

Question 4 (Answer: C)

- Magnification = image size $\div$ actual size, with both in the same units.
- 5 cm is 50 000 μm and the chloroplast is 5 μm .
- $50\,000/5 = 10\,000$.

Question 4 (Answer: C)

- The wall runs all the way round, so it is crossed *twice* along a diameter.
- Total wall thickness across the vessel = $2 \times 9 = 18$ mm.
- Lumen diameter = $36 - 18 = 18$ mm.

3(a)(i)	single clear outline with no shading ; width of drawing greater than 93 mm ; detail 1: 5 arms and enclosed shape in middle that doesn't touch the edges ; detail 2: indication of where colour changes on all limbs
3(a)(ii)	length of line PQ : 93 ± 1 (mm) ; 290 ;;

3(a)(iii)

max two differences from:

spiny starfish / Figure 3.2		necklace starfish / Figure 3.3
spines / AW	AND	smooth / scales / no spines ;
light / bright, in centre	AND	dark in centre ;
has five, ossicles / AW, in the centre or has a central pentagon shape	AND	does not have five, ossicles / AW, in the centre or no central pentagon shape ;
no white ends to the limbs	AND	white ends to the limbs ;
more uniform shaped limbs	AND	less uniform shaped limbs ;
straight limbs	AND	bent / curved / AW, limbs ;
lines going down the arms	AND	no lines going down the arms ;

*max one similarity from:**(both have)*

five, arms / AW ;
circle in the middle ;
dark arms / arms that are a different colour to the centre ;
tapering limbs ;
radial symmetry ;

3(b)(i)	<i>any two from:</i> same region ; same <u>size</u> of area / 20 m ² , (sampled) ; same day / same time of year / both in July / same date ; depth measured at, same time of tide / high tide / when water at its highest ;
3(b)(ii)	axes labelled with units ; suitable linear scale on number of starfish axis and ranges given for depth axis and data occupies at least half the grid in both directions ; five accurate plots $\pm$ half a small square ; bars of equal width $\pm$ half a small square with no gaps between them ;
3(b)(iii)	<u>10–19.9</u>
3(b)(iv)	<i>total number of starfish photographed:</i> 3428 ; <i>percentage in the 0.0–9.9m range:</i> 10 (%) ;;

3(a)(i)	outline clear and continuous, no shading ; size greater than half of space provided ; detail 1 : tear-shaped white patch on the left with a border and tear-shaped white patch below the beak ; detail 2 : two or more lines on the beak ;
3(a)(ii)	46 $\pm$ 1 (mm) ; 109.5 (mm) ;;
3(b)	<i>any two from:</i> <i>Gentoo has:</i> less white area / white patch around eye is triangular-shaped vs semicircular-shaped ; rounder / bigger / wider eye ; slimmer / narrower / thinner / sharper, beak ; larger pale area on beak / no stripe vs black-footed has a stripe ; smoother beak ;

3(c)	1 independent variable at least two different thicknesses of insulation (used as an insulator) ; 2 dependent variable change in temperature / time taken for a stated fall in temperature ; 3 and 4 method ;; • method of insulating beaker with named material • measure the starting temperature and final temperature 5, 6 and 7 variables kept constant ;;; • volume of water • size • type of beaker • time left to cool / stated fall in temperature • starting temperature • type of insulator • same surroundings / environmental temperature 8 repeat investigation twice more / at least two replicates ; 9 relevant safety precaution ;
------	---

Question 5 (Answer: C)

- Actual size = image size $\div$ magnification.
- $5.00 \text{ mm} \div 250 = 0.0200 \text{ mm}$.
- That is $20 \mu\text{m}$.

Question 4 (Answer: C)

- There are 1000 micrometres in a millimetre.
- So divide by 1000: $65/1000$.
- That gives 0.065 mm .