Question 26 (Answer: **B**)

- Xylem vessel elements are the widest, with thick lignified walls and no contents.
- Phloem sieve tube elements are large and empty-looking, with sieve plates at their ends.
- Companion cells are the small, dense cells lying alongside the sieve tubes.

Question 27 (Answer: **C**)

- Xylem vessels lose their end walls, so the vessel becomes one continuous open tube.
- That is what removes the obstruction to flow.
- Lignin gives strength rather than reducing resistance, and narrow tubes would *increase* resistance.

Question 28 (Answer: **B**)

- Companion cells lie immediately beside phloem sieve tube elements.
- So find the phloem tissue first, then look for the small dense cell next to the large empty one.
- In a root the phloem lies between the arms of the central xylem.

Question 28 (Answer: **C**)

- Xylem vessel elements are wide, thick-walled and empty.
- Phloem sieve tube elements are large but thin-walled, with sieve plates.
- Companion cells are the small dense cells packed against the sieve tubes.

Question 26 (Answer: **D**)

- In a root the xylem forms a central star with phloem between its arms.
- In a stem the vascular bundles form a ring, with phloem outside the xylem.
- In a leaf the bundle sits in the midrib with xylem above the phloem.

Question 27 (Answer: **C**)

- Vessel elements lose their end walls entirely, forming one continuous hollow tube.
- That is what removes the obstruction to water flow.
- Lignin adds strength, and narrower tubes would increase resistance, not reduce it.

5(a)(i)	*any **one** from:* water ; mineral ions ; **A** any named appropriate ion AVP ; e.g. plant hormone
5(a)(ii)	lignin ;
5(b)(i)	*any **three** from:* as temperature increases, rate of water vapour loss from leaf increases ; **A** transpiration for water vapour loss *idea that* more heat energy absorbed by leaf ; more (heat) energy to evaporate water molecules / increased temperature for latent heat of vaporisation ; **A** more energy to break hydrogen bonds higher rate of evaporation / AW, from, surfaces / walls, of spongy mesophyll cells ; water vapour molecules have more kinetic energy ; higher rate of diffusion of water vapour out of leaf / steeper water potential gradient ; more stomata are open at higher temperatures so more water vapour is able to diffuse out of leaf ;
5(b)(ii)	*any **one** from:* cotton leaves have fewer stomata (per unit area) ; *idea that* cotton leaves have a thicker (waxy) cuticle ; cotton leaves have trichomes ; **A** hairs for trichomes cotton leaves are curled ; **A** rolled / folded cotton leaves have, sunken stomata ; **A** other examples e.g. stomata in, grooves / crypts / chambers / pits cotton leaves have, multilayered epidermis / hypodermis / thick walled epidermis ; AVP ; e.g. suggestion that cotton leaves only have stomata on lower epidermis smaller stomatal aperture
5(c)(i)	*any **one** from:* more than one nucleus in each cell / more chromosomes ; larger cells ; more organelles ;
5(c)(ii)	any one from: nucleus will contain more chromosomes / more than 2 copies of each chromosome ; **A** more DNA molecules / more chromatin AVP ; e.g. *ref. to* polyploidy (proportionately) larger nuclei

2(a)(i)	1 uses most of the available space and the correct number of tissues ; 2 draws whole stem and no cells ; 3 draws the vascular tissue correctly ; 4 draws details of the tissue layers ; 5 label line to identify the xylem and the label xylem ;
2(a)(ii)	1 drawing of a minimum size and lines continuous, thin and sharp and no shading ; 2 draws only four cells and each cell touching at least one other cell ; 3 cell wall drawn as two lines ; 4 correct shapes of the cells ; 5 label line to identify the waxy cuticle and the label waxy cuticle ;
2(a)(iii)	(differences) 1, 2 and 3 ; ; ; *Any **three** from* :

feature	J1	Fig. 2.1
cuticle	thicker	thinner ;
presence of trichomes	absent	present ;
size of cortex cells	smaller	larger ;
central tissue	larger	smaller ;

2(b)(i)	states number of whole vascular bundles in sector **P** ;
2(b)(ii)	1 shows 360 divided by 15 ; 2 correct calculation of 24 multiplied by value from **Q2(b)(i)** ;
2(b)(iii)	1 shows value from **Q2(b)(ii)** divided by 44 ; 2 correct answer given to two significant figures ;