A level Biology A

H420/03 Unified biology

Question Set 8

1 The onion plant, *Allium cepa*, is grown as a food crop around the world.

(a) The table below contains statements about the root cells of an onion.

Place ticks (✓) in the boxes in the table to indicate whether the statements are true or false.

Statement about onion root cells	True	False
contain chloroplasts		✓
contain mitochondria	✓	
contain 70S ribosomes in the cytoplasm		✓
have pili		✓
have cellulose cell walls	✓	

[2]

(b) Fig. 1 shows a cross section of the root of an onion plant.

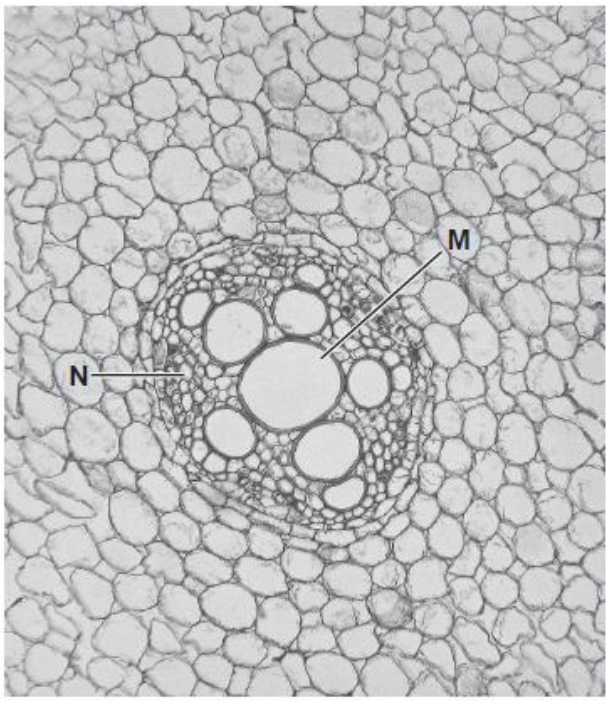

Fig. 1

Identify the **tissues** shown at **M** and **N**.

M ..... xylem .....

N ..... phloem .....

[2]

(c) The colour of onion bulbs is determined by two genes, **A/a** and **B/b**.

- **A** is a dominant allele and codes for the production of a red pigment.
- Onion bulbs that are homozygous for the recessive allele, **a**, produce no pigment and are white.
- **B** is a dominant allele that inhibits the expression of allele **A**.
- The recessive allele, **b**, allows the production of the red pigment.

A white onion plant was cross-pollinated with a red onion plant. All 15 offspring had the genotype **AaBb**.

(i) Identify the following:

The genotype of the white onion plant ..... aaBB .....

The genotype of the red onion plant ..... AAbb .....

The phenotype of the offspring ..... white ..... **[3]**

(ii) State the type of gene interaction shown by the genes **A/a** and **B/b**. dominant epistasis **[1]**

(iii) Suggest how allele **B** inhibits the expression of allele **A**. **[2]**

- B codes for repressor protein
- protein binds to promoter of A
- product of allele B stops transcription & translation of allele A
- product of B inhibits enzyme encoded by A

Total Mark for Questions Set 8: 10