

1.4.1 An enzyme is a biological catalyst. (1)

1.4.2 A – Enzyme ✓

B – Substrate ✓

C – Enzyme-substrate complex ✓

D – Product ✓ (4)

1.4.3 Any two of the following:

- They are substrate specific. (✓)
- They are pH specific. (✓)
- They speed up chemical reactions. (✓)
- They function best at an optimum temperature. (✓) (2)

1.4.4 1) The enzymes will break down and remove **only** fat and protein based stains. ✓ Not the artificial colour of the clothes.

2) The enzymes are most effective at 40 °C so the water does not need to be too hot. This saves energy. ✓

3) Physically rubbing the fabric to remove stains is not necessary because the enzymes break them down chemically. ✓ (3)

**[10]**

1.5.1 chromatids✓, centromere✓ (2)

1.5.2 benign✓ malignant✓ (2)

**[4]**

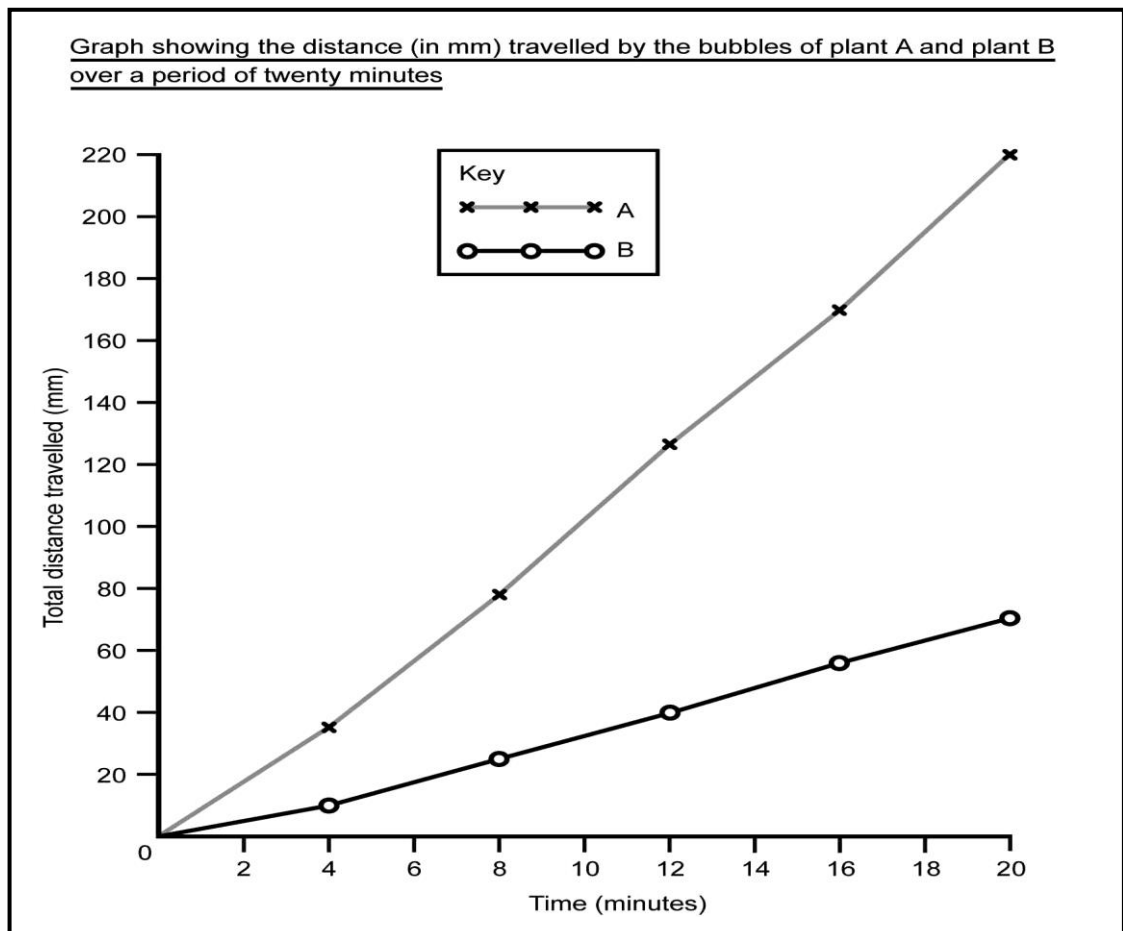
**QUESTION 3**

3.1.1 Independent variable: Temperature.  
Dependent variable: Enzyme activity. (2)

3.1.2 At low temperatures enzyme activity is low. ✓  
The optimum activity for enzyme activity is 37 °C. ✓  
At high temperatures, enzymes denature ✓ and they are no longer active. ✓ (4)  
**[6]**

3.2.1 A comparison of the rate of bubble movement ✓ will only be accurate if the twigs were roughly the same size and there are roughly the same number of leaves on each twig ✓. (2)

3.2.2



Allocate marks as follows:

- Heading that includes both variables ✓✓
- Heading for y-axis ✓ and for x-axis ✓
- Scale on y-axis ✓ and on x-axis ✓
- Key for plant A and B ✓ (7)

- 3.2.3 B ✓ (1)
- 3.2.4 The bubble travelled a shorter distance/slower ✓, which means that the transpiration rate was lower/slower ✓, so it must be the Namib coral tree, which would be better adapted to arid conditions. (2)
- 3.2.5 The total distance travelled would increase ✓. (1)
- 3.2.6 An increase in temperature would increase the rate of evaporation of water from sub-stomatal air spaces ✓, so the rate of transpiration would increase ✓. (2)
- [15]**

- 3.3 a) Endoskeleton, exoskeleton and hydrostatic skeleton ✓ (*must mention all three for the mark*)  
 b) They all have muscles ✓ that work in antagonistic pairs ✓. The muscles work opposite each other to cause the bone/exoskeleton/water to move ✓. (4)

3.4.1 xylem ✓ (1)

3.4.2 hollow / no cytoplasm ✓  
 thick secondary thickened cell walls ✓  
 pits ✓  
 Cross walls perforated or no cross walls / long continuous tubes ✓. (any 3) (3)

3.4.3 X - root ✓  
 Y - stem ✓  
 Z - leaf ✓ (3)

3.4.4 A) Root pressure – osmosis ✓ into the root ✓ causing water to be pushed ✓ into the xylem / up the stem ✓. (4)

B) Transpiration pull – evaporation of water ✓ from the leaf ✓ surface through the stomata ✓ pulls the water up the stem ✓ from the roots to the leaves. (4)

**[15]**