(Hormones in reproduction (menstrual cycle, FSH, LH, oestrogen, contraception, fertility treatments))

Q1.(2021)

Describe how hormones control the menstrual cycle.

[5 marks]

Q2.a)(2023)

Hormones are important for regulating the menstrual cycle.

During the menstrual cycle, eggs mature inside follicles in the ovaries.

A 27-year-old woman was infertile.

A doctor tested a sample of the woman's blood.

The test did **not** detect any follicle stimulating hormone (FSH) in the woman's blood.

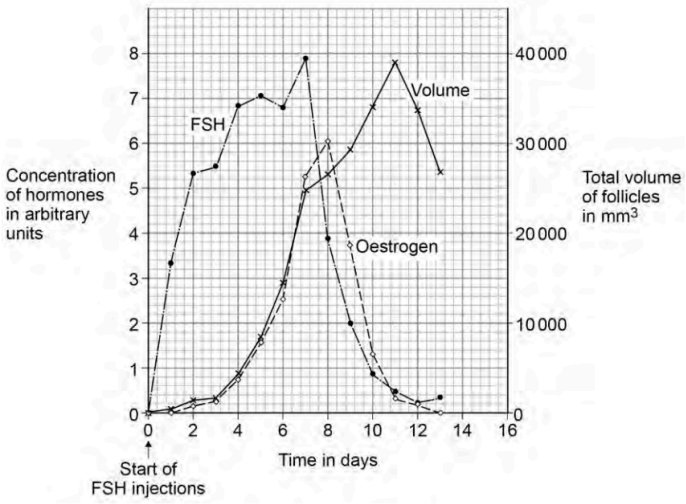
The doctor gave the woman daily injections of FSH for 7 days.

The doctor measured:

- the concentration of FSH in the woman's blood
- the concentration of oestrogen in the woman's blood
- the volumes of developing follicles in the ovaries.

Figure 12 shows the results.

Figure 12



Give evidence from **Figure 12** that the follicles in the ovaries release oestrogen.

[1 mark]

Q2.b)(2023)

Injection of FSH caused the development of a number of follicles.

The mean diameter of the follicles on day 11 was 22 millimetres.

Calculate the number of follicles in the woman's ovaries on day 11.

Assume each follicle is a sphere.

Volume of a sphere = $\frac{4}{3}\pi r^3$

r = radius
π = 3.14

Give your answer to the nearest whole number.

[5 marks]

Number of follicles (to the nearest whole number) = _____

Q2.c)(2023)

Before treatment with FSH, the woman had underdeveloped breasts.

Explain why the lack of FSH in the woman's blood caused underdeveloped breasts.

[2 marks]

Q2.d)(2023)

Usually males and females both produce FSH.

The woman had inherited a faulty gene for FSH production from each of her parents.

The woman's parents both produce FSH.

Show how the **woman's parents** could have a child that does **not** produce FSH.

You should:

- draw a Punnett square diagram
- identify the phenotype of each offspring genotype
- use the symbols below:

  H = allele for making FSH

  h = allele for **not** making FSH

[3 marks]

Q2.e)(2023)

The woman continues to have injections of FSH.

The woman has a child with a man who is heterozygous for the FSH gene.

Explain why the probability that the child will be able to produce FSH is 0.5.

[3 marks]