move to opposite poles

[4]