# GCSE
## BIOLOGY

Topic Paper: 3.1 Drugs
Part 1

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## Time allowed: 50 minutes

**Materials**
For this paper you must have:
- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

**Instructions**
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**
- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
    - is clear, logical, sensibly structured
    - fully meets the requirements of the question
    - shows that each separate point or step supports the overall answer.

**44 Marks**

**Q1.** Many people use recreational drugs.

(a) Some recreational drugs are addictive.

(i) Give **one** example of a recreational drug that is very addictive.

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**(1)**

(ii) People may suffer withdrawal symptoms when they become addicted to drugs.

How does the action of a drug make a person become addicted to it?

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**(1)**

(b) Some doctors think that smoking cannabis causes depression.

Doctors investigated the cannabis smoking habits of 1500 young adults.

The table shows the percentage of the cannabis smokers in the investigation who became depressed.

| How many times the men or women had smoked cannabis in the last 12 months | Percentage of men whobecame depressed | Percentage of women who became depressed |
| --- | --- | --- |
| Less than 5 times | 9 | 16 |
| More than 5 times, but less than once per week | 10 | 17 |
| 1 – 4 times per week | 12 | 31 |
| Every day | 15 | 68 |

From the data, give **two** conclusions that can be drawn about the relationship between cannabis and depression.

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2 ..........................................................................................................

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**(2)**
**(Total 4 marks)**

**Q2.**     Scientists have trialled a new statin called rosuvastatin.

17 802 people took part in the trial.

All of these people had high levels of a protein called CRP in their blood.

The higher the level of CRP in the blood, the higher the risk of a heart attack.

None of these people had heart conditions at the beginning of the investigation.

None of these people had high LDL (low density lipoprotein) levels.

All of these people were aged 50 or above.

Half the people were given a rosuvastatin tablet each day; the other half were given a placebo.

The trial was stopped 7 months early when it was found that the people given rosuvastatin were 54% less likely to have a heart attack than people given the placebo.

(a)     Give **two** control variables in this investigation.

1 ...................................................................................................................

2 ...................................................................................................................

**(2)**

(b)     What would the placebo be in this investigation?

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**(1)**

(c)     The trial gave reliable results.

Give **one** reason why.

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**(1)**

(d)     The trial was stopped 7 months early.

Give **one** reason why.

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**(1)**

(e)    The manufacturers of rosuvastatin paid for the trial.

However, the manufacturers took no part in the trial.

Suggest **one** reason why the manufacturers did not take part in the trial.

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**(1)**

(f)    The table shows some of the results of the trial.

| Substance | Concentration in blood in mg per 100 cm³ after 3 years of trial | |
|---|---|---|
| | People given rosuvastatin | People given placebo |
| LDL cholesterol | 53 | 106 |
| HDL cholesterol | 50 | 49 |
| Saturated fats | 106 | 123 |

Rosuvastatin reduces the risk of heart attacks.

Use the data in the table to explain why.

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**(2)**
**(Total 8 marks)**

**Q3.**     (a)    **List A** gives the names of three stages in trialling a new drug.

**List B** gives information about the three stages.

Draw a line from each stage in **List A** to the correct information in **List B**.

**List A**
**Stage**

**List B**
**Information**

Used to find if the drug is toxic

Tests on humans
including a placebo

The first stage in the clinical trials
of the drug

Tests on humans using
very small quantities of
the drug

Used to find the optimum dose
of the drug

Tests on animals

Used to prove that the drug is
effective on humans

**(3)**

(b) Read the passage.

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**Daily coffee dose delays development of Alzheimer's in humans.**

Alzheimer's is a brain disease that causes memory loss in elderly people. Scientists studied 56 mice that had been genetically engineered to develop Alzheimer's.

Before treatment all the mice did badly in memory tests.

Half the mice were given a daily dose of caffeine in their drinking water. The dose was equivalent to the amount of caffeine in six cups of coffee for a human.

The other mice were given ordinary water.

After two months, the caffeine-drinking mice did better in memory tests than the mice drinking ordinary water.

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The headline for the passage is not justified.

Explain why as fully as possible.

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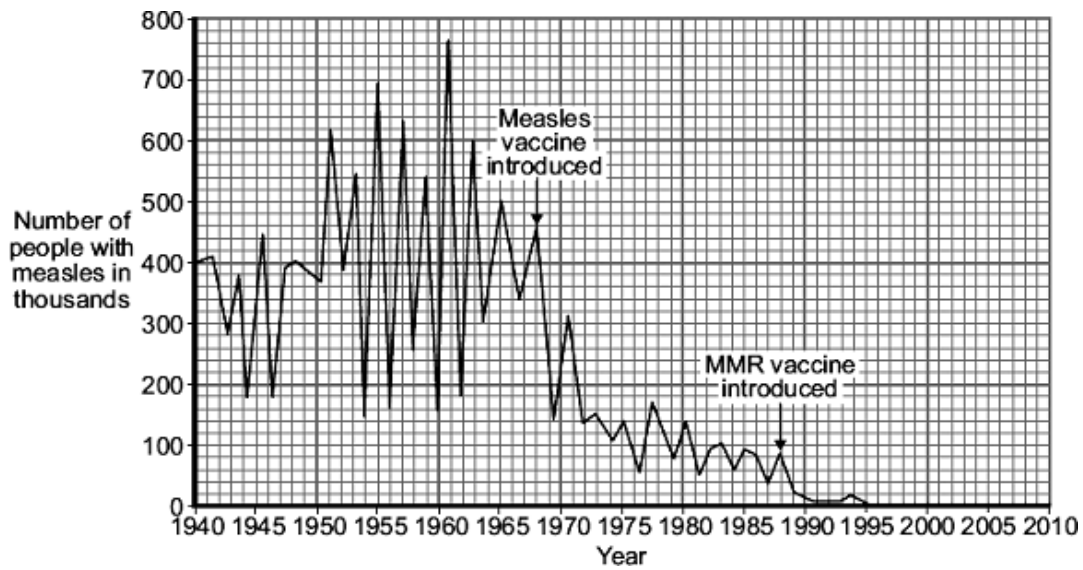
**(3)**
**(Total 6 marks)**

**Q4.** The graph shows the number of people with measles in the UK between 1940 and 2010.



©Health Protection Agency

(a) Compare how effective introducing the measles vaccine was with introducing the MMR vaccine.

Use data from the graph.

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**(3)**

(b) The MMR vaccine was introduced in 1988.

Other than measles, which **two** diseases does the MMR vaccine protect against?

1 ................................................. 2 .....................................................

**(2)**

(c) To immunise someone against measles, a small quantity of the inactive measles pathogen is injected into the body.

Describe what happens in the body after immunisation to stop a person catching measles in the future.

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**(3)**
**(Total 8 marks)**

**Q5.** Scientists at a drug company developed a new pain-killing drug, drug **X**.

(a) Painkillers do **not** cure infectious diseases.

Why?

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**(1)**

(b) The scientists compared drug **X** with two other pain-killing drugs, drug **A** and drug **B**.
In their investigation the scientists:
    chose 600 volunteers. The volunteers were all in pain
    gave 200 of the volunteers a standard dose of drug **A**
    gave 200 of the volunteers a standard dose of drug **B**
    gave 200 of the volunteers a standard dose of drug **X**.

Over the next seven hours the volunteers recorded how much pain they felt.

To get valid results the three groups of volunteers should be matched for as many factors as possible.

Suggest **two** of the factors that should be matched.
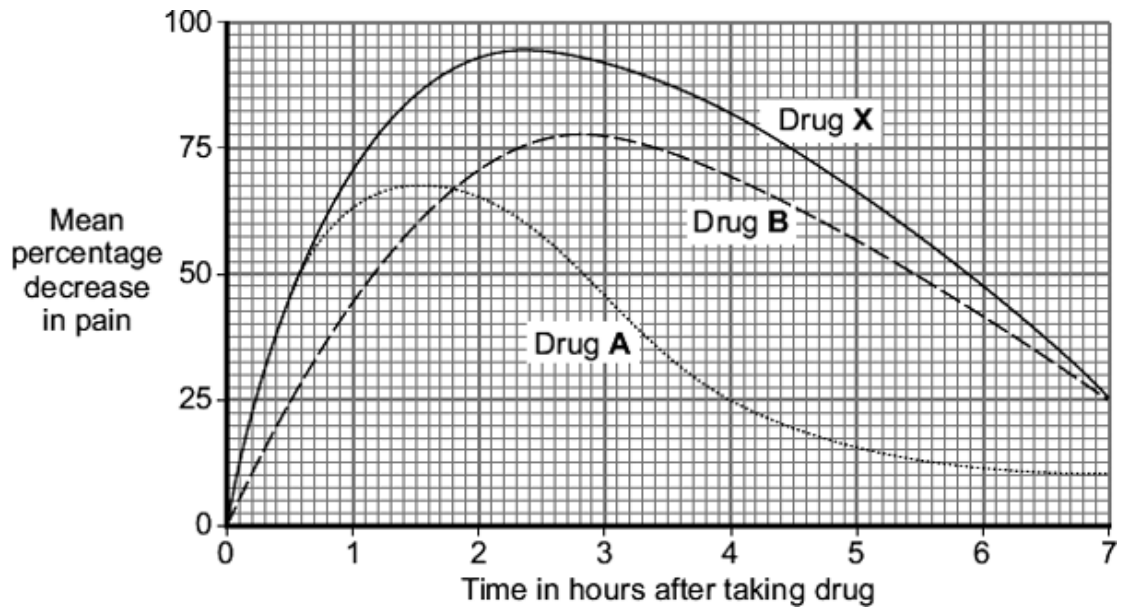
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**(2)**

(c)    The graph shows the results of the investigation.



(i)    How much pain did the volunteers still feel, four hours after taking drug **A**?

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**(1)**

(ii)    Give **one** advantage of taking drug **A** and **not** drug **B**.

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**(1)**

(iii)    Give **two** advantages of taking drug **B** and **not** drug **A**.

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**(2)**

(d)   Drug **X** is much more expensive than both drug **A** and drug **B**.

A pharmacist advised a customer that it would be just as good to take drug **A** and drug **B** together instead of drug **X**.

Do you agree with the pharmacist's advice?

Give reasons for your answer.

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**(3)**
**(Total 10 marks)**

**Q6.**   Drugs may harm the human body.

(a)   The drug thalidomide was originally developed in the 1950s.

(i)   What was the drug thalidomide originally developed to treat?

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**(1)**

(ii)   Soon after it was developed, thalidomide was found to be useful in treating another condition.

What was this other condition?

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**(1)**

(iii)   Describe **one** harmful effect of thalidomide.

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**(1)**

(iv)   Suggest why this harmful effect had **not** been detected during clinical drug trials on thalidomide.

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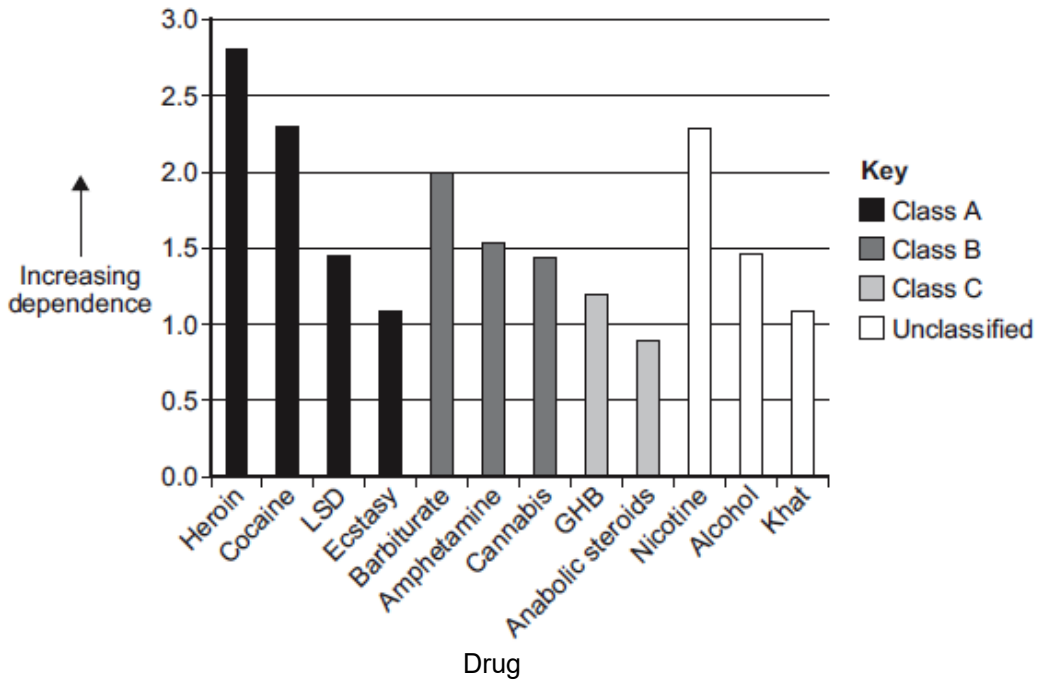
**(1)**

(b) Using a recreational drug may cause a person to become dependent on the drug.

(i) What happens in the body to make someone dependent on a drug?

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**(1)**

(ii) Doctors rated different recreational drugs according to how dependent users had become on them. The graph below shows the results.



It is illegal (against the law) to take Class A, B or C drugs.
Unclassified drugs are legal.

Some people think that some legal drugs should be made illegal.
What evidence is there in the graph above to support this view?

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**(2)**

(iii) Suggest **one** other piece of information about legal drugs that would need to be considered before the classification of these drugs was changed.

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**(1)**
**(Total 8 marks)**