



ANSWER BOOK

Sexual reproduction in flowering plants

Cell cycles, reproduction and development · Unit B06

Edexcel B 2.5 i, 2.5 ii, 2.5 iii

12 questions · 35 marks

NAVY EDITION

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SECTION A · Short, 1 to 2 marks

- A1**
SRF-Q7 **B1** the endosperm nucleus forms when one male nucleus fuses with two polar nuclei, each of which is haploid. **B1** so it has three sets of chromosomes, and the endosperm grows from it by mitosis, which keeps all three sets. [2]
- A2**
SRF-Q9 **M1** 30 divided by 48, multiplied by 100. **A1** 62.5%, or 63% to two significant figures. [2]
- A3**
SRF-Q12 **B1** both are formed from the generative nucleus by mitosis. **B1** mitosis produces nuclei with identical copies of the parent nucleus's DNA, so there is no crossing over or independent assortment to make them differ. [2]
- A4**
SRF-Q13 **B1** the endosperm forms only in ovules where an egg is being fertilised at the same time. **B1** so the plant does not spend starch and other stored food on ovules that will never contain an embryo. [2]

SECTION B · Standard, 3 to 5 marks

- B1**
SRF-Q1 **B1** the pollen mother cell is diploid and divides by meiosis. **B1** giving a tetrad of four haploid cells, or microspores, each of which becomes a pollen grain. **B1** the microspore nucleus divides by mitosis into a tube nucleus and a generative nucleus, and a wall with an outer exine forms around the grain. **B1** the generative nucleus divides by mitosis to give two haploid male nuclei. [4]
- B2**
SRF-Q2 **B1** a diploid megaspore mother cell in the nucellus divides by meiosis. **B1** this gives four haploid megaspores, three of which degenerate. **B1** the nucleus of the surviving megaspore divides by mitosis three times, giving eight haploid nuclei. **B1** these form an egg cell and two synergids at the micropyle end, two polar nuclei in the centre and three antipodal cells at the other end. [4]
- B3**
SRF-Q3 **B1** the pollen tube grows from the grain through the stigma and down the style, carrying the male nuclei inside it. **B1** the tube nucleus, near the tip, controls the growth of the tube, for example by its genes being transcribed to make the enzymes. **B1** the tip secretes hydrolytic enzymes that digest a path through the tissues of the style, and the products are absorbed and used by the growing tube. **B1** the tube grows towards chemicals from the ovule, enters through the micropyle and releases the male nuclei into the embryo sac. [4]

- B4** **B1** the pollen tube releases two male nuclei into the embryo sac. **B1** one male nucleus fuses with the egg nucleus to form a diploid zygote. **B1** the other male nucleus fuses with the two polar nuclei to form a triploid endosperm nucleus. [3]
SRF-Q4
- B5** **B1** anther: where pollen grains are made, and from which they are released. **B1** stigma: the surface that receives pollen, on which the pollen grain germinates. **B1** ovary: contains and protects the ovules, and becomes the fruit after fertilisation. [3]
SRF-Q6
- B6** **B1** calibrate an eyepiece graticule against a stage micrometer at the magnification used. **B1** measure the length of each tube in eyepiece units and convert to micrometres using the calibration. **B1** measure a set number of tubes, chosen at random or in several fields of view, at a fixed time, and calculate the mean. [3]
SRF-Q10
- B7** **B1** both begin with a diploid mother cell dividing by meiosis to give four haploid cells. **B1** in the anther all four haploid cells become pollen grains, whereas in the ovule three of the four megaspores degenerate and only one develops. **B1** in the pollen grain the nucleus divides by mitosis to give two nuclei, then the generative nucleus divides again, whereas the megaspore nucleus divides by mitosis three times to give eight nuclei. [3]
SRF-Q11
- B8** **B1** each ovule becomes a seed, after the zygote inside it has divided by mitosis to form an embryo. **B1** the integuments of each ovule become its seed coat, the testa. **B1** the ovary wall becomes the pod, which is the fruit. [3]
SRF-Q14

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