

1 Hormones are secreted by glands or made artificially by drug companies.

(a) (i) Name the gland that secretes testosterone.

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(ii) State why testosterone can improve sporting performance.

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..... [1]

(iii) Describe the role of progesterone in the menstrual cycle.

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..... [1]

(iv) Synthetic progesterone is found in oral contraceptives.

Name **one** other hormone often found in oral contraceptives.

..... [1]

Water entering two sewage works, **A** and **B**, was tested for the presence of four hormones.

The testing was repeated on water that left the sewage works to flow into lake **A** and lake **B**.

The results of the tests on the water samples are shown in Table 5.1.

Table 5.1

hormone	concentration of hormones at sewage works / ng per dm ³			
	A		B	
	before sewage treatment	after sewage treatment including ozone and chlorine	before sewage treatment	after sewage treatment including chlorine alone
oestrogen	not measurable	not measurable	0.1	not measurable
synthetic progesterone	8.5	8.0	4.5	4.6
natural progesterone	2.5	2.8	2.4	2.7
testosterone	15.6	3.7	2.7	3.1

(b) Explain which water sample was most polluted with hormones **before** sewage treatment. Use data from Table 5.1 to support your answer.

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[3]

(c) One reason for treating sewage is to reduce the concentration of hormones in the environment.

(i) Chlorine was used in the sewage treatment of both lakes.

Describe the effect that chlorine had on the hormone concentrations in the water. Use data from Table 5.1 to support your answer.

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[2]

(ii) State the main purpose of chlorine in sewage treatment.

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[1]

(d) Describe the negative consequences of letting untreated sewage flow into lake ecosystems.

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[6]

[Total: 16]

- 2 The menstrual cycle is coordinated by hormones secreted by the pituitary gland and hormones secreted by the ovaries.

Fig. 3.1 shows some of the events that occur during the menstrual cycle.

H	FSH is secreted by the pituitary gland
J	oestrogen stimulates repair and growth of the lining of the uterus
K	one or more follicles start to develop in an ovary
L	ovulation occurs
M	oestrogen is secreted by follicle cells
N	LH is secreted by the pituitary gland
O	oestrogen inhibits secretion of FSH

Fig. 3.1

- (a) Put the stages into the correct sequence. Two have been done for you.

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[2]

- (b) (i) Describe what happens at ovulation.

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.....[2]

- (ii) Name the cell produced at fertilisation by the fusion of two gametes.

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(ii) Outline **two** social implications of using fertility drugs.

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[2]

[Total: 17]

3 The growth and development of an embryo begins immediately after fertilisation.

(a) Fig. 5.1 shows some of the events (S to Y) between fertilisation and birth.

S	development of the heart
T	placenta forms
U	hormones are released by mother to start contractions
V	implantation of the embryo in the lining of the uterus
W	embryo forms into a ball of eight cells
X	development of sex organs
Y	fertilised ovum divides into two cells by mitosis

Fig. 5.1

(i) Put the events into the correct sequence. Two have been done for you.

Y					X	
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[2]

Fig. 5.2 shows a developing fetus and part of the reproductive system of the mother.

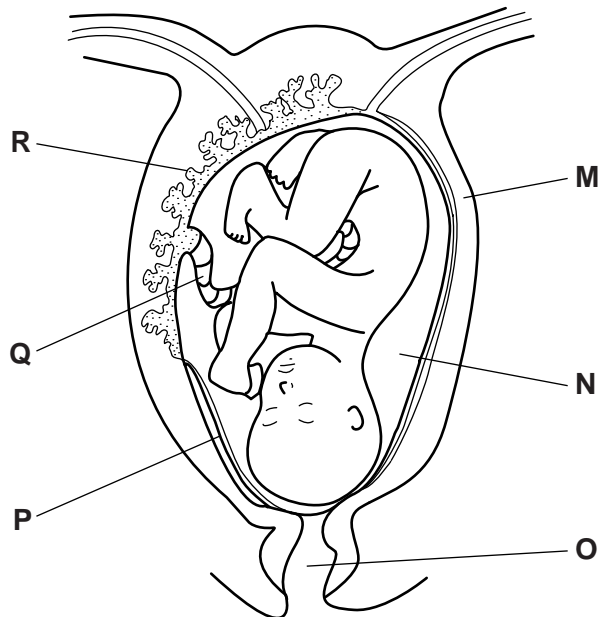


Fig. 5.2

- (ii) Table 5.1 shows some functions and names of parts of the developing fetus and pregnant mother.

Complete the table. One row has been done for you.

Table 5.1

letter from Fig. 5.2	name	function during pregnancy
P	amniotic sac	encloses the amniotic fluid
		attaches the placenta to the fetus
	amniotic fluid	
		contracts to push the baby through the birth canal
	placenta	
		widens during labour to allow the head of the baby to pass

[5]

- (b) Mothers are often given nutritional advice for their newborn babies. Scientists compared breast-feeding to bottle-feeding with formula milk. Their data is shown in Table 5.2.

Table 5.2

	breast milk	formula milk
lipid/g per dm ³	37	38
lactose/g per dm ³	73	72
protein/g per dm ³	8.7	12.9
energy/kJ per dm ³	680	690
volume of milk taken/g per day	448	732

Use the data in Table 5.2 to describe **one** difference and **one** similarity between the nutritional value of breast milk and formula milk.

difference

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similarity

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[2]

- (c) The scientists measured the growth of the babies fed with breast milk and babies fed with formula milk described in Table 5.2. The mass of the babies from birth until they were 15 months old is shown in Fig. 5.3.

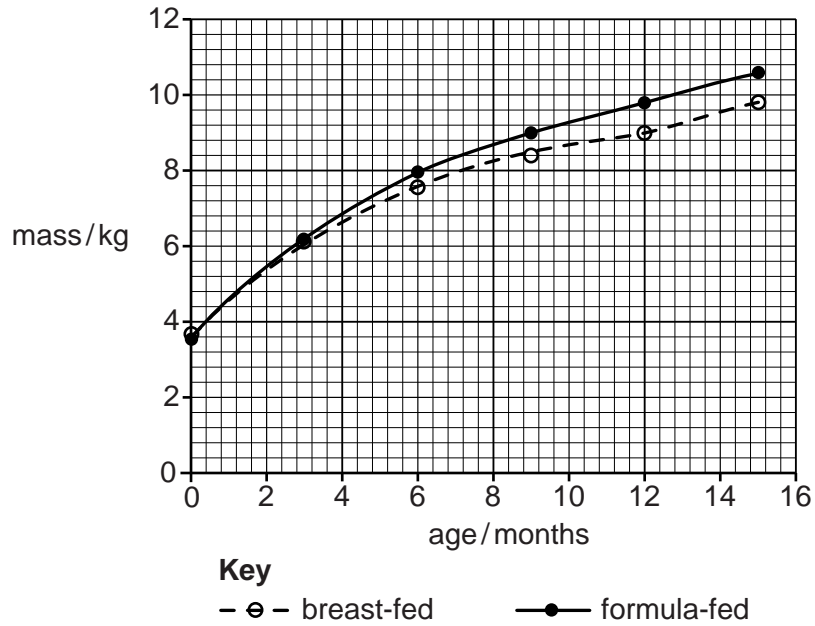


Fig. 5.3

- (i) Define the term *growth*.

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- (ii) Using the information in Table 5.2 and Fig. 5.3, describe and explain the changes in the mass of the babies that were breast-fed and babies that were bottle-fed with formula milk.

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- (iii) The scientists noticed that there were other differences between the breast-fed babies and the babies fed with formula milk.

Describe the advantages and disadvantages of breast-feeding.

advantages

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disadvantages

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[4]

[Total: 19]