

**Q1.** Viruses and bacteria cause diseases in humans.

(a) Draw a ring around the correct word to complete the sentence.

Organisms that cause disease are called

algae.

pathogens.

vaccines.

(1)

(b) In August 2011 the United Nations gave a warning that there was a new strain of the bird flu virus in China.

Bird flu may kill humans. The new strain of the bird flu virus could cause a *pandemic* very quickly.

(i) What is a *pandemic*?

Tick (✓) **one** box.

A disease affecting the people all over one country.

A disease affecting hundreds of people.

A disease affecting people in many countries.

(1)

(ii) The swine flu virus is carried by pigs.

The bird flu virus is likely to spread much more quickly than the swine flu virus.

Suggest **one** reason why.

.....  
.....

(1)

This notice is from a doctor's surgery.

**Unfortunately,  
antibiotics  
will NOT get  
rid of your  
flu.**

(c) (i) Why will antibiotics **not** get rid of flu?

.....  
.....

(1)

(ii) The symptoms of flu include a sore throat and aching muscles.

What would a doctor give to a patient to relieve the symptoms of flu?

.....

(1)

(iii) It is important that antibiotics are **not** overused.

Explain why.

Use words from the box to complete the sentence.

<b>antibody</b>	<b>bacteria</b>	<b>immune</b>	<b>resistant</b>	<b>viruses</b>
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Overuse of antibiotics might speed up the development

of ..... strains of .....

(2)

(Total 7 marks)

**Q2.** Students tested eight different foods, **A – H**, for carbohydrate, fat and protein.

The table shows the students' results.

Food	Carbohydrate	Fat	Protein
<b>A</b>	X	✓	✓
<b>B</b>	X	✓	✓
<b>C</b>	✓	✓	✓
<b>D</b>	✓	X	✓
<b>E</b>	X	X	X
<b>F</b>	✓	X	X
<b>G</b>	✓	X	X
<b>H</b>	✓	X	✓

Key
✓ = present
X = not present

(a) (i) How many of the foods contained **only** carbohydrate?

.....

(1)

(ii) Which of the foods contained carbohydrate **and** fat **and** protein?  
Tick (✓) **one** box.

**B, C and D** only

**B and D** only

**C** only

(1)

(b) A person's diet should contain carbohydrate **and** fat **and** protein.

Give **two** reasons why.

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

(2)

(c) As well as carbohydrate, fat and protein, the body also needs vitamins and mineral ions.

(i) Why does the body need vitamins and mineral ions?

.....

(1)

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

Compared to the mass of carbohydrates, the body needs

- |           |
|-----------|
| a greater |
| a smaller |
| the same  |

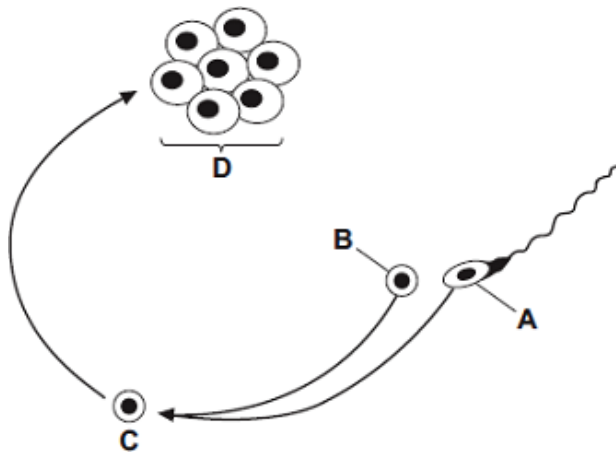
mass

of vitamins and mineral ions.

(1)

(Total 6 marks)

**Q3.** The diagram shows some of the stages in IVF (in vitro fertilisation).



(a) Use words from the box to name structures A, B, C and D.

- |     |        |                |       |       |
|-----|--------|----------------|-------|-------|
| egg | embryo | fertilised egg | ovary | sperm |
|-----|--------|----------------|-------|-------|

Structure A .....

Structure B .....

Structure C .....

Structure D .....

(4)

(b) What do doctors do next with structure **D**?

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

(2)

(c) The table gives statistics for an IVF clinic.

	Age of women treated			
	Below 35 years	35 – 37 years	38 – 39 years	40 – 42 years
Number of women treated	414	207	106	53
Number of women who produced one baby	90	43	17	1
Number of women who produced twins	24	8	4	1
Number of women who produced triplets	1	0	0	0

(i) About what proportion of the treated women aged 35 – 37 years produced one or more babies?

Draw a ring around your answer.

**one quarter      one third      half**

(1)

(ii) This clinic does **not** give IVF treatment to women over 42 years of age.

Use data from the table to explain why.

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

(2)

- (iii) The committee which regulates IVF treatment now advises that only one embryo is used in each treatment.

Suggest **one** reason for this.

.....  
.....

(1)  
(Total 10 marks)

- Q4.** (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**

Tests on humans  
including a placebo

Used to find if the drug is toxic

Tests on humans using  
very small quantities of  
the drug

The first stage in the clinical trials  
of the drug

Tests on animals

Used to find the optimum dose  
of the drug

Used to prove that the drug is  
effective on humans

(3)

(b) Read the passage.

**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.

The headline for the passage is not justified.

Explain why as fully as possible.

.....

.....

.....

.....

.....

.....

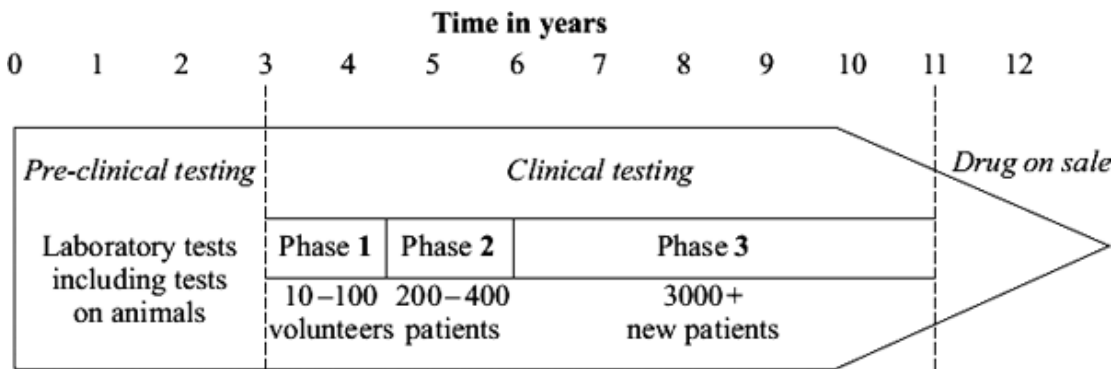
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.....

(3)  
(Total 6 marks)

**Q5.** New drugs have to be thoroughly tested before they are sold.

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



(a) What is the main purpose of *pre-clinical testing*?

.....  
 .....

(1)

(b) In Phase 1 of the *clinical testing*, very low doses of the new drug are used on a small number of volunteers.

(i) What is the main purpose of Phase 1 testing?

.....  
 .....

(1)

(ii) In Phase 1 testing, healthy volunteers are used rather than patients.

Suggest **one** reason for this.

.....  
 .....

(1)

(c) What is the main purpose of the Phase 2 and Phase 3 testing?

.....  
 .....

(1)

(d) During Phase 3 testing, many of the patients are given a *placebo*.

(i) What is meant by a *placebo*?

.....  
 .....

(1)

(ii) During the testing, who knows which patients are receiving the *placebo*?

Tick (✓) **one** box.

Only the patients

Only the doctors

Both patients and doctors

Neither patients nor doctors

(1)  
(Total 6 marks)

**Q6.** Thalidomide is a drug that was developed in the 1950s.  
It was originally developed to treat one particular medical condition.  
It was later found to be useful in treating another condition.

Thalidomide had not been tested thoroughly enough before use and caused some serious side effects. The drug was then banned in the 1960s.

Recently it has been used successfully in the treatment of other diseases.

- State what thalidomide was originally developed to treat and what it is used to treat today.
- Describe what else thalidomide was used for and why it was banned in the 1960s.

.....

.....

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.....

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.....

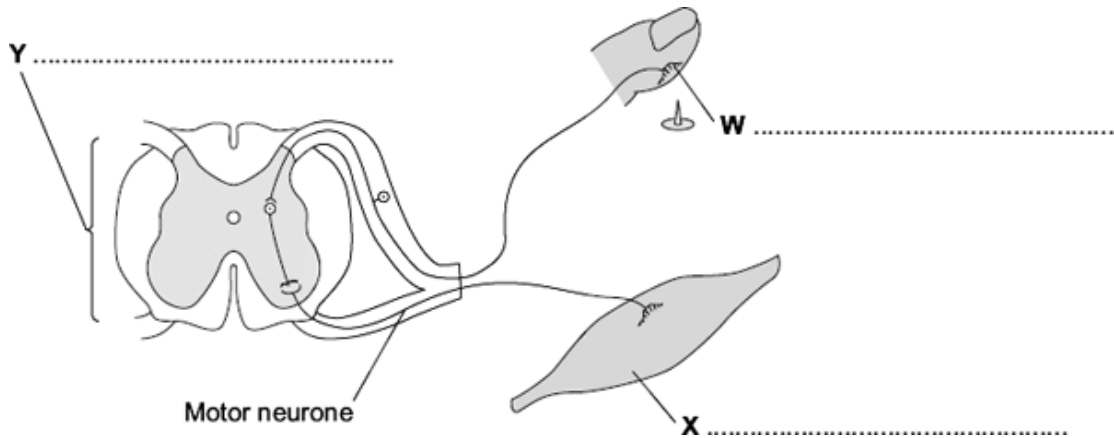
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.....

(Total 4 marks)

**Q7.** The diagram shows the structures involved in a reflex action.



(a) On the diagram, name the structures labelled **W**, **X** and **Y**. (3)

(b) The control of blood sugar level is an example of an action controlled by hormones.  
Give **two** ways in which a reflex action is different from an action controlled by hormones.

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

(2)  
(Total 5 marks)

**Q8.** Reflex actions are rapid and automatic.

(a) Name the following structures in a reflex action.

(i) The structure that detects the stimulus.

.....

(1)

(ii) The neurone that carries impulses to the central nervous system.

.....

(1)

(iii) The neurone that carries impulses away from the central nervous system.

.....

(1)

(iv) The structure that brings about the response.

.....

(1)

(b) Describe what happens at a synapse when an impulse arrives.

.....

.....

.....

.....

.....

(2)

(c) Some people have a condition in which information from the skin does not reach the brain.

Explain why this is dangerous for the person.

.....

.....

.....

.....

.....

(2)

**(Total 8 marks)**

<b>M1.</b>	(a)	pathogens	1
	(b)	(i) A disease affecting people in many countries	1
		(ii) birds fly / migrate <i>accept converse</i>	
		OR	
		human contact with birds more likely <i>birds not contained / difficult to control movement</i>	
		OR	
		there are more birds (than pigs)	1
	(c)	(i) antibiotics (only) <u>kill</u> bacteria <i>ignore flu is caused by a virus unqualified</i>	
		OR	
		antibiotics don't <u>kill</u> viruses <i>ignore virus resistant / immune</i>	1
		(ii) painkillers <i>accept any correct named painkiller, eg aspirin or paracetamol</i> <i>allow antivirals / Tamiflu</i> <i>ignore medicine / tablets</i>	1
		(iii) resistant	1
		bacteria	1
		<i>in this order</i>	
			[7]
<b>M2.</b>	(a)	(i) 2 / two <i>allow F <u>and</u> G</i>	1
		(ii) <b>C</b> only	1

(b) any **two** from:

ignore reference to health / strength

- balanced diet / otherwise malnourished
- (release) energy
- build cells / growth / repair
  - or allow:*
  - *carbohydrates for energy (1)*
  - *fat for energy / insulation (1)*
  - *protein for growth / repair (1)*

2

(c) (i) health

*do **not** allow energy / insulation / growth / repair*

*allow reference to specific function of vitamin or ion, eg prevent scurvy / harden bones*

*allow to prevent deficiency diseases*

*ignore strength / fitness / prevent diseases*

1

(ii) a smaller

1

[6]

**M3.** (a) A sperm

1

**B** egg

1

**C** fertilised egg

1

**D** embryo

1

(b) insert into mother

*ignore fertilise / check fertilisation / check viability*

1

womb / uterus

1

(c) (i) one quarter

1

(ii) no / little chance of success over 42

1

reference to table of only two women in the age bracket 40-42 years became pregnant

*the statement 'only 2 out of 53 40-42 year old women became pregnant / had babies' gains 2 marks*

1

- (iii) so fewer twins / multiple births  
or  
multiple births more dangerous

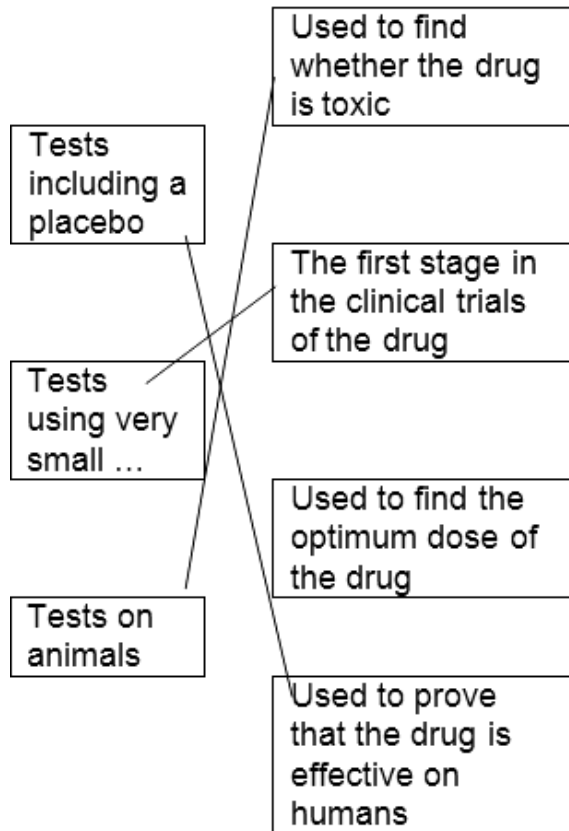
1

[10]

M4. (a)

**A**

**B**



*1 mark for each correct line*

*mark each line from left hand box*

*two lines from left hand box cancels mark for that box*

3

(b) any **three** from:

*Students have been informed that the headline is not justified*

- reference to reliability, eg only a small number of mice tested  
**or** trial too short  
**or** investigation not repeated
- reference to control, eg mice given caffeine not coffee  
**or** 6 cups (equivalence) is more than 1 dose
- (and) the effect on mice might not be same as on humans  
*allow only tested on mice*
- (also) text suggests that the treatment improves memory loss (rather than delays it)  
*accept text suggests disease cured*

**or** mice already have memory loss or experiment only showed improvement in memory

**or** does not show **delays** Alzheimer's

**or** experiment not done on old mice

*allow reference to the fact that mice engineered to have it*

3

[6]

**M5.** (a) testing for toxicity / see if it is safe / see if it is dangerous / to see if it works

*ignore side effects unqualified*

1

(b) (i) testing for side effects / testing for reactions (to drug)

*ignore to see if it works*

*do **not** accept dosage*

1

(ii) any **one** from

*ignore immune system*

- dose too low to help patient
- higher risk for patient
- might conflict with patient's treatment / patient on other drug
- effect might be masked by patient's symptoms / side effects clearer

1

(c) to find optimum dose

*allow testing on larger sample **or** it makes results more reliable*

*allow to find out if drug is effective / find out if drug works on ill people (not just if drug works)*

1

(d) (i) (tablet / drug / injection) that does not contain drug  
*allow control / fake / false*  
*allow tablet / injection that does not affect body*  
*do **not** accept drug that does not affect body*

1

(ii) neither patients nor doctors

1

[6]

**M6.** original use:  
as a sleeping pill

1

more recent uses:  
to treat leprosy

*accept to treat cancers / leukaemia / skin disorders / inflammatory  
diseases / arthritis*

1

also used:  
to treat morning sickness (in pregnant women)

1

reason for ban:  
caused arm / leg / limb abnormalities (in some babies)

*allow toes / fingers / thumbs / hands / feet / body / body parts /  
bones*

1

[4]

**M7.** (a) Y - spinal cord / central nervous system / CNS

*do **not** accept spine*  
*ignore nerve / nervous system / coordinator*  
*ignore grey / white matter*

1

W - receptor / nerve ending

*ignore sensory / neurone / stimulus*

1

X - effector / muscle

*allow gland*

1

- (b) any **two** from: eg  
*accept reverse argument for each marking point*
- reflex action quicker
  - effect of reflex action over shorter period
  - hormone involves blood system and reflex involves neurones / nerve cells  
*ignore nervous system / nerves*
  - reflex involves impulses and hormone involves chemicals
  - reflex action affects only one part of the body  
*ignore involves brain*  
*ignore outside / inside stimuli*

2

[5]

- M8.** (a) (i) receptor  
*allow named receptor eg light receptor*  
*ignore sensory neurone*  
*allow sense organ / named sensory organ eg skin / eye*
- 1
- (ii) sensory (neurone)  
*allow afferent*
- 1
- (iii) motor (neurone)  
*allow efferent*
- 1
- (iv) effector / muscle / gland / named
- 1

- (b) any **two** from:
- impulse / information passes from one neurone to another  
**or** impulse / information passes across gap
  - chemical / transmitter involved
  - diffusion (across gap)
- 2

(c) brain / person not aware of pain / stimulus / can't feel  
*allow brain/ person doesn't know / realise / unable to coordinate*  
*ignore reflex*  
*ignore information*

1

possibility of (permanent / serious) damage / eg burning  
*ignore danger*

1

[8]

