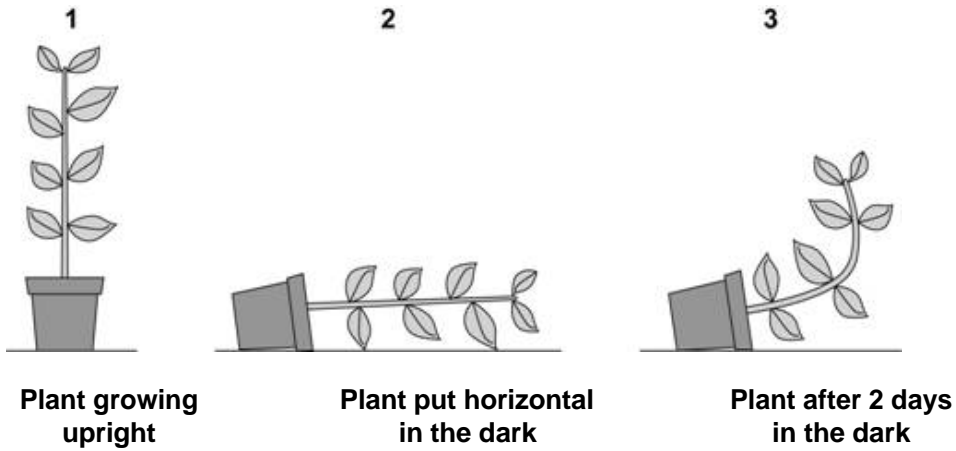


Q1. A student grew a plant in an upright pot.

She then put the pot in a horizontal position and left the plant in the dark for two days.

Diagram 3 shows the potted plant after two days in the dark.



Explain fully why the plant responded in this way.

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(Total 4 marks)

Q2. Read the information about the trialling of the first contraceptive pill.

The Pill was developed by a team of scientists led by Gregory Pincus. The team needed to carry out large scale trials on humans.

In the summer of 1955, Pincus visited the island of Puerto Rico. Puerto Rico is one of the most densely populated areas in the world. Officials supported birth control as a form of population control. The women in Puerto Rico were mainly poor and uneducated.

The scientists selected a pill with a high dose of hormones. The Pill was found to be 100 % effective when taken properly. But 17 % of the women in the study complained of side effects.

The women in the trial had been told only that they were taking a drug that prevented pregnancy. They had not been told that the Pill was experimental or that there was a chance of dangerous side effects.

Evaluate the issues involved with methods used by Pincus in trialling the contraceptive pill.

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(Total 6 marks)

Q3. Two types of fertility treatment are in-vitro fertilisation (IVF) and in-vitro maturation (IVM).

(a) Describe the role of hormones in IVF treatment.

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(3)

(b) Read the passage about fertility treatment.

During normal IVF, a woman undergoes several weeks of hormone injections.

The treatment can lead to a condition called ovarian hyperstimulation syndrome resulting in a build-up of fluid in the lungs. Very rarely, it can cause death. The syndrome occurs in about 1 % of standard IVF cycles, but in about 10 % of the IVF cycles of some women. An IVF cycle may cost up to £4300.

In IVM, hormone treatment lasts for less than 7 days. Eggs are then collected from the ovaries while they are still immature. Each egg is then matured in a laboratory for up to 48 hours before being injected with a single sperm.

A few days after fertilisation, the embryos are implanted into the mother's womb. The cost of each IVM cycle is £1700.

An IVM expert says: "In IVM treatment there's a small risk of abnormalities in the sex chromosomes and also of birth deformities and cancer in the babies. These risks are not massive but they are greater than in IVF."

Evaluate the use of IVM rather than IVF in treating infertility.

Remember to give a conclusion to your evaluation.

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(4)
(Total 7 marks)

Q4. Hormones are sometimes used to regulate human reproduction.

(a) (i) What is a hormone?

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(1)

(ii) How are hormones transported around the body?

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(1)

- (b) Describe the benefits and possible problems that may result from the use of hormones to regulate human reproduction. You should refer to fertility drugs and contraceptives in your answer.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

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(4)
(Total 6 marks)

M1. gravity
accept gravitropism / geotropism 1
caused redistribution of auxin / hormone to lower side of stem 1
these hormones stimulate growth of cells on the lower side of the stem only 1
so the stem grows upwards 1
[4]

M2. argued evaluation

- large scale trial gave better results
- chose uneducated women so that if these women could use it correctly, women elsewhere would be able to
- uneducated women unlikely to give informed consent
- no placebo
- used pill with high dose of hormone / should have tried a range of doses / results not valid for other populations
- women not told pill was experimental / pill might have side effects / should have done pre-trial to check for side effects

[6]

M3. (a) any **three** from
*if oestrogen **or** progesterone used = max 2*
*if both oestrogen **and** progesterone used = max 1*

- FSH used / given / injected
- LH used / given / injected
- FSH causes eggs to mature
- LH stimulates egg release

ignore effects of oestrogen and progesterone 3

(b) max **two** pros for IVM / it from:

*allow max **two** cons for IVF*

- cheaper
- less hormones used
- ovarian hyperstimulation **or** the syndrome less likely
allow 'it's safer for the mother'
ignore 'more risks' unqualified
- IVM treatment shorter

2

con for IVM

*allow max **one** pro for IVF*

- small risk of abnormal sex chromosomes / birth defects / baby cancer
allow 'more risk to baby'
ignore 'more risks' unqualified

1

evaluation

eg IVM better because less risk to mother outweighs small risk to baby

or

IVF better because no risk to baby and a small risk to mother

must include an appreciation that there are two sides to the argument

1

[7]

M4. (a) (i) any **one** from:

- chemical messenger
- chemical / substance released in one part to have effect elsewhere in body
- chemical / substance which affects another / target organ / tissues / cells
allow chemical from endocrine gland

1

(ii) in blood / circulatory system / any named part including plasma

extra wrong answer would cancel example

not red blood cells

1

(b) **Quality of written communication:**

correct use of at least two relevant scientific terms spelt phonetically

e.g. pregnancy, ovulation, FSH, oestrogen, progesterone, ovary, follicle, circulation, thrombosis, feminisation, sperm count, STD
Q ✓ or Q ✗

1

any **three** from:

Oral contraceptives:

(benefit)

- prevent (unwanted) pregnancy **or** prevent egg release
- regulate menstrual cycle / periods

(problems)

- prolonged use may prevent later ovulation / cause infertility
- named side-effect on female body
e.g. circulatory problems / weight gain / nausea / headache / breast cancer / mood swings
- increased promiscuity / increase in STD's / STI's
- named side-effect on environment
e.g. feminisation of fish **or** lowered sperm count in human males

Fertility drugs:

(benefit)

- can enable woman to have children **or** to become pregnant
or stimulates egg release

(problem)

- multiple births
*for full marks must score at least **one** re contraceptives **and** at least **one** re fertility drugs*
*if unclear which type of hormone maximum **2** marks from 3*

3

[6]

