Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

A: primary **hypothyroidism** (thyroid failing)

B: **hyperthyroidism**, for example Graves disease

C: **secondary** hypothyroidism: the pituitary is at fault

2.2

progesterone: **negative**

high oestradiol before ovulation: **positive**, causing the LH surge

2.3

ovulation about **day 14**

progesterone peak about **day 21**

2.4

CRH from the hypothalamus

ACTH from the pituitary, then cortisol from the adrenal cortex

cortisol feeds back to stop CRH and ACTH

3.1

(a) the thyroid makes too much T4 by itself; high T4 switches off TSH by negative feedback

(b) they bind and switch on the TSH receptor

(c) many symptoms come from extra sensitivity to adrenaline; a beta-blocker slows the heart and calms the tremor while the thyroid is treated

(d) the antibodies also act on tissue behind the eye, which swells and pushes the eye forward

3.2

(a) the adrenal cortex is destroyed, so cortisol is low; with no negative feedback, the pituitary makes much more ACTH

(b) ACTH comes from the same parent protein as MSH and also stimulates skin pigment cells

(c) aldosterone is lost too, so the kidney loses Na^+ and keeps K^+

3.3

(a) ovulation is about day 14; progesterone from the corpus luteum peaks about 7 days later

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(b) she did not ovulate in that cycle

(c) progesterone normally slows GnRH pulses; without it the pulses are fast, and fast pulses make the pituitary release more LH than FSH

(d) from the placenta (trophoblast); it keeps the corpus luteum making progesterone until the placenta takes over

(e) the luteal phase stays about 14 days: ovulation about day 21, so test about **day 28**