

11.4 Sexual Reproduction

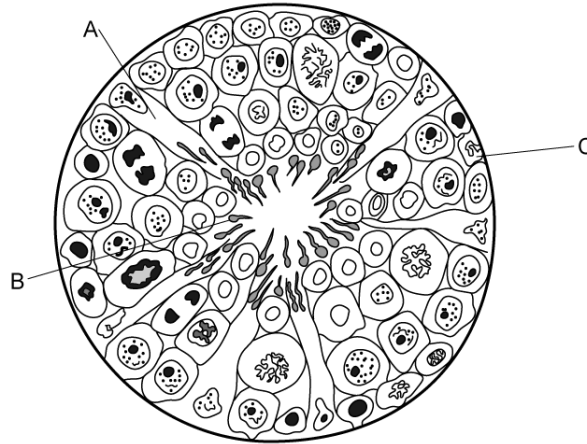
Question Paper

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| Course | DP IB Biology |
| Section | 11. Animal Physiology (HL Only) |
| Topic | 11.4 Sexual Reproduction |
| Difficulty | Medium |

Time allowed: 60
Score: /50
Percentage: /100

Question 1a

a)
The image below shows a cross-section through a seminiferous tubule during spermatogenesis.



Identify the cells labelled **A-C** in the image.

[3 marks]

Question 1b

b)
Outline the events that take place between the formation of cells **C** and **B** labelled in part a).

[3 marks]

Question 1c

c)
Contrast the processes of spermatogenesis and oogenesis.

[3 marks]**Question 2a**

a)
Compare and contrast internal and external fertilisation.

[3 marks]**Question 2b**

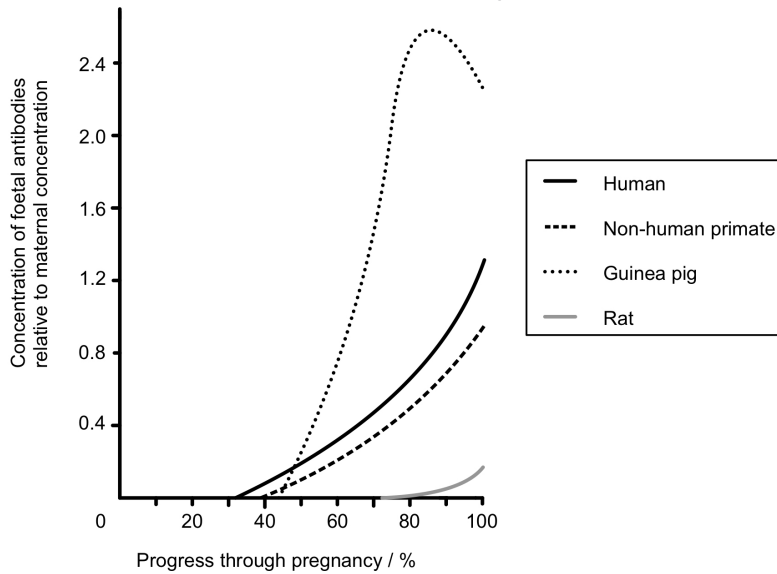
b)
Fertilisation in humans is followed by implantation of the blastocyst.

Outline the events that allow implantation to occur.

[2 marks]

Question 2c

c)
Once implantation has occurred, part of the blastocyst develops into the placenta. The transfer of antibodies from mother to foetus at the placenta in several different species can be seen in the graph below.



Contrast the changes in antibody concentration in the foetuses of humans and rats.

[2 marks]

Question 2d

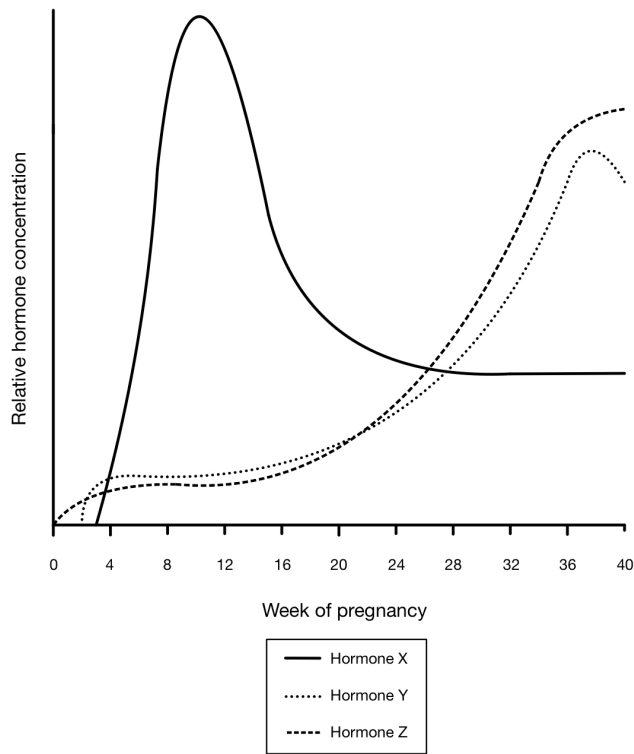
d)
Suggest, with a reason, which of the species in the graph shown in part c) will need the least maternal care from birth.

[2 marks]

Question 3a

a)

The graph below shows the relative levels of three hormones during pregnancy.



Identify, with a reason, the hormone labelled **X** in the graph above.

[3 marks]

Question 3b

b)

As the woman's body prepares to give birth, a fourth hormone, oxytocin, has an important role.

Sketch what you might expect to happen to levels of oxytocin on the graph in part a).

Note that hormone **Y** in the graph in part a) is progesterone.

[2 marks]

Question 3c

c)

Oxytocin is part of a positive feedback loop during birth.

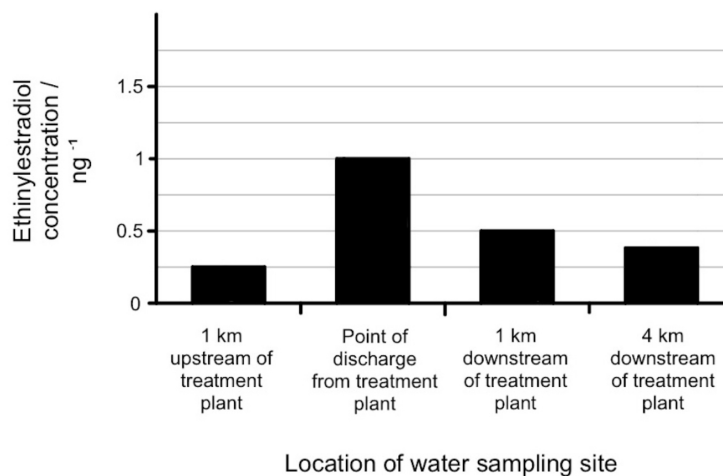
Outline the role of this positive feedback loop during birth.

[3 marks]

Question 4a

a)

The graph below shows levels of a synthetic oestrogen called ethinylestradiol at different sampling locations along a river. Note that a treatment plant treats sewage wastewater before releasing treated water back into a river.



Calculate the percentage increase in ethinylestradiol concentration between 1 km upstream of the treatment plant and the point of discharge from the treatment plant.

[2 marks]

Question 4b

b)

One study investigated the effect of ethinylestradiol on reproduction in one species of fish. The researchers exposed fish in separate mesocosms to different concentrations of ethinylestradiol.

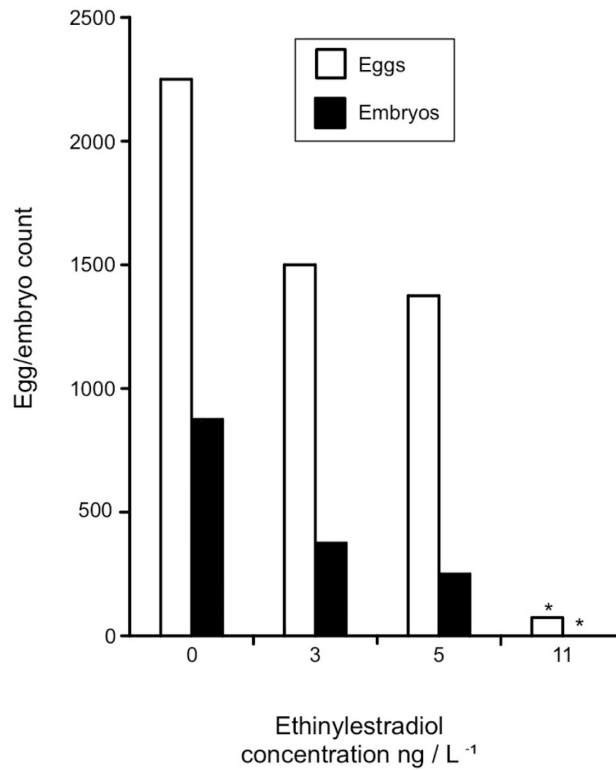
Explain why the scientists chose to carry out their investigation in mesocosms.

[2 marks]

Question 4c

c)

The scientists measured the effect of changing ethinylestradiol levels on egg production and embryo formation in fish populations. Their results are shown in the graph below. Note that the symbol * denotes a result that is significantly different from the control (0 ng L⁻¹).



A student read these results and concluded that ethinylestradiol was harmful to reproduction in fish.

Use all the information provided throughout Q4 to evaluate the student's conclusion.

[4 marks]

Question 5a

One mark is available for clarity of communication throughout this question.

a)

Draw an annotated diagram of a mature human sperm cell.

[4 marks]**Question 5b**

b)

Describe the process of fertilisation in humans.

[5 marks]**Question 5c**

c)

Outline the process of oogenesis.

[7 marks]