



## Drugs (trials, testing, recreational, performance enhancing)

---



76 minutes



76 marks

---

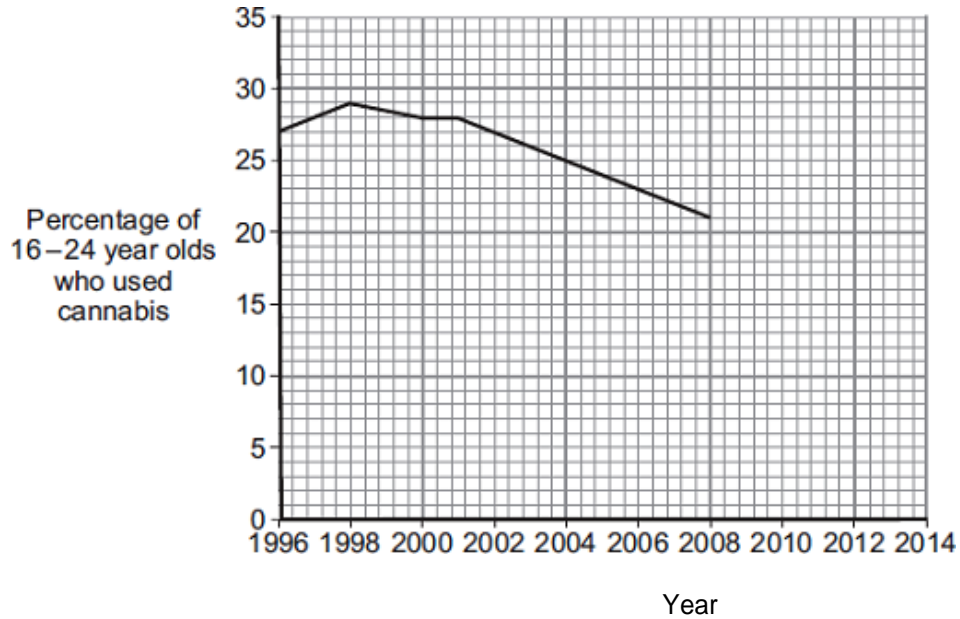
**Q1.** Cannabis is an illegal drug.

(a) What type of illness might be caused by smoking cannabis regularly?

.....

(1)

(b) The graph shows the use of cannabis by 16–24 year olds in the UK between 1996 and 2008.



(i) Use the graph to predict the percentage of 16–24 year olds who will use cannabis in 2014.

Show your working **on the graph**.

Percentage = .....

(2)

- (ii) Illegal drugs are classified as Class A, Class B or Class C. Class C drugs are the least dangerous.

In 2004, the government changed the classification of cannabis from Class B to Class C.

In 2009, the government changed the classification of cannabis back from Class C to Class B.

Do you think that changing the classification of cannabis back to a Class B drug will reduce the percentage of 16–24 year olds who use cannabis?

Use evidence from the graph to explain your answer.

.....

.....

.....

.....

.....

.....

(2)  
(Total 5 marks)

- Q2.** (a) We control many conditions inside our bodies.

Name **three** conditions which are controlled inside our bodies.

- 1. ....
- 2. ....
- 3. ....

(3)

- (b) Hormones are used to control fertility in women.

Use words from the box to complete the sentences.

<b>antibiotic</b>	<b>contraceptive drug</b>	<b>fertility drug</b>	<b>vaccine</b>
-------------------	---------------------------	-----------------------	----------------

A woman can prevent pregnancy by taking a .....

A woman can be helped to become pregnant by taking a .....

(2)

- (c) Some drugs are addictive.

- (i) Name **one** addictive drug.

.....

(1)

(ii) Explain why it is very difficult to give up using an addictive drug.

.....  
.....  
.....  
.....

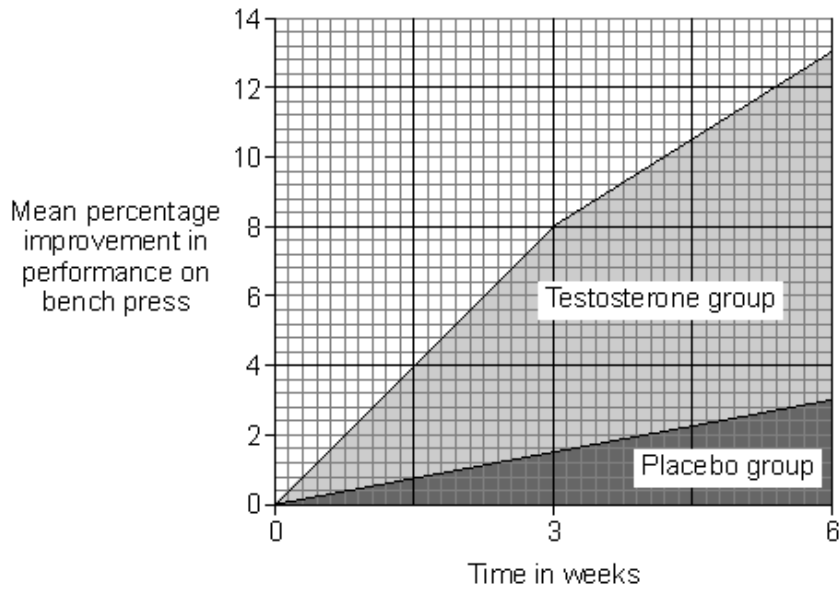
(2)  
(Total 8 marks)

**Q3.** Some athletes use drugs containing the steroid testosterone to improve their performance.

In an investigation:

- scientists monitored the performance of 18 male athletes over a 6 week training programme
- 9 athletes were given weekly injections of testosterone with the dose of 3.5 milligrams per kilogram of body mass, for 6 weeks
- the other 9 athletes were given a placebo
- the athletes' performance on a bench press exercise was measured at 3 weeks and 6 weeks.

The graph shows the results of the investigation.



David Cohen, *Steroids boost performance in just weeks*,  
© New Scientist Magazine 12 August 2004

(a) The data would have been better presented as a bar chart.

Give a reason why.

.....  
.....

(1)

(b) Suggest what was given as a placebo in this investigation.

.....  
.....

(1)

(c) Describe the results of the investigation.

.....  
.....  
.....  
.....  
.....

(2)

- (d) Most internet advertisements for testosterone state that athletes need to use testosterone for at least 10 weeks to significantly improve performance.

Do the results of this investigation support the statement in the advertisements?

Give **one** reason for your answer.

.....  
.....

(1)  
(Total 5 marks)

**Q4.** Medicinal drugs are used to treat diseases.

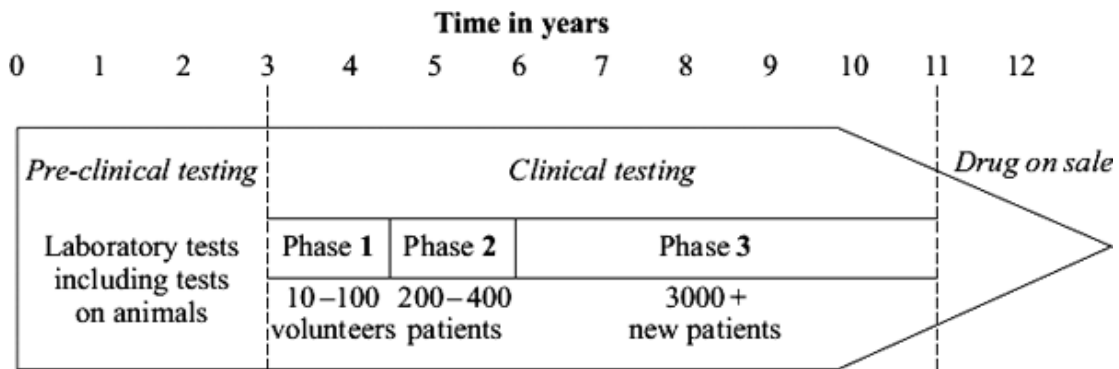
- (a) Draw **one** line from each drug to its correct use.

Drug	Use
Painkiller	Used as a fertility drug
Statin	Used to relieve disease symptoms
Thalidomide	Used to treat leprosy
	Used to lower blood cholesterol

(3)

(b) New drugs need to be tested before going on sale.

The diagram shows a time line for the testing of a new drug.



(i) How long do trials on humans take? ..... years (1)

(ii) What is the minimum number of humans the drug is tested on throughout *clinical testing*?  
 ..... (1)

(c) Draw a ring around the correct answer to complete each sentence.

(i) A new drug is first tested in the laboratory to find  
 if it is toxic.  
 if it is cost effective.  
 the optimum dose. (1)

(ii) The drug is then tested on a few volunteers to find  
 if it is cost effective.  
 if it has side effects.  
 the optimum dose. (1)

(Total 7 marks)

**Q5.** Many people use recreational drugs.

(a) Give **one** example of:

(i) a legal recreational drug  
 ..... (1)

(ii) an illegal recreational drug.

.....

(1)

(b) Some recreational drugs are addictive.

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

.....

(1)

(ii) Explain how the action of a drug makes a person become addicted to it.

.....

.....

(1)

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

Doctors investigated the cannabis smoking habits of 1500 young adults.

The table shows the percentage of 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 who became 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.

1 .....

.....

2 .....

.....

(2)

(Total 6 marks)



**Q6.** 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?

.....  
.....

(1)

(c) The trial gave reliable results.

Give **one** reason why.

.....  
.....

(1)

(d) The trial was stopped 7 months early.

Give **one** reason why.

.....  
.....

(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.

.....  
.....

(1)

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

Substance	Concentration in blood in mg per 100 cm <sup>3</sup> 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.

.....  
.....  
.....  
.....

(2)  
(Total 8 marks)

**Q7.** Obesity is linked to several diseases.

(a) Name **two** diseases linked to obesity.

1 .....

2 .....

(2)

(b) Scientists trialled a new slimming drug.

The table shows their results after one year.

Percentage change in mass of each volunteer	Number of volunteers
gained mass or lost 0 to 3.9 %	1900
lost 4.0 to 4.9 %	1100
lost 5.0 to 9.9 %	1500
lost 10 % or more	1500

(i) Calculate the proportion of the volunteers who lost 10 % or more of their mass.

You should first calculate the total number of volunteers, then work out the proportion.

.....  
.....

Proportion of volunteers = .....

(2)

(ii) The National Health Service (NHS) gave permission for the drug to be used.

Use information from the table to suggest a reason why the NHS gave permission for the drug to be used.

.....  
.....

(1)

(Total 5 marks)

**Q8.** Thalidomide is a drug that was developed in the 1950s.

In the 1950s some pregnant women took thalidomide to prevent morning sickness during pregnancy.

Today, thalidomide is **not** used to prevent morning sickness.

(a) (i) Give **one** medical use of thalidomide, today.

.....  
.....

(1)

- (ii) Today, before a woman is given thalidomide, she is
- checked to see if she is pregnant
  - told to use two different methods of contraception at the same time.

Give the reason why:

the woman is checked to see if she is pregnant

.....  
 .....

the woman is told to use two different methods of contraception at the same time

.....  
 .....

(2)

- (b) The information is about two types of contraceptive pill used by women.

**Combined pill**

- contains two hormones
- is taken for 21 days, then no pills are taken for 7 days
- > 99 % effective at preventing pregnancy
- increases chance of headaches
- increases chance of breast cancer
- decreases chance of cancer of the ovary

**Mini-pill**

- contains one hormone
- must be taken at the same time every day
- < 99 % effective at preventing pregnancy
- increases chance of breast cancer

- (i) Which **two** hormones does the combined pill contain?

Draw a ring around **two** answers.

**LH                    oestrogen                    progesterone                    FSH**

(2)

- (ii) Give **two** advantages of taking the combined pill and **not** the mini-pill.

.....  
 .....

(2)

(iii) Give **one** advantage of taking the mini-pill and **not** the combined pill.

.....  
.....

(1)  
(Total 8 marks)

**Q9.** Many recreational drugs harm the body.

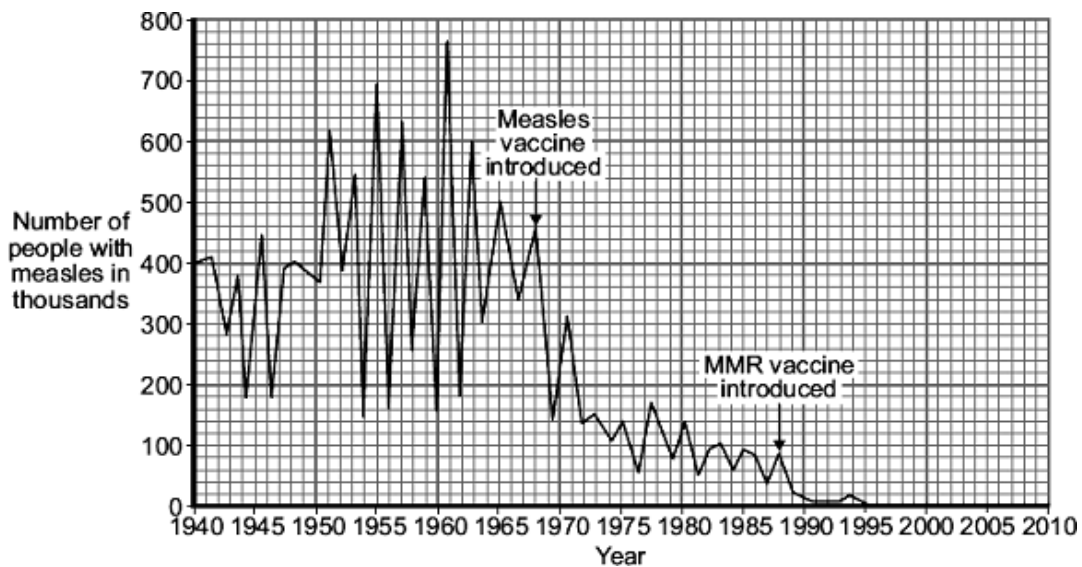
Some people become dependent on a recreational drug.

What happens to people's bodies when they become dependent on a drug?

.....  
.....  
.....  
.....  
.....

(Total 2 marks)

**Q10.** 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.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(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.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(3)

(Total 8 marks)

**Q11.** Scientists at a drug company developed a new pain-killing drug, drug **X**.

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

Why?

.....

(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.

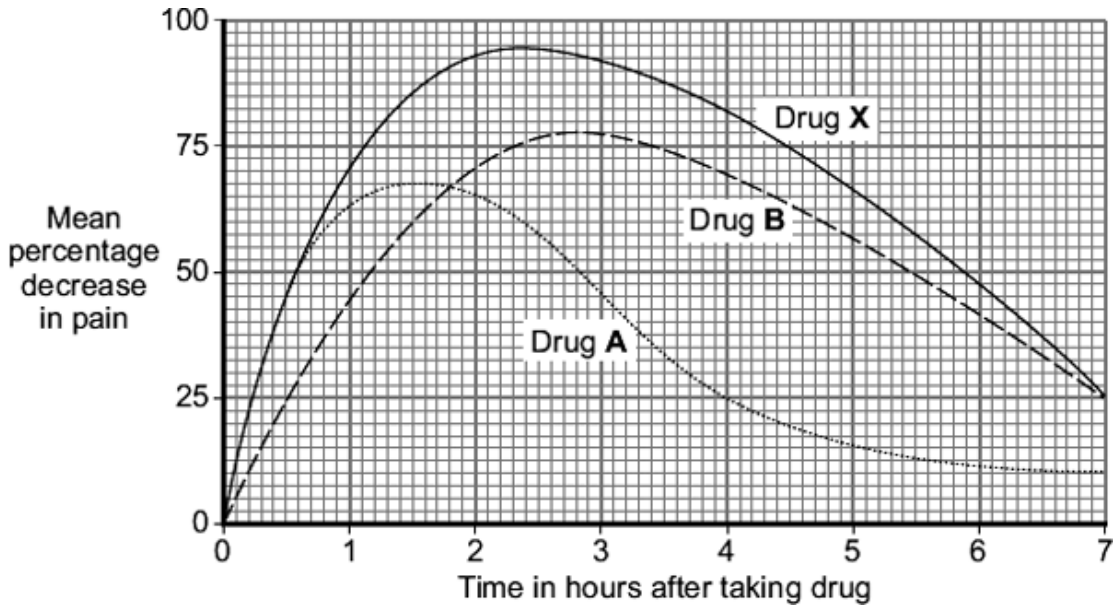
Suggest **two** of the factors that should be matched.

.....

.....

(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**?

..... percent

(1)

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

.....  
.....

(1)

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

.....  
.....  
.....  
.....

(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.

.....  
.....  
.....  
.....  
.....  
.....  
.....

(3)

(Total 10 marks)

**Q12.** Many people use recreational drugs.

(a) Some recreational drugs are addictive.

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

.....

(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?

.....  
.....

(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.

<b>How many times the men or women had smoked cannabis in the last 12 months</b>	<b>Percentage of men who became depressed</b>	<b>Percentage of women who became depressed</b>
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.

1 .....

.....

2 .....

.....

(2)  
(Total 4 marks)

- M1.** (a) mental (illness)  
*accept specific mental illnesses such as depression, paranoia  
schizophrenia or dementia  
allow brain damage  
do **not** accept cancer* 1
- (b) (i) evidence on graph of attempt to continue line from 2001 to 2014  
*range at 2014 from 13 to 16 inclusive* 1
- (ii) 15  
*accept any value between 13 and 16 consistent with attempt at  
straight line  
if there is no line accept only 15* 1
- (ii) no because  
*only award this mark if there is an attempt at an explanation* 1
- changing to Class C did not affect trend 1
- OR
- trend / use already falling before the change
- OR
- use higher when class B
- [5]
- M2.** (a) any **three** from:
- water  
*allow breathing / oxygen / carbon dioxide*
  - ions / minerals / salts  
*allow sodium / chloride, other ions neutral*
  - temperature  
*allow heat*
  - blood sugar
  - heart rate
  - blood pressure  
*ignore urea*
- 3

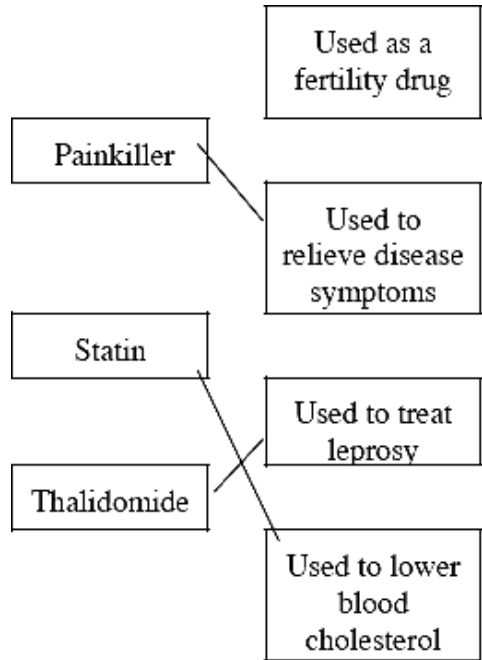
- (b) contraceptive drug 1
- fertility drug 1
- (c) (i) eg nicotine, alcohol, cocaine, heroin, painkillers, tranquilisers, LSD
  - allow cannabis / weed or other alternative names*
  - allow tobacco*
  - ignore smoking / ecstasy*1
- (ii) alters body chemistry **or** craving / needing / dependence
  - allow psychological dependence*1
- withdrawal symptoms on stopping
  - allow withdrawal described*
  - allow 'feel ill without it'*1

[8]

- M3.**
- (a) because there is insufficient data for line graph 1
  - (b) injection with no testosterone 1
  - (c) performance of testosterone group improved more than that of placebo group 1
  - quantitative figure given eg about 4 times greater 1
  - (d) (no)
  - there was a significant improvement after 6 weeks
    - allow significant improvement after 3 weeks*1

[5]

M4. (a)



*all three correct = 3 marks  
two correct = 2 marks  
one correct = 1 mark  
extra line from a statement cancels  
the mark*

3

(b) (i) 8

1

(ii) 3210

1

(c) (i) if it is toxic

1

(ii) if it has side effects

1

[7]

M5. (a) (i) tobacco / nicotine / alcohol  
*accept solvent / glue / caffeine  
ignore cigarettes / coffee*

1

(ii) cannabis / heroin / cocaine  
*allow eg crack / weed / ecstasy / LSD / amphetamine / speed /  
steroids / GHB*

1

(b) (i) heroin / cocaine / tobacco / nicotine  
*ignore alcohol / cigarettes / cannabis / caffeine / coffee*

1

- (ii) alters body chemistry  
*ignore withdrawal symptoms / craving*  
*ignore non-chemical effects on nervous system*

1

(c) any **two** from:

- increase in cannabis smoking increases (%) depression
- greater effect in women  
*allow women become more depressed*
- depression linked with / not directly caused by cannabis  
*ignore cannabis causes depression*
- not all cannabis smokers get depression

2

[6]

**M6.** (a) any **two** from:

- (high) CRP / protein
- (no) heart condition  
*allow health*
- (not high) LDL
- over 50 / age
- number of tablets (each day)  
*ignore time*  
*ignore placebo / rosuvastatin*  
*ignore number of people*

2

(b) any **one** from:

- tablet with no drug  
*allow fake (pill) / dummy (pill) / sugar / chalk (pill)*
- tablet that has no effect  
*allow drug that has no effect*
- tablet without chemicals  
*ignore vitamin / mineral pill*
- tablet that people thought contained statin **or** reference to psychological effect  
*ignore control / different statin*

1

(c) 17802 / large number of people **or** enough people  
*ignore control group / fair test / control variables*  
*ignore time / repeats* 1

(d) any **one** from:  
*ignore cost*

- placebo group at risk of heart attack **or** to allow statin to be given to everyone
- statin group 54% less likely to get heart attack **or** showed that statin worked **or** showed trial (very) successful  
*ignore reliable*
- sufficient information gained / results conclusive  
*ignore got results early*
- unethical / unfair to carry on trial

1

(e) to avoid bias **or** show impartiality **or** show results independent  
*allow manufacturers could cheat*  
*ignore reliability*  
*ignore could be sued / blamed if trial went wrong*  
*ignore manufacturer would know which group got statin / placebo* 1

(f) any **two** from:

- reduction in LDL  
*allow improves LDL:HDL balance **or** LDL and HDL concentrations equal*  
*ignore less cholesterol*  
*ignore more HDL*  
*do **not** accept less HDL*
- reduction in (saturated) fats
- reduces deposition of fat / cholesterol / LDL in walls of blood vessels  
**or**  
blood vessels less likely to be blocked with fat / cholesterol / LDL

2

[8]

- M7.** (a) any **two** from:
- ignore eating disorder*
  - ignore cancer*
  - arthritis  
*accept worn joints*
  - diabetes  
*accept high blood sugar*
  - high blood pressure  
*ignore cholesterol*
  - heart disease / heart condition / heart attack / blood vessel disease  
*allow blood clots / strokes*
- 2

- (b) (i)  $\frac{1}{4}$  **or** 0.25 **or** 25%
- correct answer gains 2 marks*  
*if answer incorrect, evidence of  $1500 \div 6000$  gains 1 mark*  
*25 without % gains 1 mark*
- 2

- (ii) majority / most / high proportion of people in trial lost mass / weight  
*ignore good results / it worked*
- 1

[5]

- M8.** (a) (i) any **one** from:
- ignore cancer / AIDS*
  - as a sleeping pill  
*do **not** accept morning sickness*
  - treating leprosy
- 1

- (ii) thalidomide causes birth defects / abnormalities / described  
*in this order*  
*ignore kill / harm / damage baby*
- 1

to be (more) sure of not getting pregnant  
*allow to be certain there is no baby **or** in case one doesn't work*

1

- (b) (i) oestrogen
- 1
- progesterone
- 1

- (ii) any **two** from:
- reduce chances of ovarian cancer
  - more effective (in preventing pregnancy)
  - no pills (to remember) for 7 days (out of every 28)  
*allow only taken for 21 days (out of 28)*
  - doesn't have to be taken at the same time every day
- 2

- (iii) less chance of headaches  
*ignore won't get headaches*
- or**  
less chance of forgetting  
*allow lower dose of hormone*  
*allow fewer side effects*  
*ignore only contains one hormone*
- 1

[8]

**M9.** drugs alter chemical processes in body

1

person suffers withdrawal symptoms without drug

1

**M10.** (a) both lead to reduction / fall (in measles cases)  
*can be implied*

1

measles vaccine caused a big drop **or** correct use of figures

1

MMR wipes out measles **or** drops to (almost) zero **or** doesn't fall as much as measles vaccine **or** correct use of figures.

1

(b) mump(s)

1

rubella / german measles  
*either order*  
*allow phonetic spelling*

1



(c) white blood cells  
*allow lymphocytes / leucocytes*  
*ignore memory cells* 1

(wbc) produce antibodies  
*ignore antitoxins / antigens / antibiotics / engulfing* 1

in future / if re-infected antibody production rapid / fast(er) / quick(er)  
*allow ecf from antitoxins / antigens / antibiotics*  
*ignore engulfing*  
*ignore reference to specificity* 1

[8]

**M11.** (a) don't kill pathogens / bacteria / viruses / microbes / microorganisms  
*allow don't contain antibiotics*  
*ignore antibodies / attack / fight*  
*allow only treat symptoms / pain*  
*ignore kill disease / germs* 1

(b) any **two** from:

- age
- gender
- extent / severity of pain  
**or** how long had pain before trial
- type of pain / illness / site of pain  
*accept 'the pain' for 1 mark, if neither extent or type given*  
*ignore pain threshold*
- (body) mass / weight / height  
*allow body size / physique*
- other medical issues / drugs taken / health / fitness
- ethnicity

2

(c) (i) 75  
*ignore calculations / %* 1

- (ii) faster pain relief / decrease  
*allow pain relief sooner*  
*or it works quicker*  
*or more pain relief at start / in first  $1 / 1\frac{3}{4}$  hours*

1

- (iii) decrease of pain higher / more  
*ignore more effective unless qualified by time  $> 1\frac{3}{4}$  hours*  
*allow effect lasts longer*

1

decrease of pain is longer lasting

1

- (d) any **three** from:  
*ignore yes or no*

**(Yes because)**

- rapid pain relief (from A)
- long lasting pain relief (from B)
- and it costs less
- the sum of the pain relief (from A + B) is greater (than X)

**(No because)**

- drug X gives more pain relief
- (A + B / they ) might interact with each other
- could result in overdose
- could be more / new side effects  
*if neither points gained*  
*allow (more) dangerous*

3

[10]

- M12.** (a) (i) heroin / cocaine / nicotine  
*accept tobacco*  
*ignore alcohol / cigarettes / cannabis / caffeine / coffee*

1

- (ii) alters body chemistry / processes  
*ignore withdrawal symptoms / craving*  
*ignore non-chemical effects on nervous system*

1

(b) any **two** from:

- increase in cannabis smoking increases (%) depression
- greater effect in women  
*ignore women become more depressed / men less depressed*
- depression linked with / not directly caused by cannabis  
*ignore cannabis causes depression*
- not all cannabis smokers get depression

2

[4]

