



Reproduction: practice questions

8 questions • 31 marks • mark scheme at the back

For IB Diploma Biology, Standard Level and Higher Level (first assessment 2025). **HL only** is additional higher level content, for HL students only.

Name

Total / 31

1 PAPER 1A STYLE [1 mark]

Which statement describes an advantage of asexual reproduction compared with sexual reproduction?

- A. ☐ It produces offspring with new combinations of alleles.
- B. ☐ It produces offspring that are well adapted if the environment changes.
- C. ☐ It produces genetically identical offspring of a parent adapted to an existing environment.
- D. ☐ It increases genetic variation within a population.

2 PAPER 1B STYLE [5 marks]

The table shows the concentrations of four hormones in the blood of a woman on selected days of one menstrual cycle (arbitrary units, data for practice). (a) Identify the day on which ovulation most probably occurred. [1] (b) Explain the change in LH concentration between day 10 and day 14. [2] (c) Explain why the endometrium breaks down after day 26. [2]

Hormone concentrations (arbitrary units)				
Day	FSH	LH	Oestradiol	Progesterone
2	8	6	4	1
10	6	8	14	1
14	14	58	18	2
21	3	5	10	16
26	4	4	5	4

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3 PAPER 2A STYLE

[4 marks]

(a) Outline what happens to the sperm and egg nuclei after a sperm's membrane fuses with the egg membrane. [2] (b) Outline how hormones are used at the start of IVF treatment. [2]

4 PAPER 2B STYLE

[7 marks]

Explain how flowering plants promote fertilization by gametes from different plants.

5 PAPER 2A STYLE

[3 marks]

(a) Distinguish between seed dispersal and pollination. [1] (b) Outline how food reserves are mobilized when a seed germinates. [2]

6 PAPER 1A STYLE

[1 mark]

HL only

Which feature occurs in oogenesis but not in spermatogenesis?

- A. ☐ Mitosis of germ cells
- B. ☐ Two divisions of meiosis
- C. ☐ Unequal division of cytoplasm during meiosis
- D. ☐ Differentiation of haploid cells

7 PAPER 2A STYLE

[4 marks]

HL only

(a) Outline the role of the acrosome reaction in fertilization. [1] (b) Explain how a pregnancy test strip detects pregnancy. [3]

8 PAPER 2B STYLE

[6 marks]

HL only

Explain the hormonal control of pregnancy and childbirth.

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

C C [1]

2. [5]

- (a) day 14 / when LH peaks [1]
- (b) LH rises sharply / LH surge from 8 to 58 units [1]
- (b) oestradiol concentration rises to a high level / from 14 to 18 units [1]
- (b) high oestradiol stimulates (pituitary) LH secretion / positive feedback [1]
- (c) progesterone falls / from 16 to 4 units [1]
- (c) because the corpus luteum degenerates (no pregnancy / no hCG) [1]
- (c) progesterone no longer maintains the endometrium [1]
- [max 5]

3. [4]

- (a) sperm nucleus enters the egg; tail and mitochondria destroyed [1]
- (a) nuclear membranes of sperm and egg nuclei dissolve [1]
- (a) chromosomes from both take part in one (joint) mitosis producing two diploid nuclei [1]
- (b) drug suspends normal secretion of (FSH/LH) hormones / down-regulation [1]
- (b) large / artificial doses of FSH injected [1]
- (b) to induce superovulation / many follicles develop [1]
- [max 4: max 2 for each part]

4. [7]

- male gametes are inside pollen grains; female gametes are inside ovules [1]
- pollination is transfer of pollen from anther to stigma [1]
- cross-pollination is transfer to a different plant (of the same species) [1]
- pollen and stigma mature at different times (in the same flower) [1]
- separate male and female flowers on one plant (e.g. maize) [1]
- separate male and female plants (e.g. holly) [1]
- animals / insects carry pollen between plants, attracted by petals / scent / nectar [1]
- wind carries pollen between plants [1]
- self-incompatibility genes / S alleles cause pollen from the same plant to be rejected [1]
- pollen with an allele matching the stigma / style fails to germinate / tube stops growing [1]
- self-pollination leads to inbreeding, which reduces genetic diversity / vigour [1]
- pollen tube grows down the style to the ovule so the male gamete can fuse with the egg [1]
- [max 7]

5. [3]

- (a) pollination moves pollen from anther to stigma (before fertilization) whereas dispersal moves seeds away from the parent plant (after fertilization) [1]
- (b) water absorbed, activating enzymes / gibberellin production [1]
- (b) amylase digests starch into maltose / sugars OR proteases digest proteins into amino acids [1]
- (b) soluble products transported to the embryo for respiration / growth [1]
- [max 3]

6. [1] HL only

C C [1]

7. [4] HL only

- (a) acrosome releases enzymes that digest (a path through) the zona pellucida so the sperm can penetrate it [1]
- (b) detects hCG (in urine) [1]
- (b) hCG is produced by the embryo / developing placenta [1]
- (b) mobile monoclonal antibodies (with coloured marker) bind hCG [1]
- (b) immobilised antibodies in the test line bind the hCG complex producing a coloured line [1]
- (b) control line shows the test has worked [1]
- [max 4]

8. [6] HL only

- embryo / trophoblast secretes hCG [1]
- hCG maintains the corpus luteum [1]
- corpus luteum secretes progesterone (and oestradiol) [1]
- progesterone maintains the endometrium / prevents menstruation [1]
- progesterone inhibits contractions of the uterus / myometrium [1]
- placenta takes over progesterone secretion (after about 3 months) [1]
- at the end of pregnancy progesterone levels fall [1]
- allowing oxytocin secretion (by the posterior pituitary) to increase [1]
- oxytocin stimulates contractions of the myometrium [1]
- contractions / stretching of the cervix stimulate more oxytocin secretion [1]
- positive feedback so contractions become stronger / more frequent until birth [1]
- [max 6]