EDEXCEL GCSE SCIENCE (360SCIENCE)

SCIENCE



EXAM QUESTION PACK

UNIT B1b MULTIPLE CHOICE 5006 PAPERS

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Surname	Initial(s)
Signature	

Paper Reference(s)

5006 5026

Edexcel GCSE

Science (5006)

Biology (5026)

B1b – Topics 3 and 4

Foundation and Higher Tier

Tuesday 15 November 2011 – Morning

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

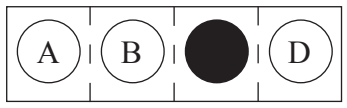
Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

Before the test begins:

Check that the answer sheet is for the correct test and that it contains your candidate details.

How to answer the test:

For each question, choose the right answer, A, B, C or D and mark it in HB pencil on the answer sheet.
For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

Do any necessary calculations and rough work in this booklet. You may use a calculator if you wish.

You must not take this booklet or the answer sheet out of the examination room.

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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Using drugs

1. Cannabis can have a long-term effect on mental health.
Which body organ, when damaged by cannabis, is most likely to affect mental health?

A liver
B lungs
C heart
D brain

2. Mental health problems can cause abnormal behaviour.
Which row of the table shows substances that can produce abnormal behaviour in humans?

	solvents	**alcohol**
A	yes	no
B	no	yes
C	yes	yes
D	no	no

3. Cannabis is a depressant.
This means that it

A slows down our responses
B speeds up our responses
C decreases the risk of viral infections
D increases the risk of viral infections

4. Paracetamol can only be bought in small amounts because an overdose can cause

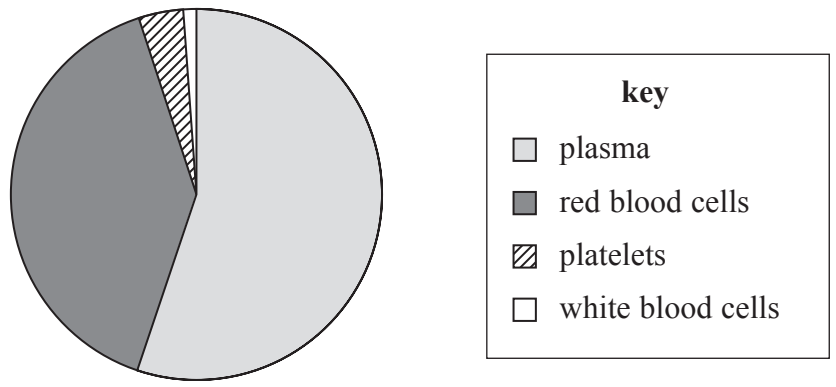
A brain damage
B liver failure
C heart disease
D lung cancer

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Richard's blood

Richard had a blood sample taken at the hospital.

5. The pie chart shows the four main parts of Richard's blood.



Richard's blood is mainly made up of

A white blood cells
B platelets
C red blood cells
D plasma

6. Which part of Richard's blood carries most oxygen?

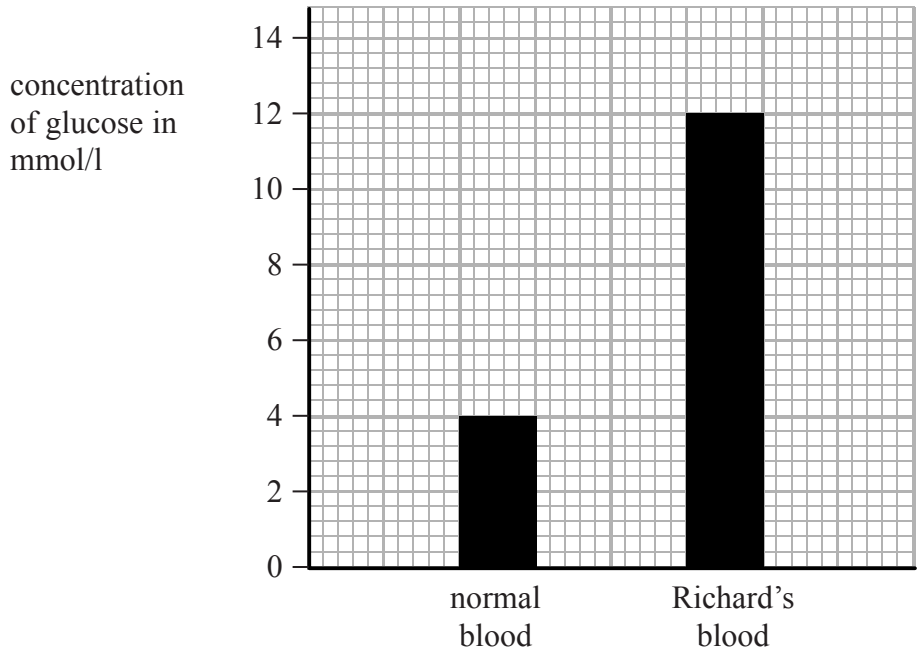
A white blood cells
B platelets
C red blood cells
D plasma

7. A doctor measured the amount of glucose in Richard's blood.
Which part of the blood transports glucose?

A white blood cells
B platelets
C red blood cells
D plasma

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8. The graph shows the concentration of glucose in normal blood and the concentration of glucose in Richard's blood.



How much more glucose does Richard's blood contain compared to normal blood?

A 4 mmol/l
B 8 mmol/l
C 10 mmol/l
D 12 mmol/l

9. The doctor explained that Richard's blood glucose concentration was too high because his pancreas was not making enough

A insulin
B glycogen
C antigens
D plasma

10. Hormones control the concentration of glucose in the blood.

Which row of the table shows the type of message carried by hormones and how hormones are transported?

	type of message	**how hormones are transported**
A	electrical	through neurones
B	chemical	through neurones
C	electrical	in blood
D	chemical	in blood

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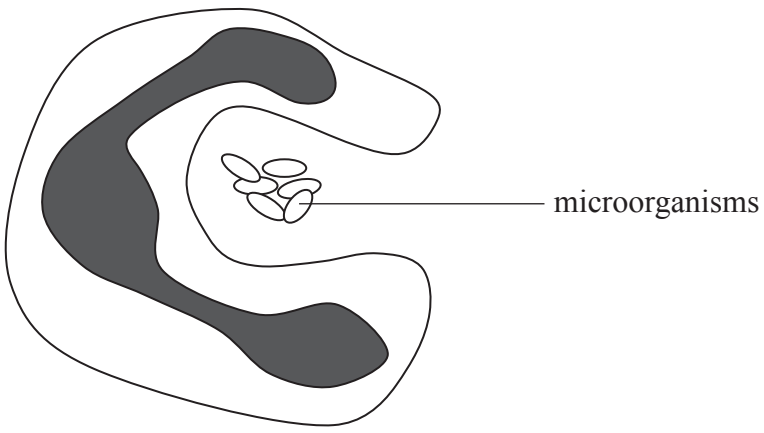
11. Bacteria can be genetically modified to produce human hormones.
Which of these statements are advantages of using bacteria to produce human hormones?

1 bacteria always multiply slowly so the amount of hormone produced is easily controlled
2 there are fewer side effects from hormones produced by bacteria compared to hormones produced by pigs

A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

The fight against disease

12. The diagram shows a white blood cell ingesting microorganisms that cause tuberculosis (TB).



Ingesting microorganisms involves the

A inflammatory response
B first line of defence against disease
C second line of defence against disease
D third line of defence against disease

13. Which of the following barriers reduce the risk of the TB microorganisms entering the lungs?

A skin and cilia
B nasal hair and skin
C mucus and cilia
D skin and mucus

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14. What name is given to microorganisms that cause disease?

A pathogens
B vectors
C foreign bodies
D antigens

15. How many of these statements are correct for TB?

- TB is caused by a bacterium
- TB is transmitted from person to person through airborne droplets
- TB is spread more rapidly in overcrowded areas

A none
B one
C two
D three

16. Some white blood cells produce chemicals to help destroy microorganisms that enter the body. These chemicals are known as

A antigens
B antibodies
C sedatives
D solvents

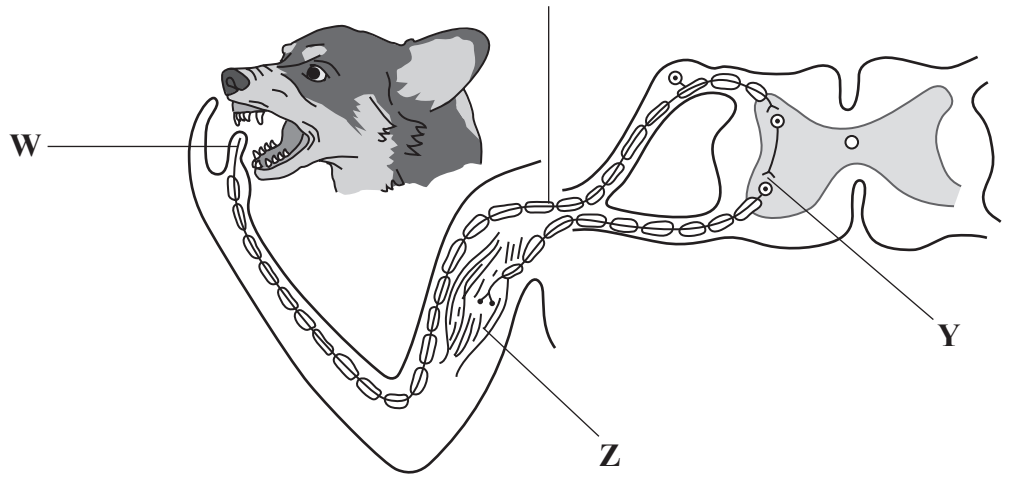
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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Reflex actions

Use the diagram to answer questions 17 to 20.

The diagram shows a dog biting a human hand.
The diagram includes some parts of the body which are used to help pull the hand away.



17. Which part is the effector?

A W
B X
C Y
D Z

18. Which part contains the receptor?

A W
B X
C Y
D Z

19. Which part represents the synapse?

A W
B X
C Y
D Z

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20. The response to the dog biting the hand is the result of a reflex action.
Which pathway shows the route of the nerve impulse during this reflex action?

A sensory neurone → relay neurone → motor neurone
B motor neurone → relay neurone → sensory neurone
C relay neurone → sensory neurone → motor neurone
D sensory neurone → motor neurone → relay neurone

21. Neurotransmitters allow neurones to communicate with each other.
Neurotransmitters are

A chemicals that diffuse across a synapse
B chemicals that diffuse along neurones
C electrical impulses that travel across a synapse
D electrical impulses that travel along neurones

Fertility treatment

22. *In vitro* fertilisation (IVF) is used with couples who are unable to have children naturally.

The table shows the number of successful births to women of different age groups following IVF treatment in 2007.

	number of		
age (years)	**single births**	**sets of twins**	**sets of triplets**
less than 35	4071	1470	1487
35 to 37	2373	659	666
38 to 39	1178	191	196
40 to 42	717	127	128
43 to 44	110	26	27

The information shows that

A there were more sets of twins or triplets than single births born to women at any age
B women aged 35 years receiving IVF produced more sets of twins than triplets
C more women aged 35 to 37 are using IVF than any other age group
D women aged 40 to 42 produced more sets of triplets than twins following IVF

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23. The statements give the stages involved in IVF but they are not in the correct order.
What is the correct order for the stages in IVF?

1 eggs are fertilised by sperm
2 embryos are implanted in the uterus
3 hormones encourage eggs to mature
4 eggs are extracted from the female

A 1-4-3-2
B 3-4-1-2
C 3-4-2-1
D 1-3-2-4

24. The use of IVF raises ethical issues for some people.
The reason for this is because IVF

A always results in multiple births
B is not given to women over 45
C creates many embryos which are destroyed
D does not produce enough eggs for fertilisation

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

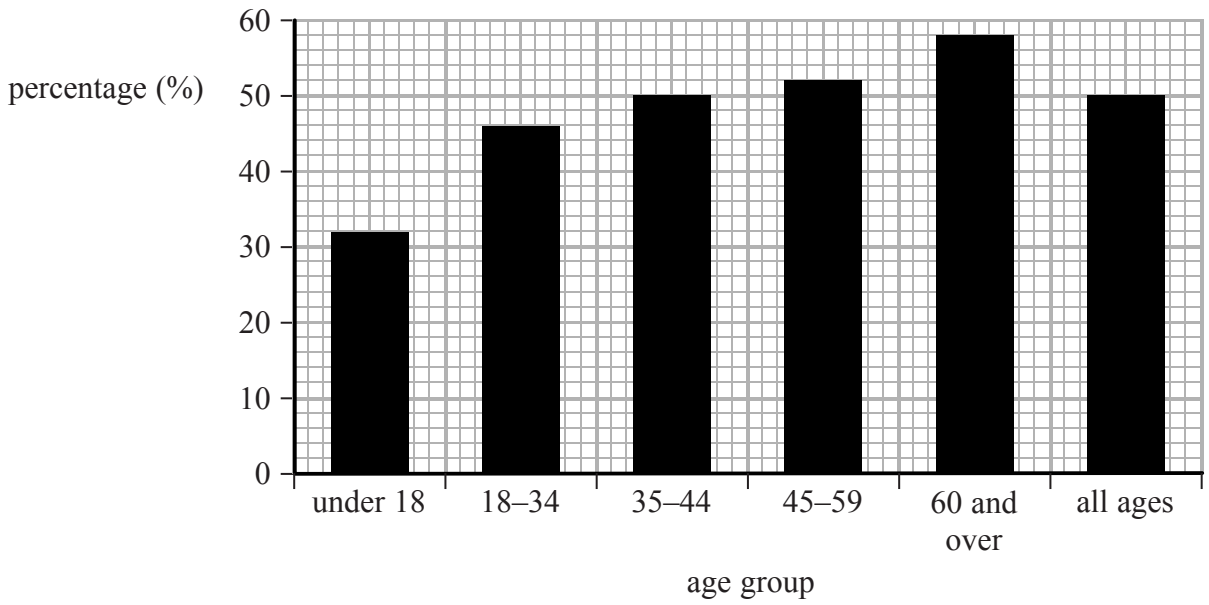
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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Smoking

25. During 2009 to 2010, a large number of people joined up to the National Health Service (NHS) Stop Smoking Services.

The chart shows the percentage of these people, in each age group, who successfully gave up smoking.



Which age group was least successful in giving up smoking?

A under 18
B 18 to 34
C 35 to 44
D 60 and over

26. What effect does tar from cigarette smoke have on the body?

A it causes emphysema which increases gas exchange in the lungs
B it blocks the action of cilia so less mucus is removed from airways
C it prevents mucus production in airways which increases infections
D it blocks arteries which can lead to a stroke

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27. Doctors can tell if a person has given up smoking by measuring the level of carbon monoxide in their blood.
This is because smoking

A decreases levels of carbon monoxide and oxygen in the blood
B increases levels of carbon monoxide and oxygen in the blood
C decreases the level of carbon monoxide which increases the level of oxygen in the blood
D increases the level of carbon monoxide which decreases the level of oxygen in the blood

28. Smokers can be given nicotine in chewing gum which gradually helps to reduce their cravings for cigarettes.
This is called nicotine replacement therapy (NRT).

Which row of the table is true for NRT?

	stops nicotine addiction	**increases heart rate**
A	yes	yes
B	no	no
C	yes	no
D	no	yes

Female hormones

The menstrual cycle is controlled by several hormones.
The concentration of these hormones inside a female can be altered using different drugs which can increase or decrease the chance of becoming pregnant.

29. Which is the main hormone that causes the lining of the uterus to increase in thickness?

A oestrogen
B progesterone
C FSH
D LH

30. Which hormone maintains the thickness of the uterus lining during pregnancy?

A oestrogen
B progesterone
C FSH
D LH

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31. What is the target organ of FSH?

A uterus
B pituitary gland
C ovary
D ovum

32. Oestrogen can be used in the contraceptive pill to prevent pregnancy.
The reason for this is because oestrogen

A inhibits the release of LH prior to ovulation
B stimulates the release of LH following ovulation
C stimulates the release of FSH
D inhibits the release of FSH

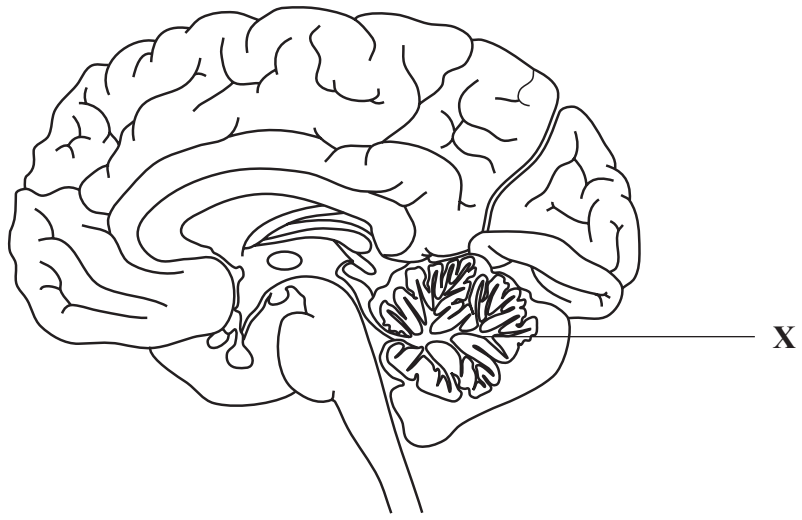
33. Hormones are used to treat infertility in women.
What is the reason for using LH in fertility treatment?

A it increases the rate at which ova mature in the ovary
B it increases the chance of an ovum being released from the ovary
C it prevents the release of progesterone which inhibits FSH production
D it increases the number of ova that develop over the 28-day cycle

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The human brain

34. The diagram shows a human brain.



The part labelled **X** coordinates muscular movement and balance.
The part labelled **X** is the

A medulla
B cerebral hemisphere
C cerebellum
D hypothalamus

35. Brain function can be disrupted by the use of drugs or by disease.
Which of these statements are correct about how drugs and disease affect the brain?

1 Grand mal epilepsy causes motor neurones to break down resulting in jerky movements
2 cannabinoids can cause psychosis

A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

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A deadly disease

Use the table to answer questions 36 and 37.

Scientists estimate that in the past 400 years tuberculosis (TB) has killed around 2 billion people worldwide.
The emergence of new drug-resistant strains of TB has made it one of the world's most deadly diseases.

The table shows the number of deaths caused by TB in some European countries over an eight-year period.

	year							
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Armenia	357	374	368	352	331	306	308	313
Azerbaijan	819	841	843	911	848	861	872	882
Belgium	158	167	158	150	144	144	137	129
Bulgaria	420	462	450	417	370	412	367	398
Czech Republic	176	158	145	134	127	120	111	103
Germany	927	832	728	694	644	591	541	491
Italy	572	541	542	518	509	503	496	532
United Kingdom	686	712	719	756	804	869	900	930

36. Which country has an annual increase in the number of deaths from TB each year?

A Azerbaijan
B Bulgaria
C Italy
D United Kingdom

37. The data shows that the number of deaths from TB

A is greater in countries where there are more foreign immigrants
B dropped most significantly in Germany over the eight-year period
C decreased each year in Italy
D in the UK shows a greater increase between 2000 and 2003 than between 2004 and 2007

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Use the information to answer questions 38 and 39.

The World Health Organisation (WHO) estimates that there are 9 million cases of TB in the world, with around 2% being infected with a drug-resistant form called XDR-TB.

38. How many people infected with TB are estimated to carry XDR-TB?

A 18 000
B 180 000
C 2 000 000
D 4 500 000

39. The WHO recommended treatment for TB is known as DOTS.
Why does the emergence of XDR-TB threaten the success of DOTS?

A DOTS uses several antibiotics which are ineffective as they are resistant to XDR-TB
B the antibiotics used in the DOTS programme are only effective against XDR-TB
C some cases of XDR-TB are not detected and are therefore not treated using DOTS
D XDR-TB contain genes that prevent it being treated effectively with antibiotics

40. Immunisation has decreased the number of cases of TB.
What effect does immunisation have on the specific immune system?

A it stimulates the production of antibodies
B it stimulates the production of antigens
C it increases resistance to the TB virus
D it encourages white blood cells to engulf the TB microorganism

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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Mark Scheme (Results)

November 2011

360Science

GCSE Science
Multiple Choice Paper B1b (5006)

GCSE Biology
Multiple Choice Paper B1b (5026)

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5006 & 5026 (B1b) Mark Scheme
November 2011

Unit B1b – 5006/5026	
Topics 1 & 2	
1	D
2	C
3	A
4	B
5	D
6	C
7	D
8	B
9	A
10	D
11	B
12	C
13	C
14	A
15	D
16	B

Unit B1b – 5006/5026	
Topics 1 & 2	
17	D
18	A
19	C
20	A
21	A
22	D
23	B
24	C

Unit B1b – 5006/5026	
Topics 1 & 2	
25	A
26	B
27	D
28	D
29	A
30	B
31	C
32	D
33	B
34	C
35	B
36	D
37	B
38	B
39	D
40	A

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Edexcel GCSE

Science (5006)

Biology (5026)

B1b – Topics 3 and 4

Foundation and Higher Tier

Friday 17 June 2011 – Afternoon

Time: 20 minutes

Materials required for examination
Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers
Nil

Instructions to Candidates

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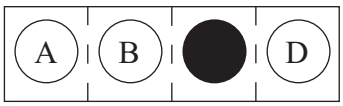
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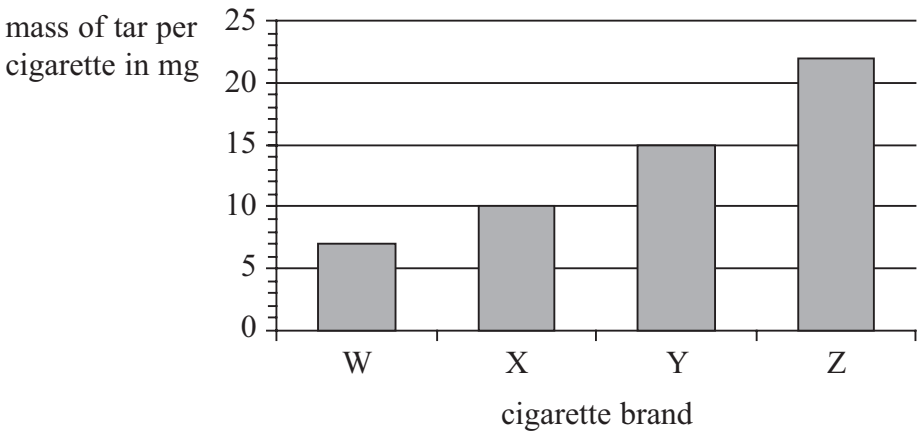
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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

The chemicals in cigarettes

Use the chart to answer questions 1 and 2.

The chart shows the mass of tar in four brands of cigarettes.



1. How much tar does cigarette brand W contain?

A 5 mg
B 7 mg
C 10 mg
D 15 mg

2. Cigarette brand Z is the most harmful to health.
This is because it is more likely to cause

A addiction
B liver damage
C lung cancer
D brain damage

3. Nicotine in cigarettes has a similar effect on our body to caffeine.
Nicotine and caffeine are

A painkillers
B depressants
C sedatives
D stimulants

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4. Smokers are more likely than non-smokers to get lung infections.
What name is given to microbes that cause infection?

A pathogens
B antigens
C antibodies
D vectors

Fighting disease

The picture shows microbes that cause tuberculosis (TB).
TB is a disease that infects the lungs.



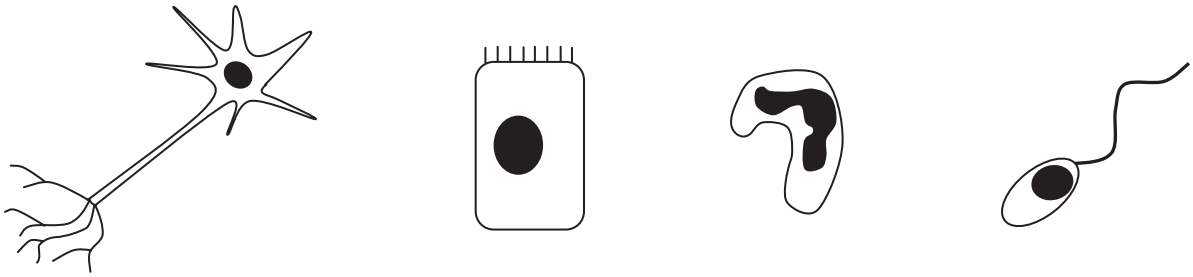
5. Which row of the table is correct for the type of microbe that causes TB?

	type of microbe	how TB is spread
A	virus	by droplets in the air
B	bacteria	by a vector
C	virus	by a vector
D	bacteria	by droplets in the air

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Use the diagrams to answer questions 6 and 7.

The diagrams show four different types of animal cell.



A **B** **C** **D**

6. Which of these cells form part of the first line of defence to help prevent TB microbes from entering the body?

7. Which of these cells ingests microbes as part of the second line of defence?

8. Mosquitoes carry a microbe that can cause malaria.
When mosquitoes pierce the skin of a person they inject the microbe into the blood of the person.
This method of disease transmission is known as

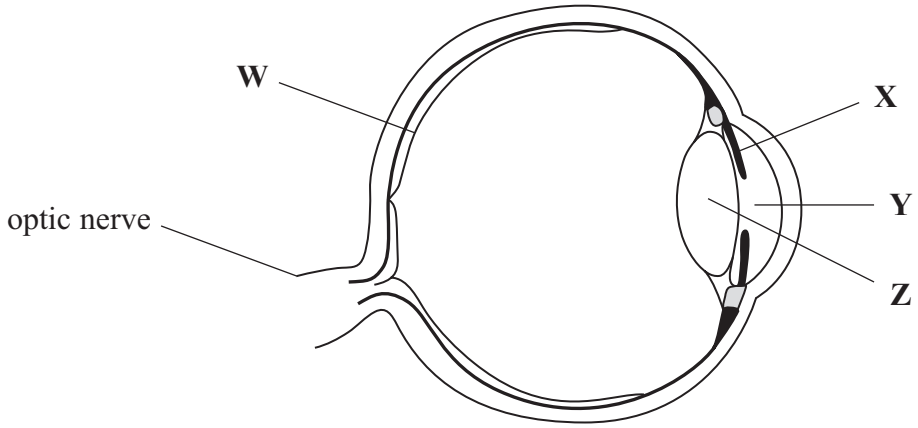
A vector-borne
B horizontal contact
C vehicle-borne
D vertical contact

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Sense organs

Use the diagram to answer questions 9 and 10.

The diagram shows the structure of the eye.



9. Which structure contains the muscles that control the amount of light entering the eye?

A W
B X
C Y
D Z

10. Which part of the eye contains light receptor cells?

A W
B X
C Y
D Z

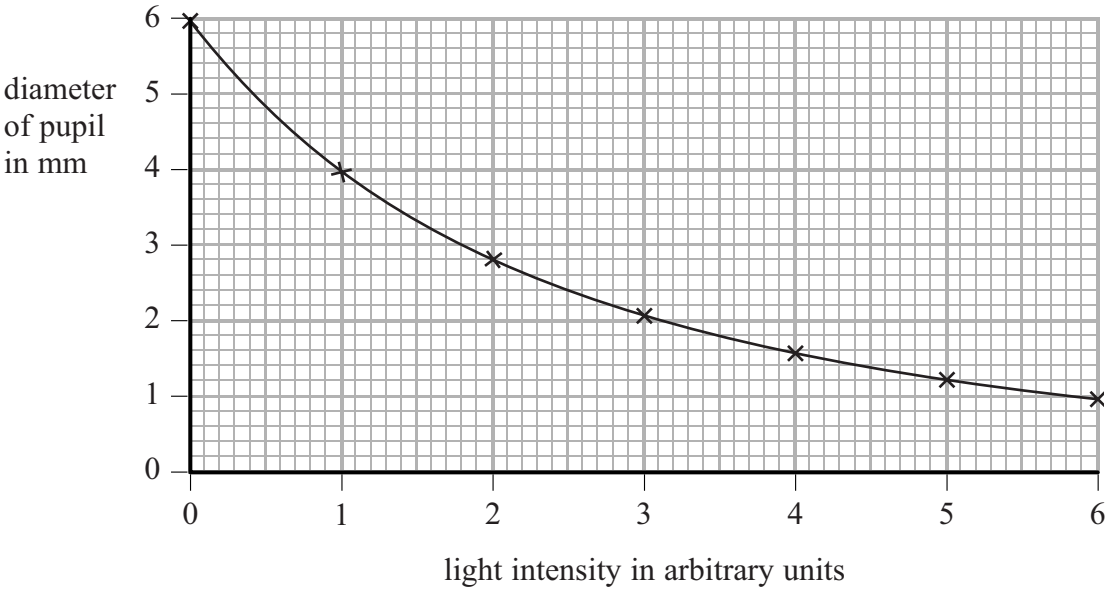
11. The optic nerve sends impulses to the central nervous system.
Which row of the table shows structures found in the central nervous system?

	spinal cord	**peripheral nerves**
A	yes	yes
B	no	no
C	no	yes
D	yes	no

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Use the graph to answer questions 12 and 13.

The graph shows the size of the pupil in a student's eye at different light intensities.



12. What is the difference in the diameter of the pupil between light intensities of 2 and 4 arbitrary units?

A 1.2 mm
B 1.6 mm
C 1.9 mm
D 2.8 mm

13. The graph shows that as the light intensity **decreases** the pupil

A gets larger
B gets smaller
C gets larger then smaller
D is not affected

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Hormones

Hormones help to keep conditions inside our body balanced.

14. Which row of the table shows the effect of insulin on the body and how it is transported to target organs?

	effect of insulin	method of transportation
A	raises blood glucose levels	chemical messenger
B	lowers blood glucose levels	chemical messenger
C	raises blood glucose levels	electrical impulse
D	lowers blood glucose levels	electrical impulse

15. Which is the target organ for insulin?

A brain
B pancreas
C liver
D lungs

16. Human insulin can be produced by genetically modified (GM) bacteria.
Which of the statements are advantages of using GM bacteria to produce human insulin?

1 bacteria use their own genes to produce human insulin
2 GM bacteria multiply rapidly to produce high yields of insulin

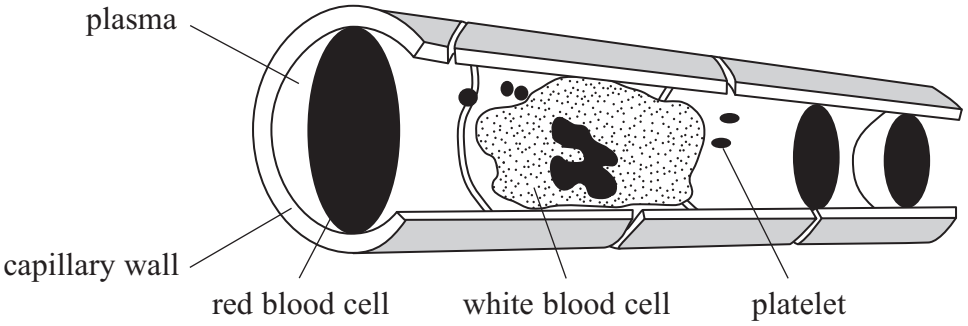
A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier

The blood

The diagram shows some blood travelling through a blood vessel called a capillary.



17. Capillaries are very narrow and blood cells flow through them slowly in single file. This flow is important so that each red blood cell can

A reach the skin easily to form a scab
B deliver carbon dioxide to body cells
C pick up oxygen from muscle cells
D deliver oxygen to body cells

18. Plasma transports

A hormones from glands to target organs
B oxygen from body cells to the lungs
C waste products from target organs to muscle cells
D carbon dioxide from the lungs to body cells

19. Some white blood cells form part of our body's third line of defence against disease. This is because they

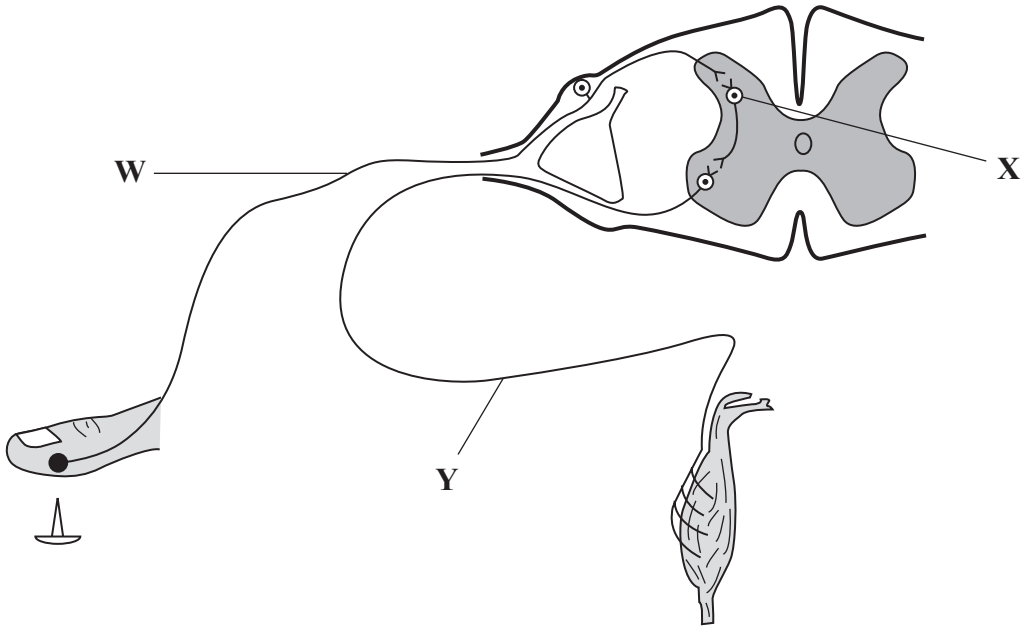
A produce antibodies
B prevent pathogens entering our body
C prevent antigen production
D produce antigens

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Body responses

Use the diagram to answer questions 20, 21 and 22.

The diagram shows a finger accidently touching a pin and the parts of the nervous system involved in the response to this action.



20. Which row of the table gives the names of neurones **W**, **X** and **Y**?

	neurone W	**neurone X**	**neurone Y**
A	sensory	motor	relay
B	relay	sensory	motor
C	motor	relay	sensory
D	sensory	relay	motor

21. How are nerve signals transmitted from neurone **W** to neurone **X**?

A chemicals are transmitted through the blood
B electrical impulses diffuse across a synapse
C chemicals diffuse across a synapse
D electrical impulses are transmitted through the blood

22. What is the effector in this reflex action?

A receptors in the skin
B the brain
C motor neurones
D muscle in the arm

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23. A reflex action is

A an involuntary response that takes place over a long period of time
B an involuntary response that is very quick
C a voluntary response that takes place over a long period of time
D a voluntary response that is very quick

24. Which of the statements about how drugs affect our nervous system are true?

1 solvents increase the speed of nerve signals from one neurone to another
2 heroin is an opiate that can cause addiction

A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Drug driving

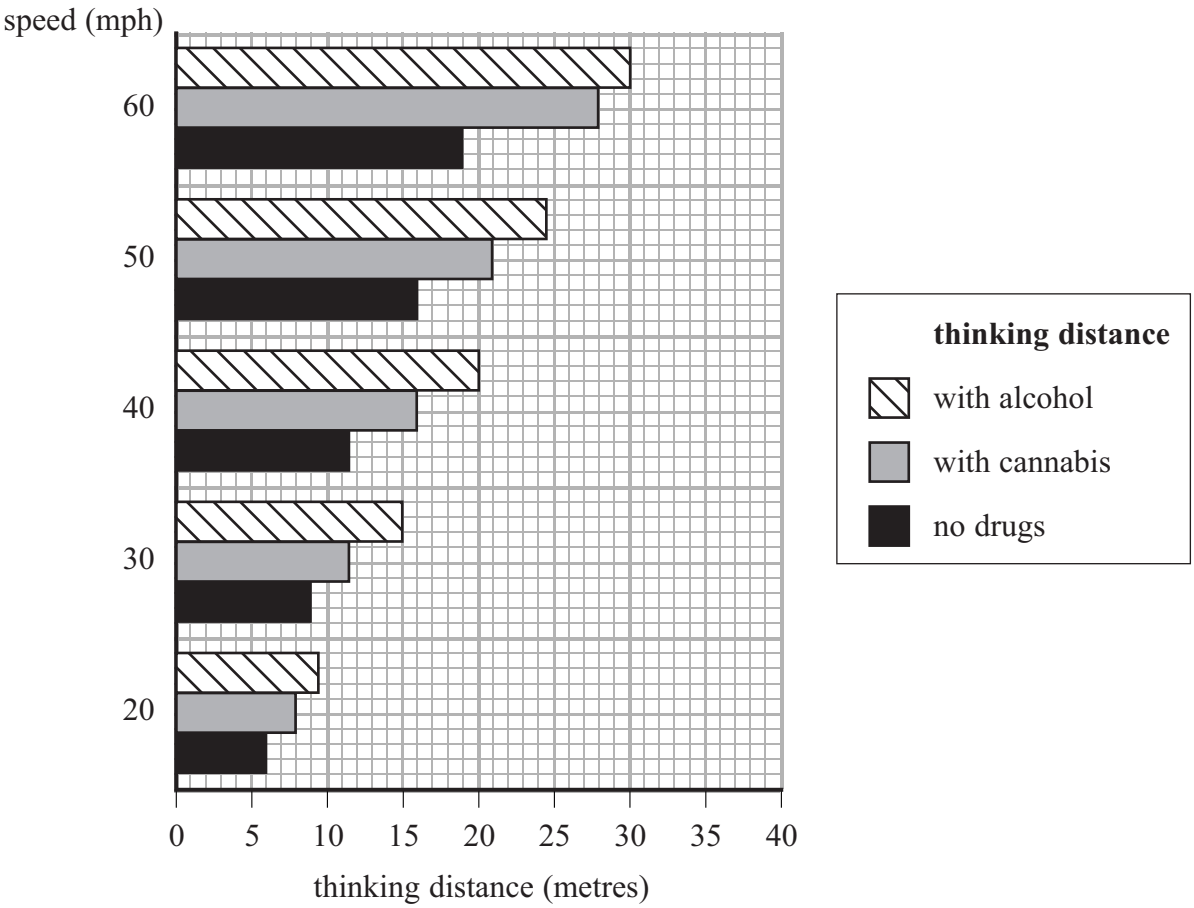
Use this information to answer questions 25 and 26.

In August 2009, an advertising campaign warning of the risks of driving after taking drugs was launched in Britain.



In road tests, the thinking distance of volunteer drivers was measured.
The thinking distance is the distance that a car travels after the driver has seen a hazard and before starting to brake.
The road tests were carried out using the same drivers when they were under the influence of alcohol, then cannabis and then no drugs.

The chart shows the results of the road tests.



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25. The results show that

A when no drugs are taken, the thinking distance is not affected as speed increases
B the thinking distance under the influence of alcohol decreases as the speed increases
C under the influence of cannabis, the thinking distance at 30 mph is double that at 60 mph
D under the influence of alcohol, the thinking distance at 60 mph is double that at 30 mph

26. The results of the road tests conclude that alcohol and cannabis

A increase reaction times and are therefore depressants
B decrease reaction times and are therefore stimulants
C decrease reaction times and are therefore depressants
D increase reaction times and are therefore stimulants

27. Which of the statements are likely reasons for doctors **not** supporting the legalisation of cannabis?

1 taking cannabis can lead to the use of 'harder' drugs
2 cannabinoids in cannabis can be used for pain relief
3 smoking cannabis is harmful to health
4 cannabis can be used to stimulate the appetite of AIDS patients

A 1 and 3 only
B 1 and 4 only
C 2 and 3 only
D 2 and 4 only

28. Which two drugs when taken in excess are most likely to cause liver failure?

A caffeine and alcohol
B paracetamol and alcohol
C opiates and caffeine
D opiates and paracetamol

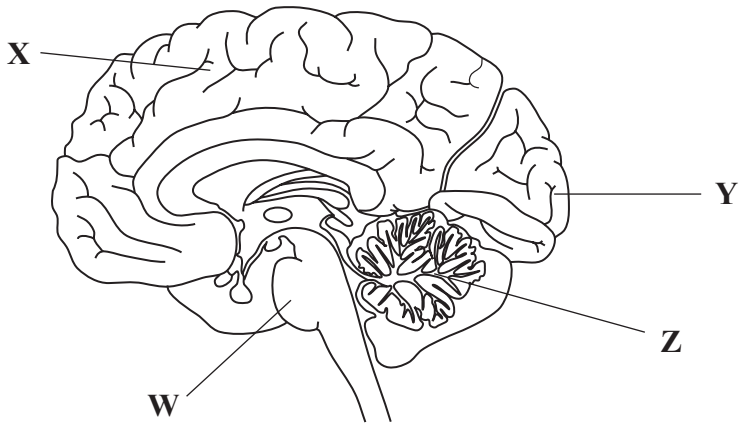
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A song on the brain

Use the diagram to answer questions 29 and 30.

Music has a powerful impact on our lives.
It can change our mood, evoke memories and it can even influence how fast we drive our car.

The diagram shows various areas of the brain



29. Some people have a brain condition called synaesthesia which means that they can 'see' music as well as hear it.
Which areas of the brain enable people with synaesthesia to 'see' and hear music?

A W and X
B X and Y
C Y and Z
D Z and W

30. Scientists have identified the part of the brain responsible for linking a certain song with a particular memory.
Which part of the brain is responsible for memories?

A W
B X
C Y
D Z

31. Musicogenic epilepsy is a condition in some people which causes a seizure when they hear a certain type of music or song.
An epileptic seizure occurs when

A the brain does not receive enough oxygen
B the transmission of impulses to muscles is blocked
C tumours put pressure on nerve cells in the brain
D excessive numbers of impulses disrupt brain function

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Tuberculosis

Extensively drug resistant TB (XDR-TB) is affecting 30,000 people per year. XDR-TB is a form of TB that is resistant to virtually all antibiotics. In an outbreak of this form of TB in South Africa 52 out of a total of 53 patients died. Most of these patients also carried the virus known as HIV.

32. The increase in XDR-TB is partly due to

A patients carrying TB being isolated
B reliable drug supplies being used to treat all forms of TB
C adequate immigration controls
D patients not completing their treatment

33. HIV attacks the immune system.
White blood cells that form part of the third line of defence against disease are destroyed.
TB is more likely to affect people with HIV because

A they produce antibodies against the TB antigens but not against the HIV antigens
B HIV attacks white cells involved in the inflammatory response
C they cannot produce white cells to ingest the TB antigens
D they cannot produce enough antibodies specific to the TB antigens

34. DOTS (Directly Observed Treatment Short Course) is the World Health Organisation's recommended treatment regime for TB.
The introduction of DOTS in 1991 has reduced the number of deaths from TB.
This is because DOTS

A has eliminated cases of the disease in all areas
B has helped to reduce the number of mutant forms of TB arising
C patients do not need to be watched whilst taking their medication
D patients do not become re-infected with TB

35. The most likely reason that TB is widespread in South Asia is because

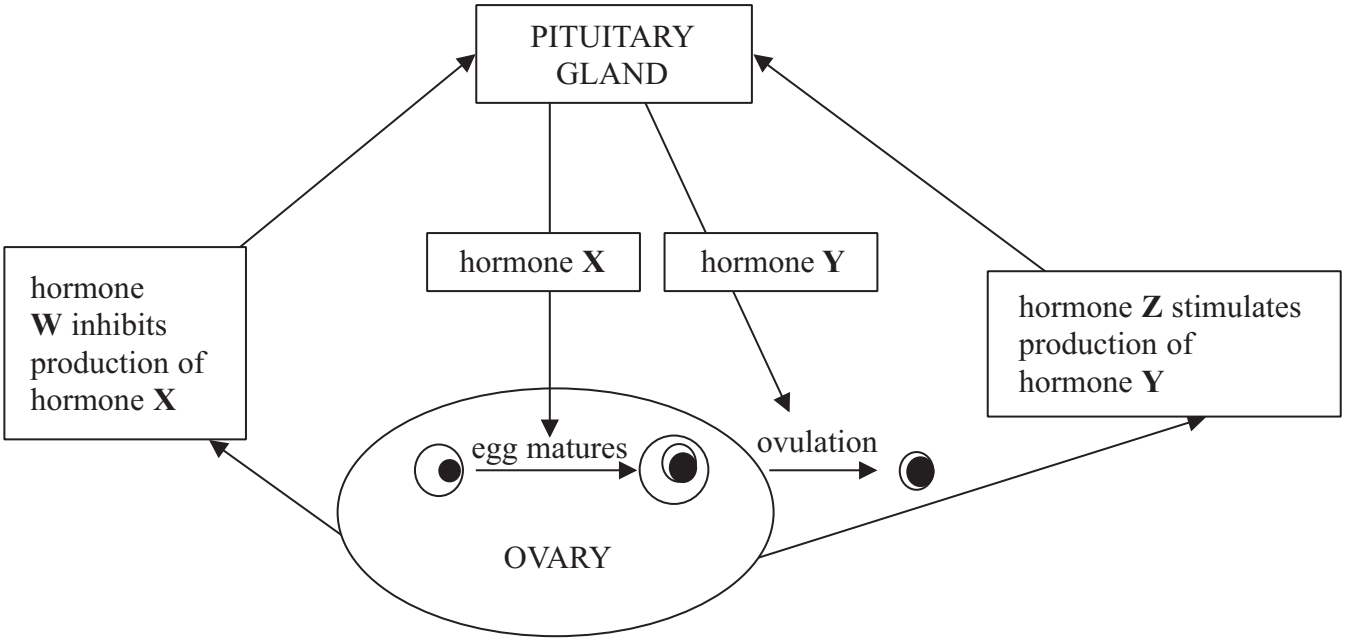
A water treatment programmes are too expensive to implement
B the DOTS programme is used in poorer countries
C TB is more likely to mutate in hotter climates
D overcrowding and poverty leads to higher transmission rate

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The menstrual cycle

Use the diagram to answer questions 36 and 37.

The female menstrual cycle is brought about by the interaction of several hormones.
The diagram shows how these hormones interact.



36. In the early stages of the menstrual cycle, hormone Z helps to prepare the uterus lining to receive a fertilised egg.
Hormone Z is

A oestrogen
B progesterone
C LH
D FSH

37. To maximise the chances of pregnancy during fertility treatment, it would be best to use

A hormone X only
B hormone Y only
C hormone X and hormone Y
D hormone W and hormone Y

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38. IVF is one type of fertility treatment that can be used in mature women to help them become pregnant.
What would be an ethical concern of using IVF in mature women?

A mature women have less money to care for young children
B mature women are more likely to suffer poor health
C IVF involves the use of genetically modified embryos
D IVF is less likely to result in multiple births

39. Throughout pregnancy levels of progesterone

A remain low to stimulate the production of LH
B increase to maintain the lining of the uterus and inhibit LH production
C reach a peak and then drop to stimulate the release of FSH
D remain at a high level to prevent ovulation but stimulate FSH production

40. Which statements are likely to cause a lower birth weight in babies born to mothers that smoke?

1 gas exchange in the lungs of the mother is reduced due to the build up of tar and mucus
2 smokers inhale more carbon dioxide that prevents oxygen reaching the growing fetus

A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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June 2011

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Multiple Choice Paper B1b (5006)

GCSE Biology
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June 2011
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5006 & 5026 (B1b) Mark Scheme
June 2011

Unit B1b – 5006/5026	
Topics 3 & 4	
1	B
2	C
3	D
4	A
5	D
6	B
7	C
8	A
9	B
10	A
11	D
12	A
13	A
14	B
15	C
16	B

Unit B1b – 5006/5026	
Topics 3 & 4	
17	D
18	A
19	A
20	D
21	C
22	D
23	B
24	B

Unit B1b – 5006/5026	
Topics 3 & 4	
25	D
26	A
27	A
28	B
29	B
30	B
31	D
32	D
33	D
34	B
35	D
36	A
37	C
38	B
39	B
40	A

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Science (5006)

Biology (5026)

B1b – Topics 3 and 4

Foundation and Higher Tier

Friday 4 March 2011 – Morning

Time: 20 minutes

Materials required for examination
Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers
Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

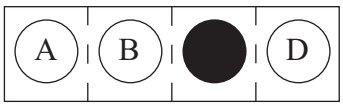
Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

Before the test begins:

Check that the answer sheet is for the correct test and that it contains your candidate details.

How to answer the test:

For each question, choose the right answer, A, B, C or D and mark it in HB pencil on the answer sheet.
For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

Do any necessary calculations and rough work in this booklet. You may use a calculator if you wish.

You must not take this booklet or the answer sheet out of the examination room.

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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Danger

Freddie stands on a sharp object and he reacts to the pain.



1. Which one of Freddie's senses was stimulated when he stepped on the sharp object?

A smell
B sight
C touch
D taste

2. Freddie pulled his foot away from the sharp object before his brain was aware of pain. What type of reaction is this?

A voluntary response involving the spinal cord
B involuntary response involving the spinal cord
C voluntary response involving the brain
D involuntary response involving the brain

3. Which row of the table is correct for the stimulus and response in this reaction?

	stimulus	**response**
A	contact with sharp object	feeling pain in spinal cord
B	contact with sharp object	moving foot away
C	moving foot away	feeling pain in spinal cord
D	feeling pain in spinal cord	contact with sharp object

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4. The central nervous system is

A the brain only
B the spinal cord only
C the brain and spinal cord
D neither the brain nor spinal cord

Disease

5. The body can be affected by pathogens such as bacteria, fungi and viruses.
A pathogen is

A a disease-curing organism
B a hormone
C an enzyme
D a disease-causing organism

6. Diseases can be caught by touching an infected person.
This type of disease transmission is

A direct contact
B indirect contact
C vector transmission
D vehicle transmission

7. Our bodies have barriers to prevent microbes entering.
Which is the main barrier that prevents microbes entering the bloodstream?

A hair
B mucus
C the skin
D the liver

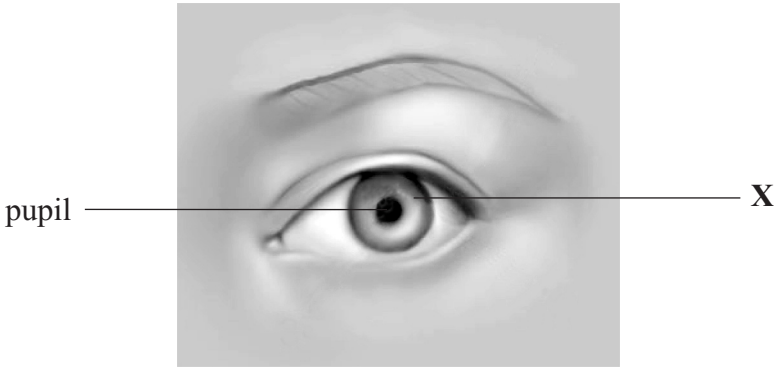
8. Tears contains lysozymes.
What is the function of lysozymes?

A to clump bacteria together
B to kill microorganisms
C to cause inflammation
D to make microorganisms multiply

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The human eye

Use this diagram to answer questions 9, 10 and 11.



9. What is the name of the part of the eye labelled **X**?

A iris
B cornea
C lens
D retina

10. What is the main function of the part of the eye labelled **X**?

A to change focus for near and far objects
B to release chemicals to protect the eye
C to change the shape of the retina
D to change the amount of light entering the eye

11. A side effect of taking some drugs is that the pupil becomes very large.
The pupil

A allows light to reach the back of the eye
B is the protective covering of the eye
C is the main focusing part of the eye
D contains light receptors

12. Which row of the table shows the voluntary responses which happen in the eye?

	accommodation	**iris reflex**
A	no	no
B	no	yes
C	yes	no
D	yes	yes

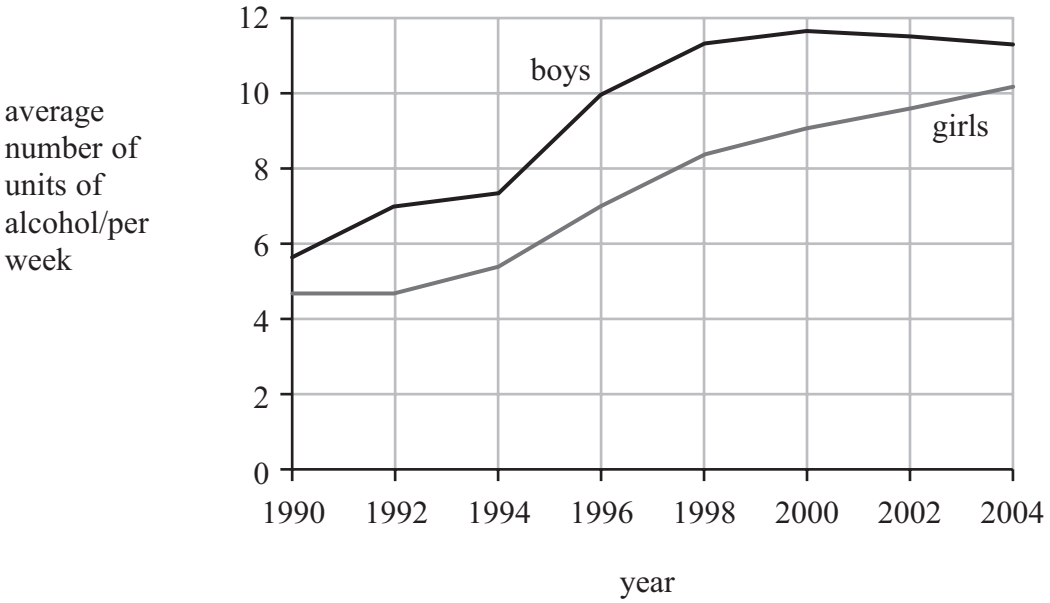
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Under age drinking

Use this information to answer questions 13 and 14.

Children aged 11 to 15 who admitted to drinking alcohol were asked how much they drank in a week. This survey was repeated every year between 1990 and 2004.

The graph shows the average number of units of alcohol the children drank in each week between 1990 and 2004.



13. What is a correct statement based on the information in the graph?

A girls drank an average of 10 units of alcohol in each week in 1996
B boys drank more units of alcohol on average each week than girls in 2004
C boys drank fewer units of alcohol on average each week in 1994 than in 1992
D girls drank fewer units of alcohol on average each week in 1992 than in 1990

14. Assuming that the boys drank the same number of units of alcohol each week during 1996, how many units of alcohol would they drink during a year?

A 84 units
B 120 units
C 364 units
D 520 units

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15. Drinking at a young age is dangerous because of the effects of alcohol on the brain. What other body organ is most damaged by drinking alcohol?

A liver
B lungs
C eyes
D blood

16. What type of drug is alcohol?

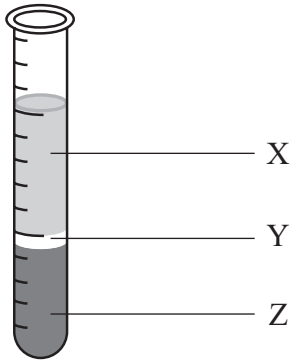
A stimulant
B opiate
C depressant
D painkiller

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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

The blood

17. The body contains between 4 and 5 litres of blood.
If blood is left to stand it separates into three layers.



Layer X is the liquid part of the blood.
Which row of the table identifies each of the blood components X, Y and Z?

	red blood cells	white blood cells	plasma
A	X	Y	Z
B	Y	Z	X
C	Z	X	Y
D	Z	Y	X

18. What is the main role of red blood cells?

A to ingest bacteria
B to carry hormones
C to carry oxygen
D to form scabs

19. Structures in the gaseous exchange tract move bacteria.
These structures are called

A cilia
B antigens
C nasal hairs
D enzymes

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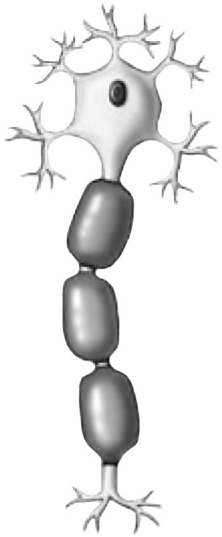
20. Viruses such as HIV are most likely to be spread between drug users by

A drinking alcohol
B inhaling solvents
C injecting opiates
D smoking cannabis

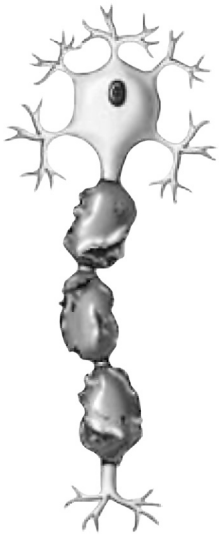
Multiple sclerosis

Use this information to answer questions 21 and 22.

Multiple sclerosis is a degenerative disease which causes the myelin sheath around neurones to become damaged.



neurone with myelin sheath



neurone with damaged myelin sheath

21. What is the role of the myelin sheath surrounding the neurone?

A to carry impulses from one neurone to another
B to insulate the neurone which speeds up the nervous impulse
C to carry chemical messages along the neurone
D to link one neurone to another

22. A message is carried from a receptor organ to an effector muscle.
Which shows some of the stages in the nerve pathway from receptor to effector?

A sensory neurone → spinal cord → motor neurone → brain
B motor neurone → spinal cord → brain → sensory neurone
C sensory neurone → spinal cord → brain → motor neurone
D motor neurone → brain → spinal cord → sensory neurone

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23. The gap between two neurones is called the

A central nervous system
B peripheral nervous system
C synapse
D reflex arc

24. Information is passed from one neurone to another neurone by

A electrical impulses
B chemical transmitters
C hormones in the bloodstream
D enzymes in the bloodstream

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

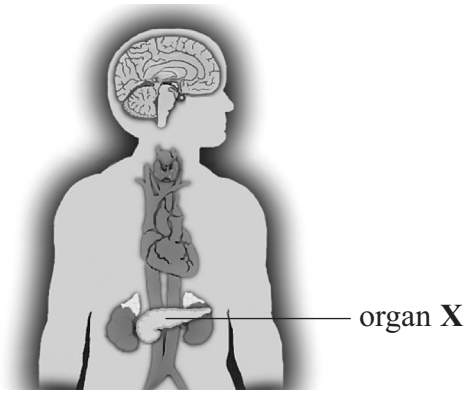
Foundation tier candidates do not answer any more questions after question 24.

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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

The endocrine system

25.



Organ **X** is essential in the control of blood glucose concentrations.
What is organ **X**?

A stomach
B heart
C liver
D kidney

26. Endocrine glands release chemicals into the body which act as chemical messengers.
Which row of the table shows the type of chemical released from endocrine glands and how they are transported around the body?

	type of chemical	method of transport
A	hormones	through the bloodstream
B	hormones	as impulses along neurons
C	enzymes	as impulses along neurons
D	enzymes	through the bloodstream

27. Insulin controls blood glucose concentrations.
Insulin triggers the conversion of

A glucagon to glycogen which is stored in the pancreas
B glucose to glycogen which is stored in the liver
C glycogen to glucose which is stored in the liver
D glucose to glucagon which is stored in the pancreas

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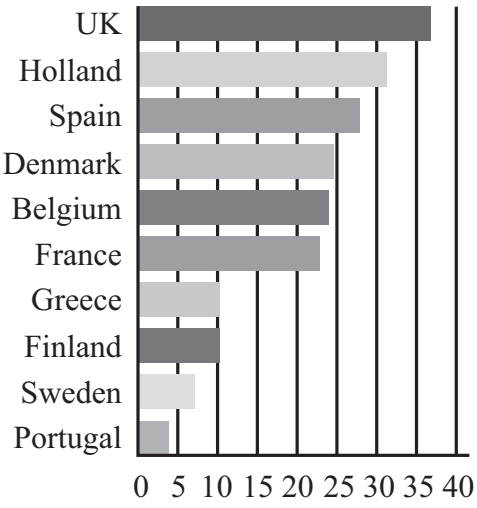
28. Most insulin used by diabetics is made by genetically modified (GM) bacteria.
Which of these statements are benefits of using insulin produced by GM bacteria?

1 insulin made by GM bacteria is less likely to have side effects than insulin extracted from pigs
2 insulin is less likely to be rejected as it is produced using human DNA in GM bacteria

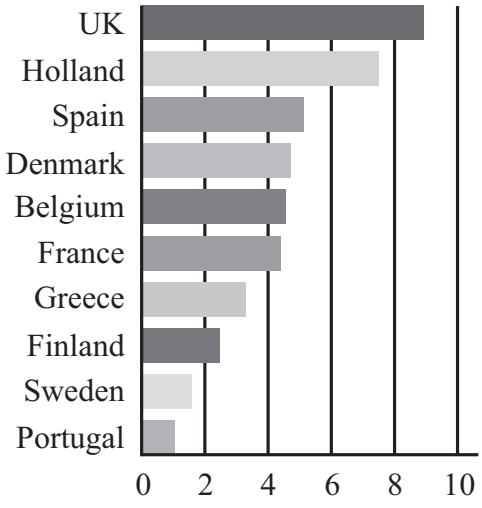
A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

Cannabis usage

29. The bar charts show the cannabis usage of 15 to 16 year olds and adults during 2007 in some European countries.



percentage of 15 to 16 year olds who admit having used cannabis in 2007



percentage of adults who admit using cannabis in 2007

Which statement is true about the data in the bar charts?

A in each country a greater percentage of adults have used cannabis than 15 to 16 year olds
B the percentage of adults using cannabis in the UK is half that of Belgium
C in each country a greater percentage of 15 to 16 year olds have used cannabis than adults
D the use of cannabis in Holland is greater than in all the other countries

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30. Cannabis can be smoked with tobacco.
What are the dangers of smoking tobacco?

A cannabinoids are addictive and cause cancer
B nicotine is addictive and tar causes cancer
C nicotine causes lung cancer
D carbon monoxide gas causes lung cancer

31. Medical research indicates that using cannabinoids can cause

A Parkinson's disease
B epilepsy
C psychosis
D strokes

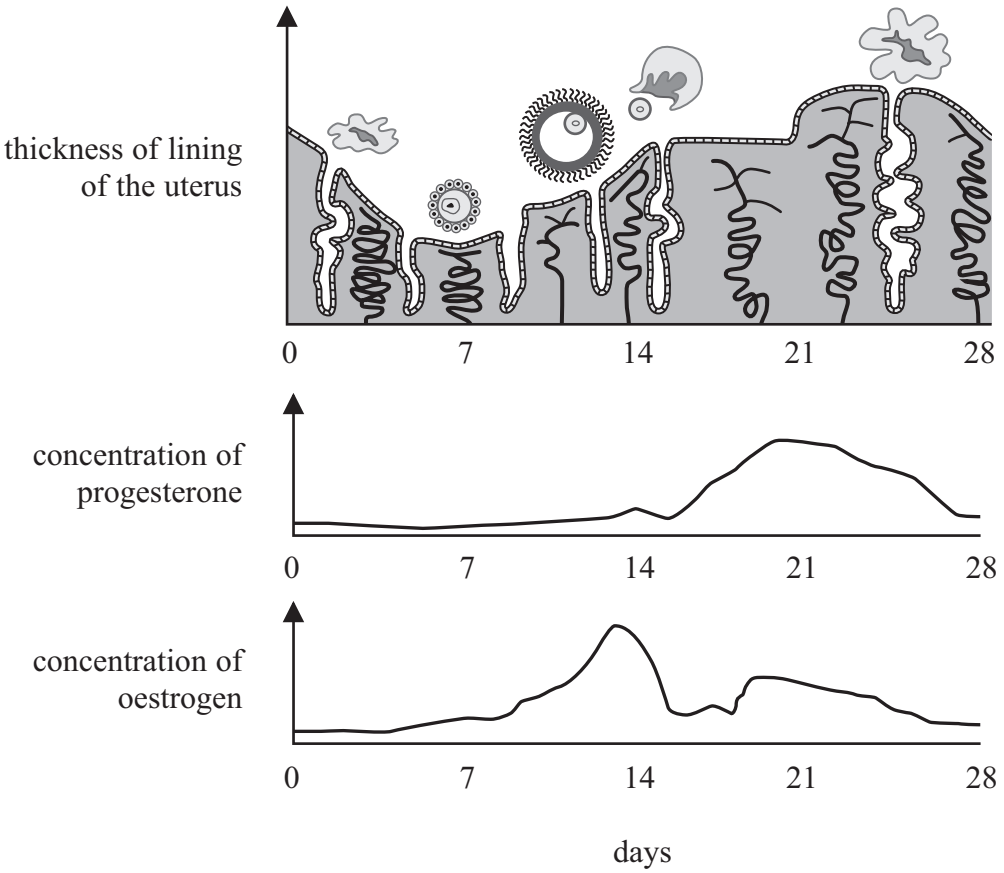
32. The region of the brain associated with memory and thinking is the

A cerebellum
B cerebral cortex
C medulla
D pituitary gland

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The menstrual cycle

Use the diagram to help you answer questions 33 and 34.



33. What is the main effect of a large and sudden increase in oestrogen concentrations?

A menstruation
B pregnancy
C implantation
D ovulation

34. What does the reduction in progesterone concentration at the end of the menstrual cycle cause?

A the lining of the uterus to build up in preparation for pregnancy
B the lining of the uterus to break down and menstruation to occur
C the follicle to release an egg cell for fertilisation to occur
D the follicle to mature many egg cells in preparation for IVF

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35. Which two hormones are most commonly given to women who are having fertility treatments?

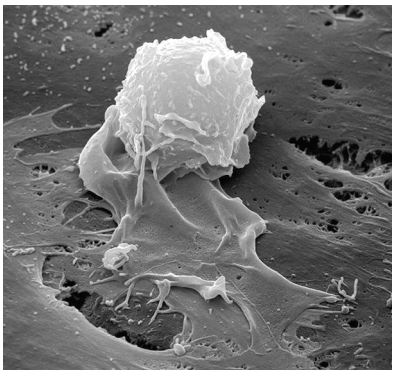
A oestrogen and FSH
B FSH and LH
C LH and progesterone
D progesterone and oestrogen

36. IVF treatment can be given to women to help them become pregnant.
IVF treatment involves

A the use of hormones and *in vivo* fertilisation
B the use of enzymes and *in vivo* fertilisation
C the use of hormones and *in vitro* fertilisation
D the use of enzymes and *in vitro* fertilisation

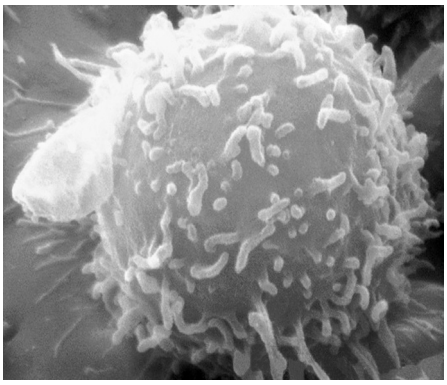
The immune system

The immune system is controlled by white blood cells.
There are two types of white blood cells.



phagocyte

David M. Phillips/Science Photo Library



lymphocyte

Science Source/Science Photo Library

37. Phagocytes form part of the second line of defence against disease.
What is the role of the phagocytes?

A to form a barrier to stop bacteria and other organisms entering the body
B to produce the chemical lysozyme to destroy bacteria
C to produce antigens as part of the specific immune response
D to engulf and ingest harmful bacteria in the body

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38. The lymphocytes form part of the third line of defence.
What is the role of the lymphocytes?

A to produce antibodies which are specific to an antigen
B to engulf and destroy invasive pathogens
C to be part of the immune system producing specific antigens
D to control the inflammatory response and assist in wound healing

39. Tuberculosis (TB) is a disease which can be controlled by the immune system.
Which row of the table is correct for the TB microorganism and its transmission?

	type of microorganism	**transmission**
A	virus	droplets in the air
B	virus	insect vector
C	bacterium	insect vector
D	bacterium	droplets in the air

40. Which of these statements about TB and the immune system are true?

1 TB can be controlled by taking multiple antibiotics which work with the immune system to destroy the microorganism that causes TB
2 the emergence of drug resistant TB means that no antibiotics can control the disease

A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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Mark Scheme (Results)
March 2011

GCSE

360Science

GCSE Science
Multiple Choice Paper B1b (5006/01)

GCSE Biology
Multiple Choice Paper B1b (5026/01)

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March 2011

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5006 & 5026 (B1b) Mark Scheme

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31	C
32	B
33	D
34	B
35	B
36	C
37	D
38	A
39	D
40	A

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Science (5006)

Biology (5026)

B1b – Topics 3 and 4

Foundation and Higher Tier

Friday 12 November 2010 – Afternoon

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

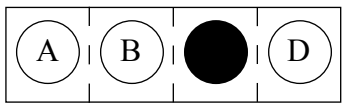
Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

Before the test begins:

Check that the answer sheet is for the correct test and that it contains your candidate details.

How to answer the test:

For each question, choose the right answer, A, B, C or D and mark it in HB pencil on the answer sheet.
For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

You must not take this booklet or the answer sheet out of the examination room.

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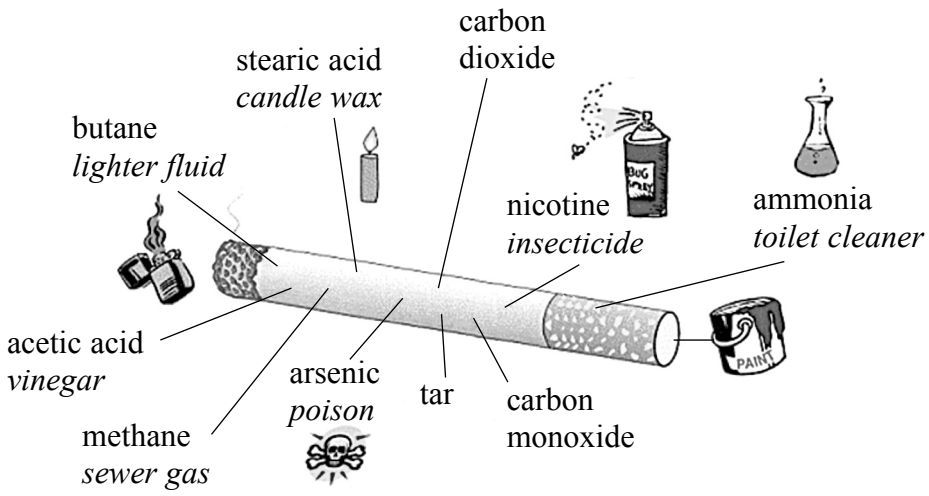
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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

The dangers of smoking

There are over 4000 chemicals in cigarette smoke.
Many of these are poisonous and can cause damage to our body.



1. Which substance in cigarette smoke is addictive?

A carbon monoxide
B nicotine
C tar
D carbon dioxide

2. Which row of the table shows diseases that can be caused by cigarette smoking?

	lung cancer	**heart disease**
A	no	yes
B	yes	no
C	no	no
D	yes	yes

3. Nicotine is a stimulant.
This means it

A increases heart rate
B decreases heart rate
C causes lung cancer
D increases reaction time

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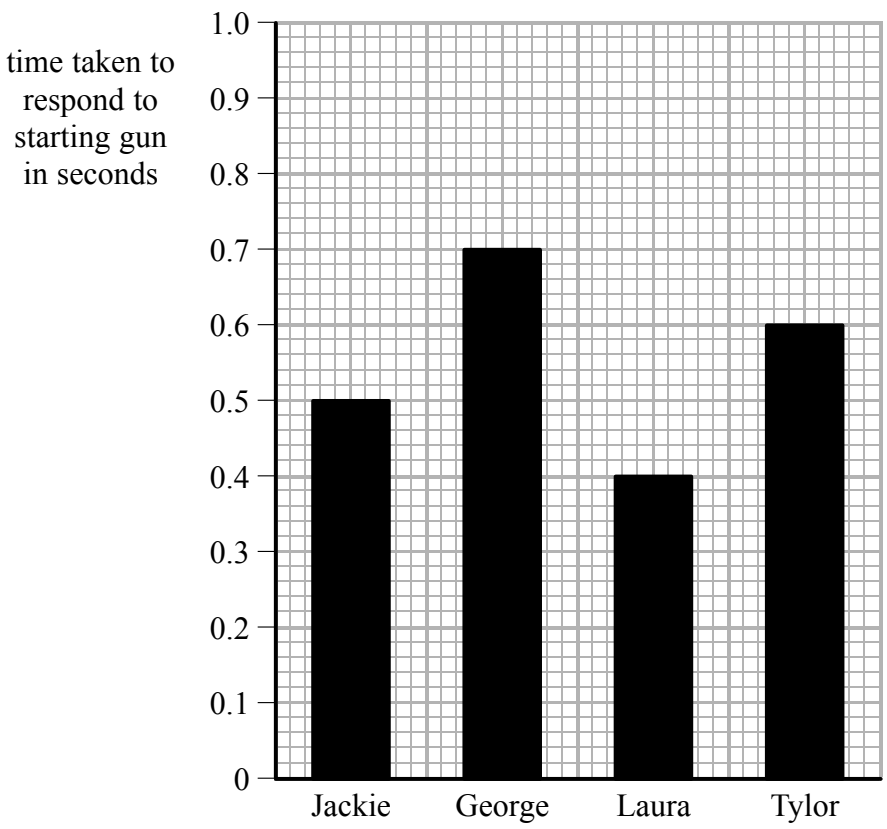
4. Smokers are more likely to get lung infections than non-smokers.
These lung infections can be caused by viruses carried

A by insects
B in air
C in blood
D in food

Body responses

In athletics, it is important that competitors react quickly to the starting gun at the beginning of a race.

5. Four students were training for a 800 m race.
The time it took the students to respond to the starting gun was measured.
The results are shown in the graph.



Which student responded most quickly to the starting gun?

A Jackie
B George
C Laura
D Tylor

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6. Which piece of equipment would be used to measure the reaction time of the students?

A starting gun
B heart rate monitor
C tape measure
D stop clock

7. When the starting gun fires, receptors detect the stimulus.
In which sense organ are these receptors found?

A ear
B eye
C nose
D skin

8. The response to the stimulus is a result of the brain sending messages to the muscles.
The brain sends these messages by

A chemicals along neurones
B chemicals through the blood
C electrical impulses along neurones
D electrical impulses through the blood

9. A student's response to the stimulus is a voluntary action.
Another example of a voluntary action is

A the iris in the eye responding to changes in light intensity
B writing your answers to this examination paper
C coughing when something gets stuck in your throat
D shivering when very cold

10. The four students each had a different drink before another race.
The table shows what each student drank.

student	**drink**
Jackie	wine
George	coffee
Laura	water
Tylor	beer

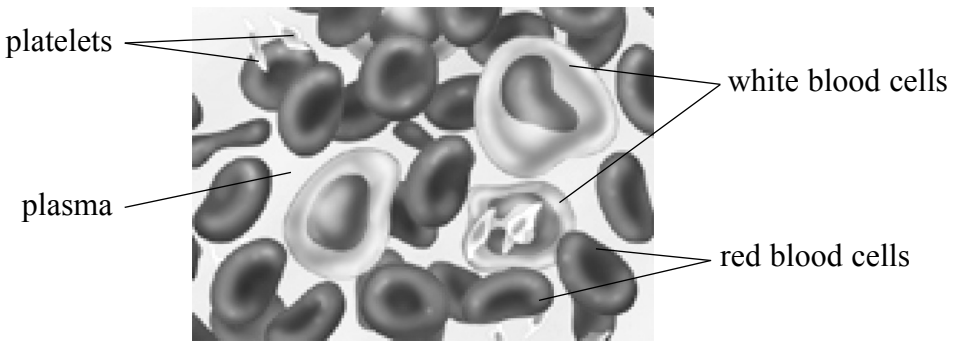
Which students are likely to respond more **slowly** to the starting gun after having their drinks?

A Jackie and George
B George and Laura
C Laura and Tylor
D Jackie and Tylor

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Fighting disease

The diagram shows a sample of blood.



11. Stuart had a blood sample taken at the hospital.
The sample showed that he had a bacterial infection.
Which part of his blood is most likely to increase during this infection?

A platelets
B plasma
C white blood cells
D red blood cells

12. Stuart's doctor advised him to take more vitamins to help him recover after the infection.
Which part of the blood carries vitamins around the body?

A platelets
B plasma
C white blood cells
D red blood cells

13. Drinking infected water can cause cholera.
This method of disease transmission is

A vehicle-borne
B vector-borne
C horizontal contact
D vertical contact

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14. The diagrams show some parts of the body that help protect us from disease.



nasal hair | tears | white blood cells | ciliated cells

Which of these provide a physical barrier as part of the body's first line of defence against microorganisms?

A nasal hair and tears
B white blood cells and ciliated cells
C tears and white blood cells
D nasal hair and ciliated cells

15. Organisms which cause disease are known as

A pathogens
B infections
C antigens
D antibodies

16. These statements are about the body's defence against disease.
How many of these statements are true?

- antibodies are released by red blood cells to destroy bacteria
- bacteria produce antibodies that attract white blood cells
- white cells produce antigens against bacteria

A none
B one
C two
D three

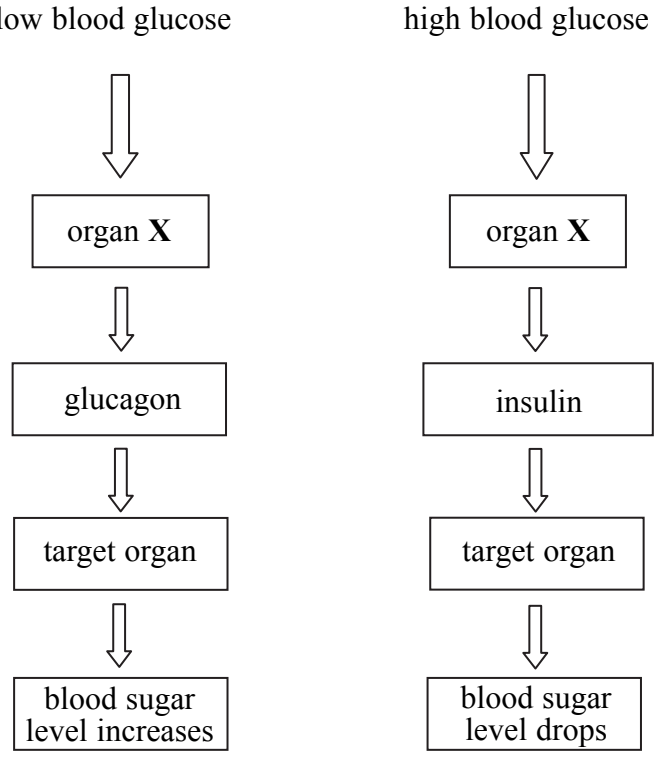
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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier

Glucose balance

Use the diagram to answer questions 17 and 18.

Hormones play an important role in helping to keep a constant level of glucose in our blood.
The diagram shows how the levels of glucose in our blood are kept constant.



17. Name organ **X**.

A liver
B kidney
C pancreas
D stomach

18. The target organ for insulin and glucagon is

A liver
B kidney
C pancreas
D stomach

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19. Some diabetics cannot produce insulin.
This means that the levels of sugar in their blood

A stay the same
B drop too low
C rise too high
D will alternate between too high and too low

20. Scientists have been able to genetically modify bacteria to produce human insulin.
One advantage of producing insulin by GM bacteria is that

A bacteria reproduce very quickly producing large yields of insulin
B the GM bacteria will repair the cells that make insulin
C it has more side effects than insulin obtained from mammals
D not all bacteria take up the insulin gene so production can be controlled

Treating infertility

32 000 women had IVF treatment in the UK in 2006.
10 000 of these women became pregnant and 12 596 healthy babies were born.

21. What percentage of IVF treatments were successful in 2006?

A 31.3
B 39.4
C 41.9
D 79.4

22. Some people argue that IVF treatment should only be given to women below the age of 60.
The most likely reason for this is because older women

A are more likely to get pregnant with IVF treatment
B do not have enough money to pay for IVF treatment
C are more likely to become ill and less able to care for children
D have a higher pregnancy success rate without IVF treatment

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23. The statements give the stages of IVF treatment.
They are not in the correct order.

1 sperm are used to fertilise the eggs
2 hormones are used to stimulate egg production
3 many embryos are formed
4 eggs are removed and placed in a Petri dish
5 healthy embryos are placed into the uterus

What is the correct order of these statements?

A 1 – 2 – 4 – 3 – 5
B 2 – 1 – 4 – 3 – 5
C 1 – 4 – 2 – 5 – 3
D 2 – 4 – 1 – 3 – 5

24. Which hormone is used in IVF treatment to stimulate egg development?

A FSH
B oestrogen
C progesterone
D LH

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

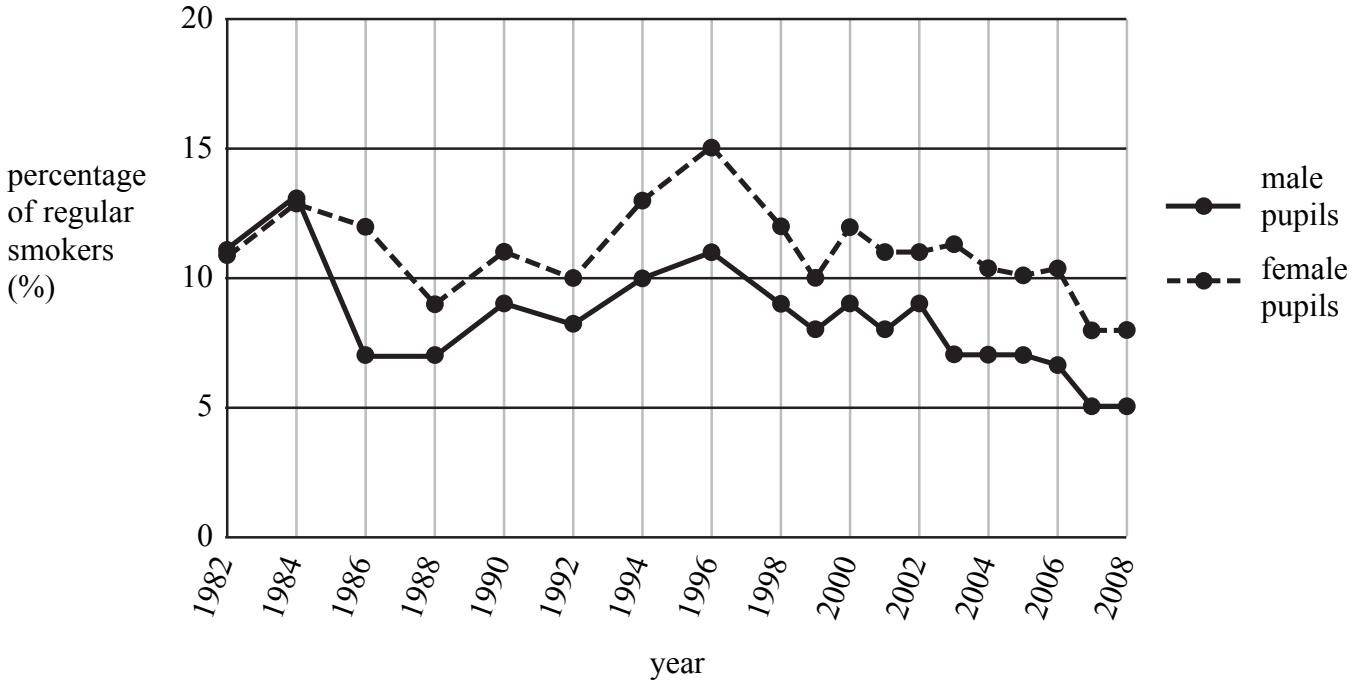
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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Underage smoking

Use the graph to answer questions 25 and 26.

In the UK, someone dies from a smoking related disease every 8 seconds.
The graph shows the percentage of male pupils and female pupils who smoked regularly.
The data was collected between 1982 and 2008.



25. The data shows that the percentage of

A female smokers is greater in all years than the percentage of male smokers
B smoking for both sexes combined peaked at an average of 13% in 1996
C smoking for each sex decreased by the greatest amount between 1984 and 1988
D male smokers increased every year between 1986 and 1996

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26. The UK government set a target to reduce levels of smoking in children to an average of 9% by 2010.
What evidence does the graph show that the percentage of regular smoking in children is likely to fall below the government target by 2010?

A the combined percentage of regular smokers of both sexes has halved since 1996
B the total number of male and female pupils smoking cigarettes since 1998 has decreased
C publicity about the dangers of smoking have caused an overall decrease in the percentage of regular smoking in 11 to 16 year olds
D the percentage of regular smokers has not increased since 2001

27. Cigarettes contain chemicals that act as stimulants.
Which row of the table shows the effect that stimulants have on our body?

	transmission across synapse	**speed of response to a stimulus**
A	increased	increased
B	decreased	decreased
C	increased	decreased
D	decreased	increased

28. How many of these statements about drugs are true?

- nicotine does not affect the circulatory system
- opiates act at the synapses which helps to relieve pain
- alcohol and cannabinoids slow down nerve transmission

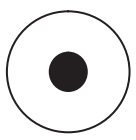
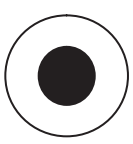
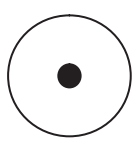
A none
B one
C two
D three

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Brain injury

Use the information to answer questions 29, 30 and 31.

Brain injuries can affect the way that the eye responds to changes in light intensity.
The table gives some results of tests carried out on a patient suffering from a brain injury.

test carried out	moderate light	bright light
electrical activity in neurones leading from eye to brain	normal	normal
electrical activity in neurones from brain to eye	normal	reduced by 45%
observed response of eye to the light (patient with brain injury)		
observed response of eye to the light (normal patient)		

29. The results of the test for the patient with a brain injury show that the response of the

A pupil to bright light had increased
B iris to bright light had increased
C pupil to bright light had decreased
D iris to bright light had decreased

30. Which type of neurones have a reduced level of electrical activity in this patient?

A sensory neurones only
B relay neurones only
C motor neurones only
D sensory, motor and relay neurones

31. The changes in the size of the pupil are brought about by

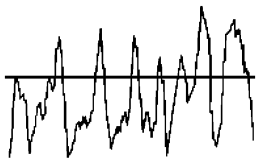
A suspensory ligaments and radial muscles
B radial muscles and circular muscles
C circular muscles and ciliary muscles
D ciliary muscles and suspensory ligaments

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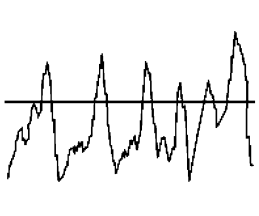
32. Brain injuries can reduce the amount of oxygen going to the brain.
A lack of oxygen to the brain could result in

A Parkinson's disease
B a brain tumour
C a stroke
D Grand mal epilepsy

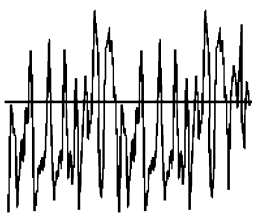
33. An EEG (electroencephalograph) can be used to measure electrical activity in the brain.
The diagram shows an EEG of a healthy person.



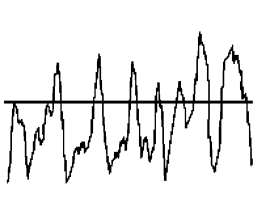
Which EEG is most likely to be that of a person suffering from an epileptic seizure?



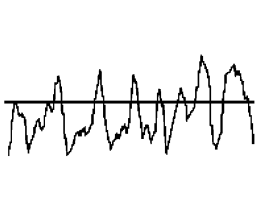
A



B

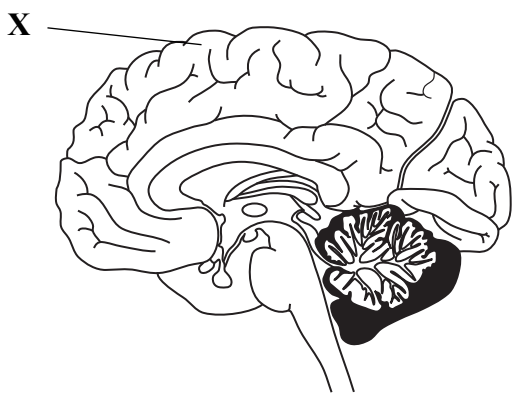


C



D

34. Epilepsy affects the region of the brain labelled **X**.



This region of the brain is the

A hypothalamus
B cerebellum
C medulla
D cerebral cortex

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Useful hormones

The hormones produced by the female reproductive system control the menstrual cycle. These hormones can also be used in the contraceptive pill.

35. Progesterone is one hormone involved in controlling the menstrual cycle. Which other hormones are involved in controlling the menstrual cycle?

A FSH and LH only
B oestrogen and FSH only
C oestrogen and LH only
D oestrogen, FSH and LH

36. The combined contraceptive pill contains oestrogen and progesterone. Progesterone is used in the combined contraceptive pill because it

A inhibits the release of FSH
B maintains the uterus lining
C stimulates follicle development
D stimulates the release of LH

Tuberculosis (TB) in Europe

37. The table shows information about the number of reported cases of TB in some European countries over a 6 year period.

Country	2001	2003	2005	2007
Belgium	1 623	1 436	1 384	1 235
France	9 280	8 926	8 720	8 548
Greece	2 204	2 103	2 137	1 984
Italy	4 793	4 568	4 454	4 336
United Kingdom (UK)	7 122	7 567	8 698	9 308

The data shows that the number of reported cases of TB in

A European countries is decreasing annually except for the UK
B Belgium has shown a greater overall decrease than France
C European countries except the UK have more effective methods of controlling TB
D the UK increased by the greatest amount between 2003 and 2005

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38. Which of these statements are true about TB?

1 TB is caused by a virus that infects the respiratory system
2 TB is a vehicle-borne disease that is transmitted by airborne droplets
3 TB is more easily transmitted in overcrowded areas

A 1 and 2
B 1 and 3
C 2 and 3
D 3 only

39. The most effective treatment for TB patients is by

A immunisation programmes that treat people infected with TB
B immunisation programmes that reduce the risk of the TB microbe mutating
C a single antibiotic taken over a short period of time
D multi-antibiotics taken over long period of time

40. TB is becoming more difficult to treat.
This is due to the emergence of resistant forms of the TB microbe.
Resistant forms of the TB microbe are more likely to arise due to

A ineffective vaccination programmes for healthy people
B infected people not completing their course of treatment
C non-resistant forms of TB surviving treatment regimes
D mutations making the microbe more resistant to TB

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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5006 Science/ 5026 Biology (B1b)

Unit B1b – 5006/5026	
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14	D
15	A
16	A

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32	C
33	B
34	D
35	D
36	A
37	D
38	C
39	D
40	B

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Science (5006)

Biology (5026)

B1b – Topics 3 and 4

Foundation and Higher Tier

Thursday 24 June 2010 – Afternoon

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	Nil

Instructions to Candidates

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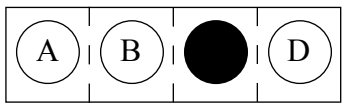
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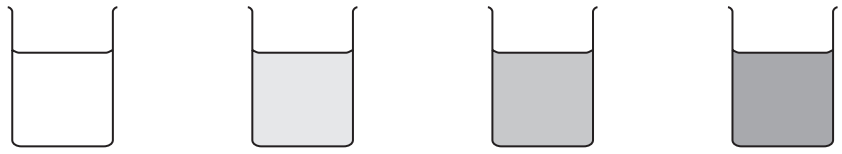
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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Your senses

Three students were asked to take part in an investigation where they had to decide on the sweetness of four drinks.
Each drink had different colour intensities.
The drink in beaker 1 was pale and the colour increased in intensity to the deepest colour in beaker 4.
All drinks had exactly the same amount of sweetness.
The students' results are shown in the table.



Students	beaker with the drink that is least sweet → most sweet			
John	1	2	3	4
Jake	1	3	2	4
Mary	1	2	3	4

1. Which beaker did all students believe contained the sweetest drink?

A 1
B 2
C 3
D 4

2. Which sense organ detects the sweetness of a drink?

A tongue
B eye
C skin
D nose

3. Which sense organ detected the different colours of the contents of the beakers?

A tongue
B eye
C skin
D nose

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4. How does information travel from sense organs to the brain?

A through blood plasma
B by electrical impulses
C attached to red blood cells
D by chemical messages

The contraceptive pill



5. The contraceptive pill is used by women to prevent pregnancy.
The contraceptive pill contains

A antigens
B hormones
C pathogens
D antibodies

6. The active ingredients of the contraceptive pill are carried around a woman's body by

A white blood cells
B red blood cells
C blood plasma
D blood platelets

7. Some women fail to become pregnant unless they have IVF treatment.
IVF is the fertilisation of

A an ovum by a sperm cell inside the body
B an ovum by a sperm cell outside the body
C a sperm cell after implantation
D an ovum after implantation

8. There are objections to the use of IVF treatment in older women.
This is because older women

A have less money to care for children than younger women
B are more likely to get pregnant naturally than by IVF
C are unable to get pregnant naturally
D are more likely to become ill than younger women

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The problem with drugs

The government estimated that in 2009 12 million adults had used the drug cocaine illegally.

9. The adult population of Britain in 2009 was approximately 60 million.
What percentage of the population used cocaine in 2009?

A 12%
B 20%
C 25%
D 60%

10. Cocaine can be injected.
Injecting cocaine is likely to cause

A lung damage due to inhalation
B a decreased heart rate
C an increased risk of viral infections
D less risk of an overdose

11. Codeine is an opiate. Codeine is used legally to

A to stimulate responses
B to prevent viral infections
C to increase reaction time
D to relieve pain

12. Morphine is an opiate and is used to treat terminally ill patients in hospital.
Terminally ill patients can take morphine because morphine

A cures terminally ill patients
B gives strong pain relief despite patients becoming tolerant to it
C is a weak pain reliever and has no harmful side effects
D can cause reaction times to decrease

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Graham's optician appointment

Graham made an appointment with an optician.
The optician said he would need glasses for reading because his eyes did not focus on close objects.

13. Which part of the eye changes its shape when focusing?

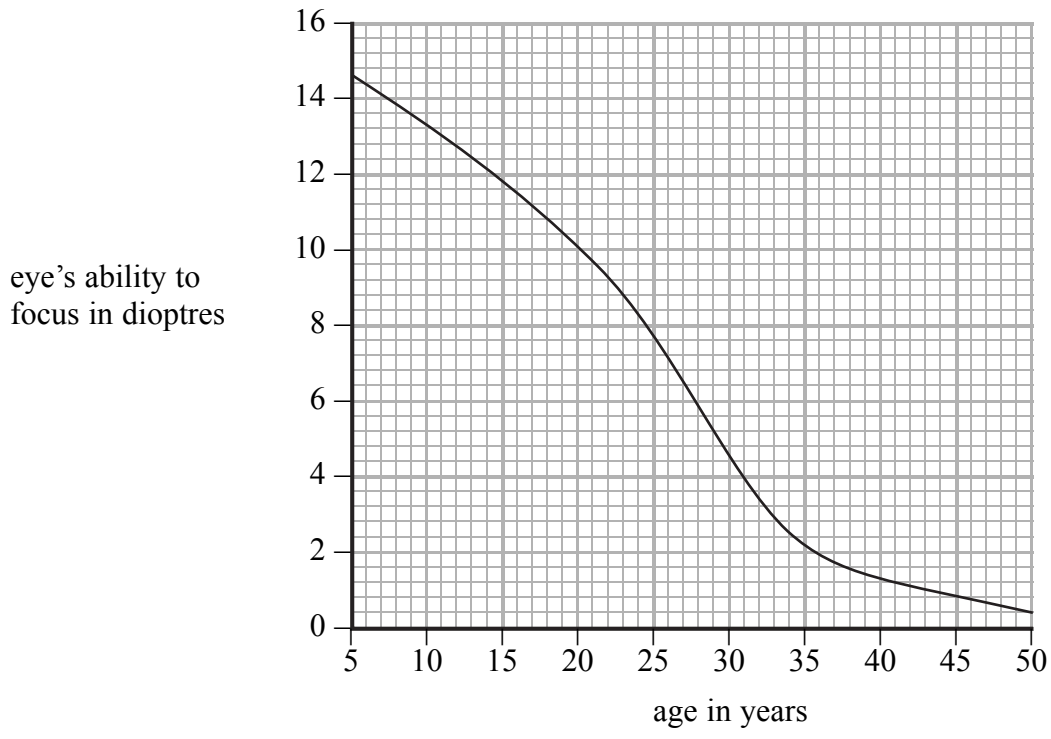
A cornea
B retina
C lens
D pupil

14. Focusing on near and distant objects is called

A accommodation
B the iris reflex
C the ducking reflex
D a voluntary action

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15. The graph shows how the eye's ability to focus changes with age.



The higher the number of dioptres, the better the eye can focus.
Which is a correct statement about this graph?

A At age 31 the eye can focus half as well as it can at age 20
B The ability of the eye to focus increases with age
C The ability of the eye to focus decreases with age
D There is no link between age and the ability to focus

16. There is a substance in human tears which helps to destroy bacteria.
This substance is

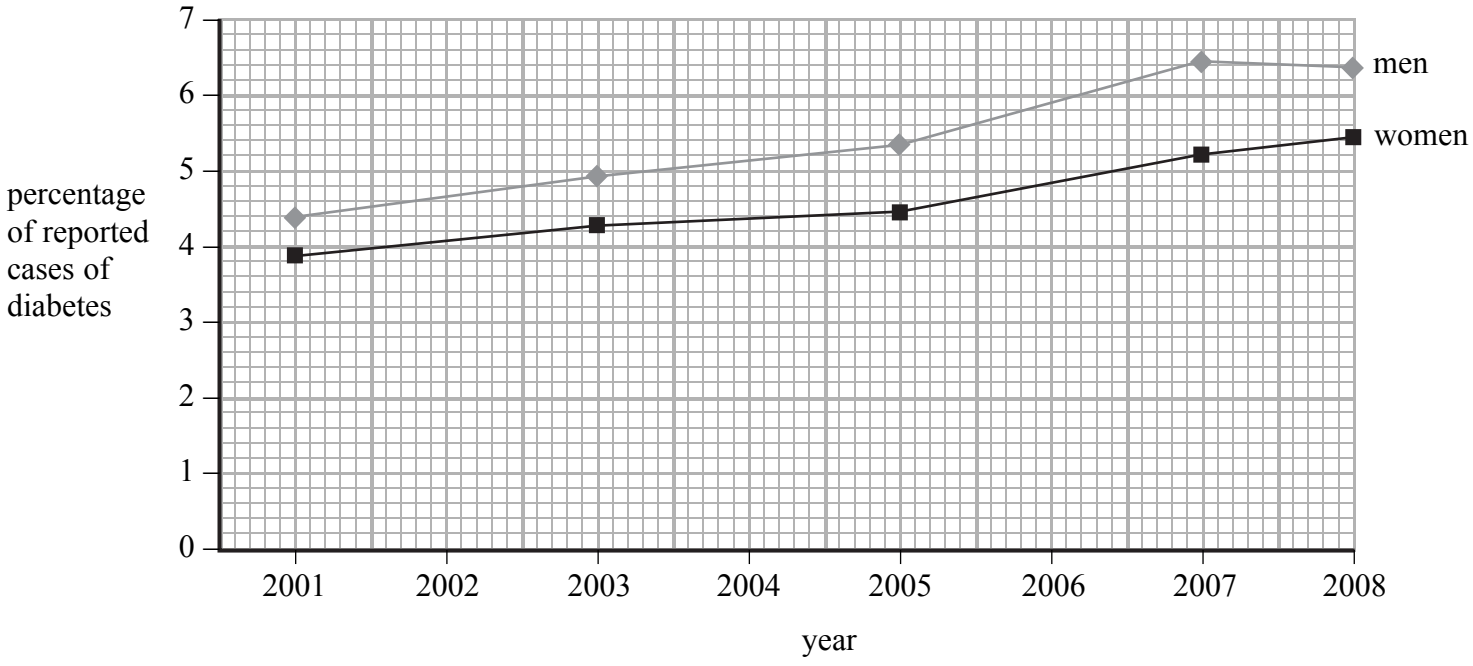
A oestrogen
B insulin
C lysozyme
D glucose

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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Diabetes is on the increase

The graph shows the percentage of reported cases of diabetes in men and women aged 12 and above. The data was reported in Canada between 2001 and 2008.



17. What is a correct statement based only on the information in the graph?

A more women have diabetes than men
B diabetes is increasing in men and women at the same rate
C more diabetes cases were reported for men in 2008 than in 2007
D reported cases of diabetes for women increased between 2001 and 2008

18. Diabetes is a result of the body being unable to use hormones to

A increase blood glucose levels
B decrease blood glucose levels
C store glucose in the pancreas
D store glycogen in the pancreas

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19. Which row of the table shows the hormone needed to prevent diabetes and the organ from which it is released?

	hormone	**organ which releases this hormone**
A	insulin	liver
B	insulin	pancreas
C	oestrogen	liver
D	oestrogen	pancreas

20. Hormones to treat diabetes are produced using genetically modified

A bacteria
B pigs
C humans
D viruses

Painkillers

21. How does paracetamol relieve the pain of a headache?

A transmission across synapses is speeded up
B transmission across synapses is slowed down
C electrical impulses travel the wrong way across synapses
D electrical impulses are prevented from travelling along neurones

22. Which painkiller is harmful to the liver in large doses and can be bought in a chemist's shop?

A paracetamol
B heroin
C ibuprofen
D aspirin

23. Alcohol can affect how the body works.
Which row of the table is correct for the drug alcohol?

	type of drug	**effect on reaction times**
A	stimulant	increases
B	stimulant	decreases
C	depressant	increases
D	depressant	decreases

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24. Reaction time can be calculated by getting a friend to drop a ruler for you to catch.
What type of reaction is this?

A involuntary and involves a reflex arc
B involuntary and does not involve a reflex arc
C voluntary and involves a reflex arc
D voluntary and does not involve a reflex arc

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Swine flu (H1N1 Influenza virus)

In 2009, a flu pandemic caused by the H1N1 virus was announced.
The number of cases and deaths caused by this virus are unknown.

25. What is the general scientific name for an organism that causes disease?

A antibody
B bacterium
C pathogen
D lysozyme

26. The H1N1 virus is transmitted by droplets in the air.
Which other global disease is spread in this way?

A malaria
B tuberculosis
C grand mal epilepsy
D Parkinson's disease

27. The first line of defence reduces the likelihood of a person contracting the H1N1 virus by limiting its entry into the body.
What is this first line of defence?

A white blood cells ingesting bacteria
B the inflammatory response involving white blood cells
C nasal hairs and mucus protecting the respiratory tract
D antibodies detecting antigens and responding to them

28. The antiviral drug Tamiflu can be given to people with the H1N1 virus.
Why might this antiviral drug become less effective over a long period of time?

A the virus may have developed an immunity to the antiviral drug
B the virus may have changed and become resistant to the antiviral drug
C the immune system may not accept the antiviral drug
D antibiotic drugs are also needed to kill viruses

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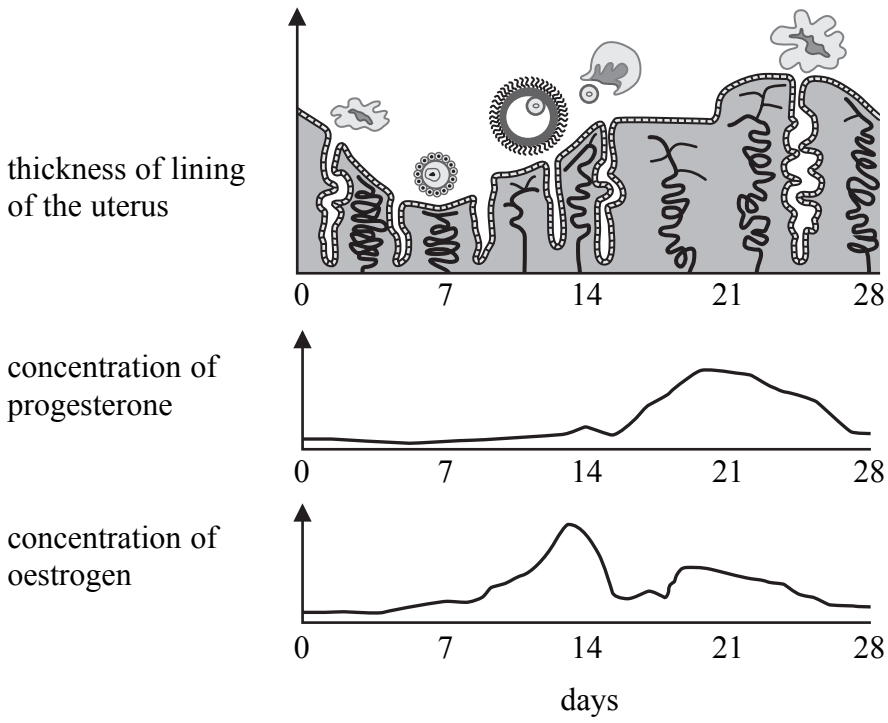
Infertility

29. Infertility can be caused by low concentrations of progesterone in the body.
If a woman has low progesterone concentrations, what is the most likely reason for her being infertile?

A the ovum is unable to ripen in the ovary
B ovulation is not likely to occur
C the lining of the uterus cannot be maintained
D menstruation is prevented from occurring

Use the diagram to help you answer questions 30 and 31.

The diagram shows the uterus lining and hormone concentrations in a healthy woman over 28 days.



30. On what day does ovulation occur?

A day 7
B day 14
C day 21
D day 28

31. What is the most likely result of the oestrogen and progesterone concentrations decreasing between day 21 and day 28 in this woman?

A implantation
B menstruation
C fertilisation
D pregnancy

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32. FSH can be used to treat some types of infertility in women.
What effect does FSH have on a woman's reproductive system?

A inhibits menstruation
B stimulates implantation
C stimulates ova development
D inhibits fertilisation

Strokes

In a recent advertising campaign the government describe the early signs of a stroke.
These include:

- numbness in one side of the body
- loss of speech
- loss of balance
- loss of consciousness

33. The cause of a stroke is

A excess electrical activity in the brain
B a hormone imbalance in the brain
C blood pumping too quickly around the body
D lack of oxygen supply to the brain

34. The part of the brain responsible for balance is the cerebellum.
Which part of the brain is responsible for hearing?

A cerebral cortex
B cerebellum
C medulla
D hypothalamus

35. Information is carried in different ways along neurones and across synapses.
Which row of the table shows the method of transmission?

	method of transmission in parts of the nervous system	
	neurone	**synapse**
A	electrical impulses	chemical messages
B	electrical impulses	electrical impulses
C	chemical messages	chemical messages
D	chemical messages	electrical impulses

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36. How many of the drugs listed can have a stimulating effect on the brain?

- caffeine
- alcohol
- paracetamol
- nicotine

A 1
B 2
C 3
D 4

Drug resistant TB

Extensively drug-resistant tuberculosis (XDR-TB) is a type of bacteria.
One in three people in the world are infected with dormant TB bacteria.
Only when the bacteria becomes active do people become ill with TB.

World Health Organisation

37. The most likely cause for the emergence of the XDR-TB bacteria is

A people dying through not being treated for TB
B people being treated for TB but not completing their treatment
C antibiotics not being effective against the original TB bacteria
D that TB only affects a small part of the population

38. The World Health Organisation's six-point plan for the treatment and prevention of TB includes the use of the DOTS treatment regime.
The DOTS treatment regime uses multiple antibiotics and has someone monitoring patients taking those antibiotics.

Which of these statements are true about the DOTS treatment regime?

1 Taking multiple antibiotics ensures that as many strains of the virus as possible are targeted
2 Observing someone taking the drugs means they will be more likely to complete the course

A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

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39. HIV is a virus that causes AIDS.
This virus attacks the immune system and destroys white blood cells.
HIV patients are more likely to become ill with TB because

A they cannot produce white blood cells to ingest the TB antibodies
B they can produce the antigens against TB but not against the HIV virus
C they cannot produce enough antibodies to destroy the TB antigens
D HIV attacks white blood cells involved in the inflammatory response

40. HIV is a virus which is most often transmitted from person to person by sexual activity or by sharing infected needles.
Which row of the table is correct for the type of transmission for each of these two methods?

	methods of transmission	
	sexual activity	**sharing infected needles**
A	direct horizontal contact	vehicle borne
B	direct vertical contact	vector borne
C	direct horizontal contact	vector borne
D	direct vertical contact	vehicle borne

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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Mark Scheme (Results)
Summer 2010

GCSE

360Science

GCSE Science
Multiple Choice Paper B1b (5006)

GCSE Biology
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5006 Science/ 5026 Biology (B1b)

Unit B1b – 5006/5026	
Topics 3 & 4	
1	D
2	A
3	B
4	B
5	B
6	C
7	B
8	D
9	B
10	C
11	D
12	B
13	C
14	A
15	C
16	C

Unit B1b – 5006/5026	
Topics 3 & 4	
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19	B
20	A
21	B
22	A
23	C
24	D

Unit B1b – 5006/5026	
Topics 3 & 4	
25	C
26	B
27	C
28	B
29	C
30	B
31	B
32	C
33	D
34	A
35	A
36	B
37	B
38	B
39	C
40	A

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B1b – Topics 3 and 4

Foundation and Higher Tier

Friday 5 March 2010 – Morning

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

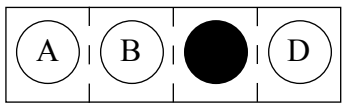
Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

Before the test begins:

Check that the answer sheet is for the correct test and that it contains your candidate details.

How to answer the test:

For each question, choose the right answer, A, B, C or D and mark it in HB pencil on the answer sheet.
For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

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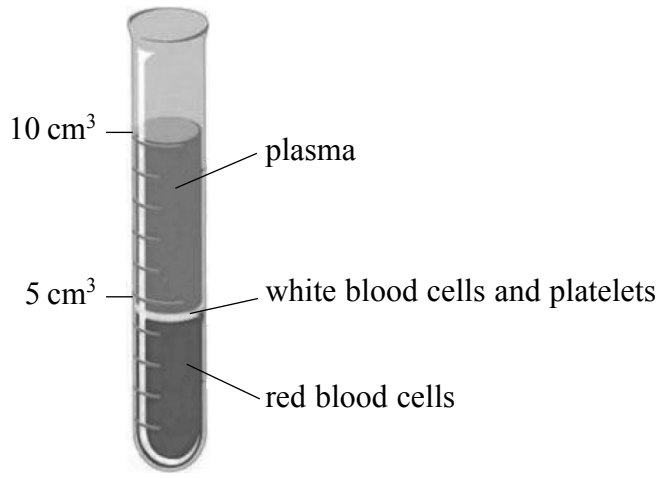
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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

The blood

Graham has been feeling unwell so he went to see his doctor. His doctor took a blood sample.



1. How many cm^3 of Graham's blood sample was plasma?

A 1.0 cm^3
B 4.5 cm^3
C 5.5 cm^3
D 10.0 cm^3

2. The number of white blood cells in Graham's blood was higher than usual.
These white blood cells

A stop bacteria entering the bloodstream
B ingest and destroy bacteria
C reduce the number of antibodies
D cause bacteria numbers to increase

3. What is the main role of the red blood cells?

A to carry oxygen
B to carry carbon dioxide
C to carry glucose
D to carry hormones

4. One part of cigarette smoke stops red blood cells from working effectively.
This part of cigarette smoke is called

A nicotine
B tar
C carbon monoxide
D carbon dioxide

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Catching flies

An online test for reaction times shows a frog catching a fly.
In the first test you hit a button when you see the fly.
In the second test you hit the button when you hear the fly.

The results of both tests are shown in the tables.

Seeing the fly

attempt	time (seconds)
1	0.499
2	0.396
3	0.398
mean	0.431

Hearing the fly

attempt	time (seconds)
1	0.717
2	0.441
3	0.562
mean	0.573

5. Which was the fastest reaction time?

A attempt 3 at seeing the fly
B attempt 2 at hearing the fly
C attempt 2 at seeing the fly
D attempt 1 at hearing the fly

6. One correct conclusion that can be drawn from the reaction time tests is that

A the reaction time decreases with practice
B reactions were faster when hearing the fly compared to seeing the fly
C reactions were faster when seeing the fly compared to hearing the fly
D the mean for both attempts was the same

7. Which two sense organs detect the flies in these reaction tests?

A eyes and skin
B skin and ears
C ears and eyes
D eyes and tongue

8. Reaction times can be increased by

A drinking a cup of coffee
B drinking a glass of wine
C smoking a cigarette
D taking paracetamol

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9. Messages are sent from the eye to the brain through

A sensory neurones
B motor neurones
C relay neurones
D reflex actions

10. Reflex responses are those which involve

A the motor neurones only
B the sensory neurones only
C the relay neurones only
D the motor, sensory and relay neurones

Coughs and colds

In the winter months, many people suffer from illnesses caused by viruses.

11. The virus that causes the common cold is a pathogen.
What is a pathogen?

A a disease-curing organism
B a disease-causing organism
C a disease-causing antibody
D a disease-curing antigen

12. Which parts of the first line of defence against disease help to prevent the cold virus entering the body?

A lysozymes and nasal hairs
B nasal hairs and mucus
C mucus and antibodies
D antibodies and lysozymes

13. The common cold can be passed from one person to another person by kissing.
This type of transmission is called

A vertical contact
B vector borne
C direct contact
D indirect contact

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14. One symptom of the common cold is a headache.
What drug would be taken to reduce the pain from a headache?

A caffeine
B nicotine
C solvents
D paracetamol

15. Painkillers affect the transmission of nerve impulses

A along the motor neurone
B across the synapse
C through the bloodstream
D down the spinal cord

16. The liver is the largest internal organ of the body.
Which drug is most harmful to the liver when taken in large doses?

A nicotine
B ibuprofen
C aspirin
D paracetamol

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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier

Can caffeine cause you to see things that are not really there?

Scientists at Durham University have found that drinking seven cups of coffee a day can cause one in three people to see or hear things which are not really there.

17. Drugs which cause people to see or hear things that are not there are known as

A sedatives
B depressants
C painkillers
D hallucinogens

18. Caffeine is a stimulant.
Stimulants

A slow down reactions and increase reaction times
B speed up reactions and decrease reaction times
C slow down reactions and decrease reaction times
D speed up reactions and increase reaction times

19. Seven cups of coffee contain 316 mg of caffeine.
An energy drink contains 79 mg of caffeine per can.
How many cans of energy drink would provide exactly 316 mg of caffeine?

A 3
B 4
C 7
D 40

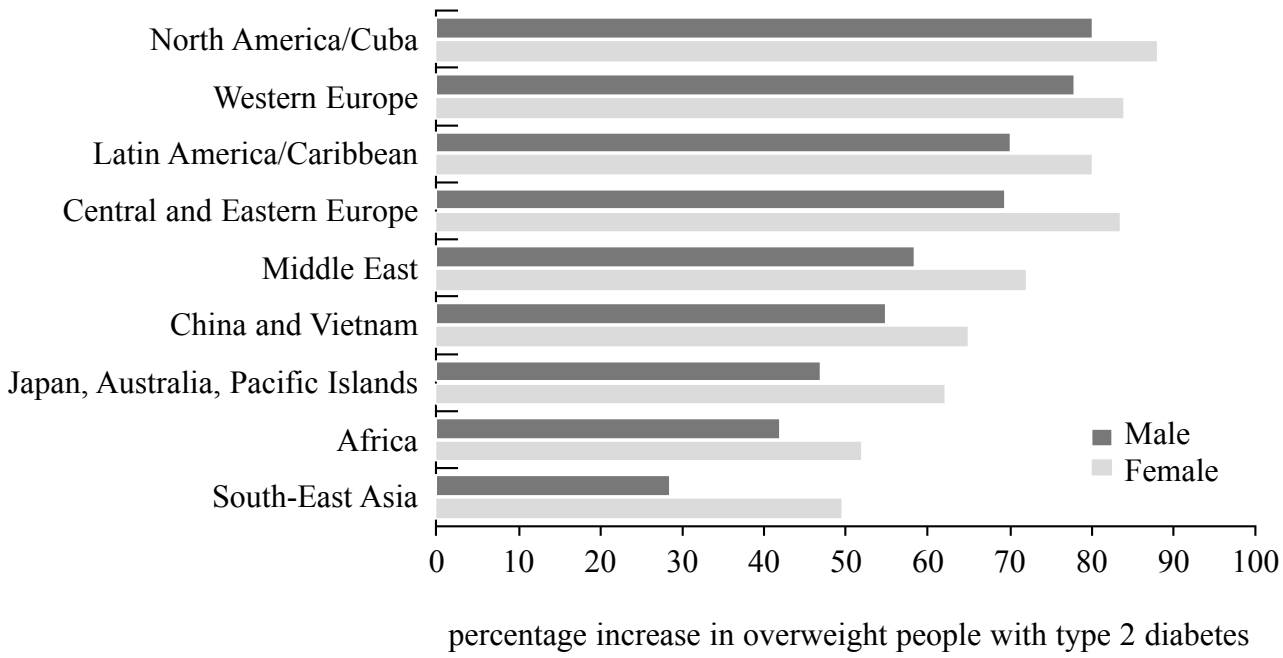
20. Some stimulants have a similar shape to neurotransmitters.
Neurotransmitters are

A electrical impulses travelling across synapses
B electrical impulses travelling along neurones
C chemical messengers travelling along neurones
D chemical messengers travelling across synapses

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The link between weight gain and diabetes

The graph shows the percentage increase in the number of people who are significantly overweight and who have developed type 2 diabetes.



21. Which is a correct statement based only on the information in the graph?

A more females than males have diabetes
B males in South-East Asia show the lowest percentage increase
C there is a 50% increase in diabetes in females in the Pacific Islands
D 80% of males in North America have diabetes

22. Type 2 diabetes is a disease caused by the body's inability to control glucose levels. Blood glucose concentrations are controlled by

A the hormone insulin which converts glucose to glycogen
B the hormone insulin which converts glycogen to glucose
C the enzyme insulin which converts glucose to glycogen
D the enzyme insulin which converts glycogen to glucose

23. The organ which produces insulin is the

A heart
B stomach
C liver
D pancreas

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24. Insulin is carried around the body by

A electrical impulses
B blood plasma
C red blood cells
D white blood cells

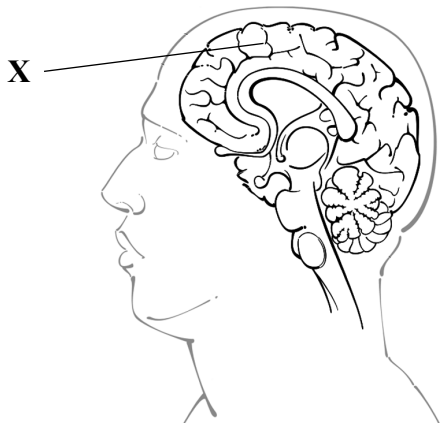
TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

The Human Brain



25. Part **X** is the

A cerebellum
B cerebral cortex
C medulla
D hypothalamus

26. Which one of the following functions is **not** carried out by part **X**?

A balance
B memory
C vision
D speech

27. The brain receives impulses from the eyes.
A blind spot is located at the back of each eye.
The blind spot is located

A where the retina meets the optic nerve
B where the lens meets the optic nerve
C at the end of the cornea
D in the centre of the iris

28. The iris reflex is the way the eye responds to changes in light intensity.
Which row of the table is correct for the iris reflex when light intensity increases?

	iris size	**pupil size**	**amount of light entering the eye**
A	increases	increases	decreases
B	increases	decreases	decreases
C	decreases	increases	increases
D	decreases	decreases	increases

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The problem with Tuberculosis (TB)

Alan went to see his doctor because he could not stop coughing.
His doctor sent him to the hospital for an X-ray.



29. In which body organ did the X-ray show a TB infection?

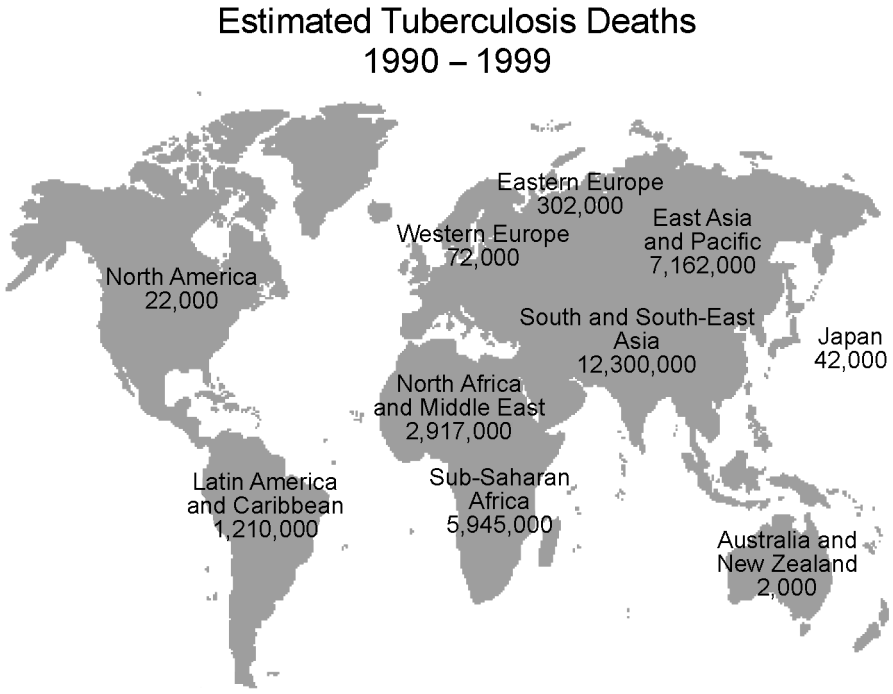
A heart
B lungs
C stomach
D liver

30. Alan was given a course of treatment using DOTS (directly observed treatment, short course). DOTS treatment should involve the

A observation of taking of a single antibiotic until the course is completed
B observation of taking of multiple antibiotics until the course is completed
C observation of taking of a single antibiotic for the first part of the course
D observation of taking of multiple antibiotics for the first part of the course

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This is a map showing the number of deaths from TB across the world between 1990 and 1999.



31. Which region had the highest number of deaths from TB between 1990 and 1999?

A Latin America and Caribbean
B South and South East Asia
C North Africa and Middle East
D Sub-Saharan Africa

32. Australia and New Zealand have the lowest number of TB deaths.
The most likely reason for this is a

A low population density and good treatment regimes
B low population density and the development of drug resistant bacteria
C high population density and good treatment regimes
D high population density and the development of drug resistant bacteria

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Reclassification of cannabis

On January 26th 2009, cannabis was reclassified from a Type C to a Type B drug.
One reason for this is the link between cannabis and psychosis (a condition which affects the mind).

The table shows how cannabis use affects the likelihood of developing psychosis.

	percentage risk of symptoms of psychosis (%)		
	with five doses of cannabis	with no doses of cannabis	difference in risk
patients at less risk of developing psychosis	21	15	6
patients at greater risk of developing psychosis	52	26	26

33. These are two statements about this data.

1 Patients at less risk of developing psychosis have a 21% risk of suffering from psychosis if they have five doses of cannabis
2 Patients at greater risk of developing psychosis are 100% more likely to suffer from psychosis if they take five doses of cannabis compared to no doses of cannabis

Which statements are true?

A 1 only
B 2 only
C both 1 and 2
D neither 1 or 2

34. Cannabis can be smoked with tobacco.
Harmful effects of smoking tobacco are

A addiction to nicotine and damage to the lungs caused by tar
B addiction to tar and damage to the lungs caused by nicotine
C addiction to carbon monoxide and damage to the heart
D addiction to cannabinoids and damage to the heart

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35. It is illegal to take cannabis for pain relief in this country without written consent from a doctor.
Doctors can prescribe opiates such as morphine for terminally ill patients even though opiates are very addictive.
Doctors prescribe opiates in these cases because

A they are less dangerous than other pain relief drugs
B they are extremely powerful pain relievers
C addiction to opiates is easy to break
D opiates are less addictive than cannabis

36. The development of THC (an active component in cannabis) as a pain relief drug is now going through clinical trials in Canada.
This drug development is lengthy and expensive because

- the drug has to be extracted from its original source
- animals are used for early trials
- humans are used for clinical trials

How many of these statements are true?

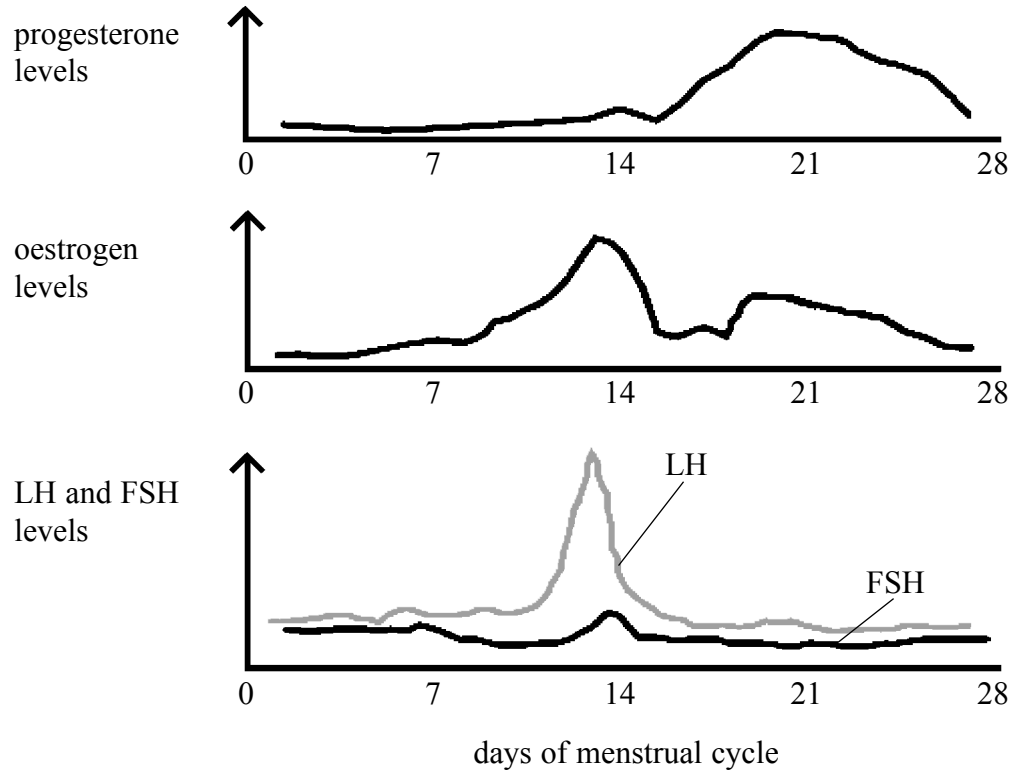
A none
B one
C two
D three

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The menstrual cycle

The graphs show the levels of four hormones during the menstrual cycle.

Use the information in the graphs to help you answer questions 37 and 38.



37. What is happening in the menstrual cycle at day 14?

A menstruation
B implantation
C ovulation
D fertilisation

38. These are two statements about hormones in the menstrual cycle.

1 An increase in oestrogen inhibits the release of LH

2 An increase in progesterone promotes the release of FSH

Which are true?

A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

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39. Which change in hormone levels shows that implantation has **not** occurred?

A increase in oestrogen between day 7 and 14
B decrease in progesterone between day 21 and 28
C increase in LH between day 10 and 13
D decrease in FSH between day 14 and 16

40. Women who are infertile can be treated with hormones.
The main hormones used when treating infertility are

A oestrogen and progesterone
B progesterone and LH
C LH and FSH
D FSH and oestrogen

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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Mark Scheme (Results)

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GCSE Science
Multiple Choice Paper B1b (5006)

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March 2010

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5006 Science/ 5026 Biology (B1b)

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Science (5006)

Biology (5026)

B1b – Topics 3 and 4

Foundation and Higher Tier

Friday 20 November 2009 – Morning

Time: 20 minutes

Materials required for examination
Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers
Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

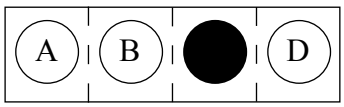
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Higher tier candidates: answer questions 17 – 40.
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Before the test begins:

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For example, the answer C would be marked as shown.



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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Smokers to face picture warnings

Pictures showing the dangers of smoking will be printed on all tobacco products by the end of 2009.
The minimum age for buying tobacco in England and Wales has also been increased from 16 to 18, bringing it in line with the age for buying alcohol.

1. Smoking tobacco causes

A liver disease
B heart disease
C viral infections
D diabetes

2. Pregnant women who smoke put the health of their unborn babies at risk.
A substance in cigarette smoke attaches to red blood cells.
It stops the unborn baby from receiving enough oxygen.
What is this substance?

A carbon dioxide
B nicotine
C carbon monoxide
D tar

3. Some people buy products to help reduce their craving for cigarettes.
What substance in these products helps people to reduce their craving for cigarettes?

A nicotine
B carbon monoxide
C caffeine
D tobacco

4. It is illegal for anyone under the age of 18 to buy alcohol.
Which organ is most damaged by drinking a lot of alcohol?

A heart
B lungs
C brain
D liver

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Blood and disease

A blood transfusion is when donated blood is passed directly into the blood of a patient through a needle.

5. These statements are some functions of the blood.

- fight infections
- deliver nutrients to the cells
- provide muscles with oxygen

How many of these statements are functions of red blood cells?

A none
B one
C two
D three

6. Blood is checked for disease-causing organisms before it is given to a patient.
Disease-causing organisms are called

A antigens
B antibodies
C pathogens
D infections

7. A person could catch a disease if 'dirty' needles were used.
What is this type of disease transmission called?

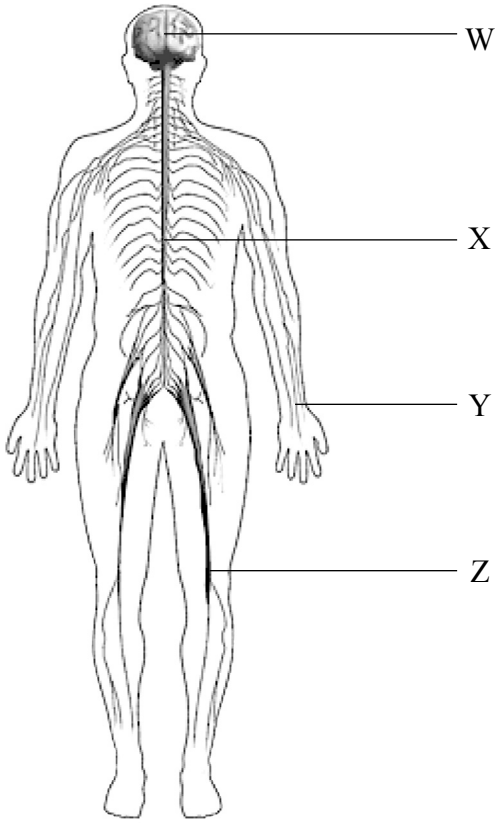
A direct horizontal
B direct vertical
C vector-borne
D vehicle-borne

8. Which row of the table shows the cause of tuberculosis (TB) and how it is transmitted from person to person?

	cause of TB	**transmission**
A	virus	through sneezing
B	bacteria	through sneezing
C	virus	through drinking water
D	bacteria	through drinking water

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Our nervous system



9. Which letters on the diagram represent the central nervous system (CNS)?

A W and X
B W and Y
C X and Y
D X and Z

10. Our peripheral nervous system is made up of

A motor neurones only
B sensory neurones only
C relay neurones only
D sensory and motor neurones

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11. Which row of the table shows how messages are carried across synapses and around the body by our nervous system?

	across synapse	**around the body**
A	electrical	electrical
B	chemical	chemical
C	electrical	chemical
D	chemical	electrical

12. The list below shows some drugs that affect our nervous system.

- caffeine
- cannabis
- a sedative
- nicotine

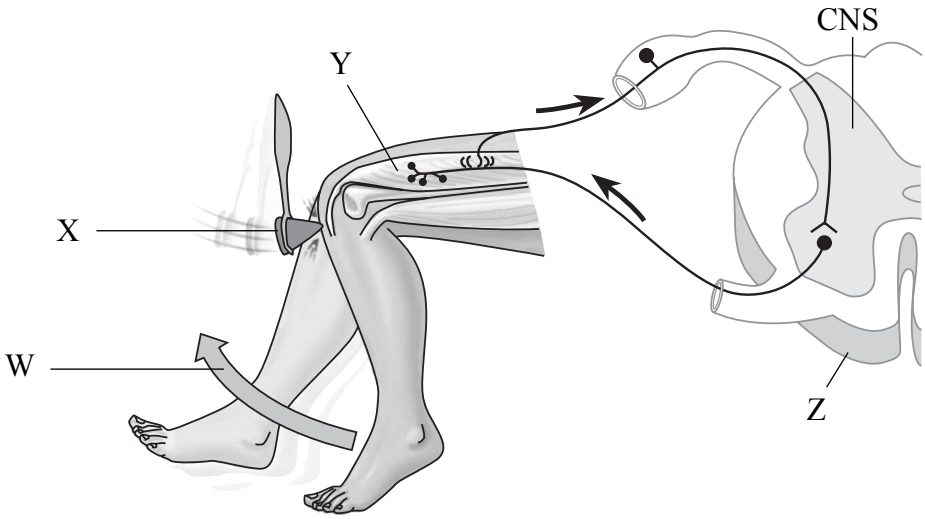
How many of these drugs will slow down reactions?

A one
B two
C three
D four

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Testing reactions

Doctors can carry out a knee jerk test to find out the health of a patient's nervous system.
The base of the knee is tapped gently with a rubber hammer.
A quick response by the patient indicates a healthy nervous system.



13. The response to the knee jerk test is caused by a stimulus.
Which letter represents the stimulus?

A W
B X
C Y
D Z

14. Which letter represents the effector organ in the knee jerk test?

A W
B X
C Y
D Z

15. The neurone from the CNS to the effector organ is a

A receptor neurone
B sensory neurone
C motor neurone
D relay neurone

16. A person cannot control their response to the knee jerk test.
The knee jerk response is an example of

A a voluntary reflex action
B a voluntary non-reflex action
C an involuntary reflex action
D an involuntary non-reflex action

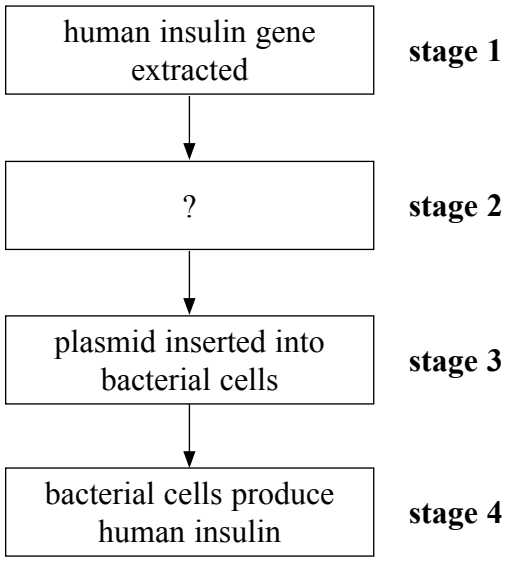
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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Making use of hormones

Use the information to help you answer questions 17 and 18.

The diagram below shows the stages involved in producing human insulin from bacteria.



17. Stage 2 involves

A inserting the human insulin gene into human DNA
B inserting the human insulin gene into plasmids
C cutting out the human insulin gene from human DNA
D cutting out the human insulin gene from bacterial plasmids

18. An advantage of stage 4 is that

A humans have fewer side effects from insulin produced by mammals
B bacteria need to have special conditions in which to grow and produce insulin
C it is cheaper and less time consuming to produce large amounts of insulin
D vegetarians cannot use insulin as it is made by bacteria

19. Which row of the table shows the human organ which produces insulin and the target organ for the insulin?

	organ producing insulin	target organ
A	kidneys	liver
B	pancreas	kidneys
C	kidneys	pancreas
D	pancreas	liver

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20. Some people with diabetes cannot produce insulin.
These people need to take medication to

A raise blood glucose levels
B lower blood glucose levels
C make target cells less sensitive to glucose
D increase the amount of glucose produced by cells

Having babies

Use the information in the table to answer questions 21 and 22.

The table shows a comparison between the number of births after fertility treatment and the number of births by women who did not have fertility treatment in the UK in 2006.

	total number of births	**number of single births**	**number of twins**	**number of triplets or more**
women with fertility treatment	10 242	7 922	2 286	34
all UK births (including women with fertility treatment)	737 679	726 482	10 963	149

21. What was the total number of single births without fertility treatment?

A 7 922
B 10 242
C 718 560
D 737 679

22. The data from the table suggests that

A more women are receiving fertility treatment than ever before
B fewer women are receiving fertility treatment than ever before
C women receiving fertility treatment are more likely to have twins or triplets
D women receiving fertility treatment are less likely to have twins or triplets

23. Eggs can be fertilised with sperm outside the body.
This is called

A *in vitro* fertilisation
B *in vivo* fertilisation
C *in utero* fertilisation
D *inter-utero* fertilisation

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24. The use of fertility treatment raises ethical issues for some people.
The reason for this is because fertility treatment

A always results in multiple births
B is only given to clients over the age of 50
C is only given to women on high income
D produces many embryos some of which are discarded

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

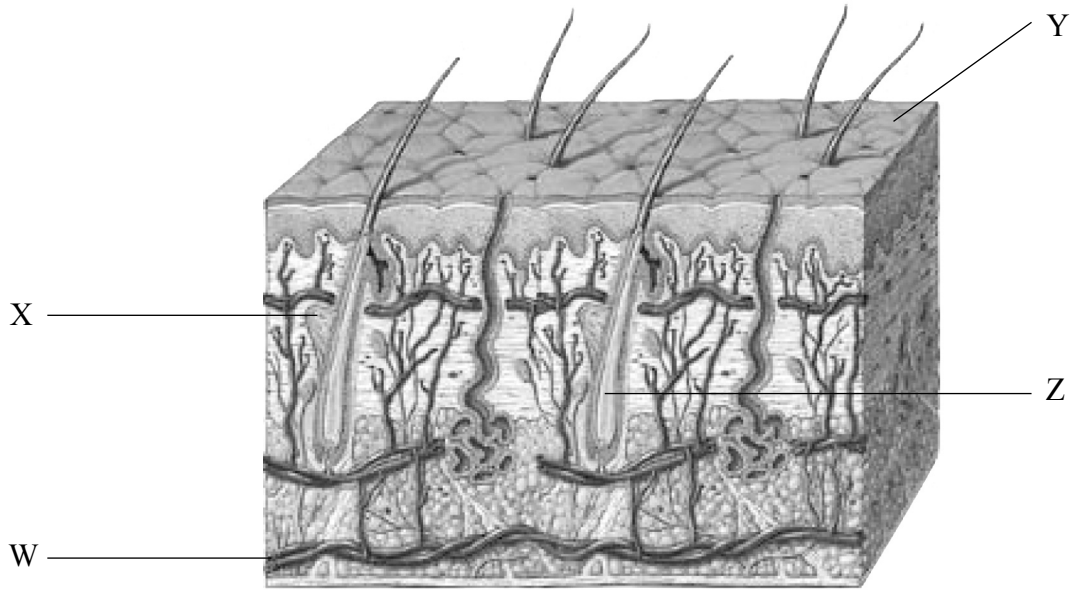
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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Defence against disease

Use the diagram to help you answer questions 25 and 26.

The diagram shows the structure of the skin.



25. Which is a physical barrier against microorganisms?

A W
B X
C Y
D Z

26. Which produces a substance that acts as a chemical barrier against microorganisms?

A W
B X
C Y
D Z

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27. White cells form part of our third line of defence.
Our third line of defence involves

A ingestion of microbes by white cells and inflammation of infected area
B ingestion of microbes by white cells but no inflammation of infected area
C white cells producing antigens against antibodies
D white cells producing antibodies against antigens

28. Which is involved in protecting our body from microorganisms by forming a clot in a wound?

A platelets
B white blood cells
C lysozyme
D hormones

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Brain attack

A statement from the Department of Health states:

> 'Strokes are the third biggest cause of death in the UK and the largest single cause of severe disability. Each year more than 110,000 people in England will suffer from strokes. These patients cost the NHS over £2.8 billion.'

29. The statements below give some causes and symptoms of brain disorders.

- An increase in electrical activity in the brain causing jerky movements
- Brain tumours can damage blood vessels causing them to burst
- Blocked blood vessels causing death of brain tissue
- Accidental damage to the brain causing internal bleeding

How many of the statements describe a cause of a stroke?

A none
B one
C two
D three

30. People that have suffered severe strokes are likely to show

A an increase in the rate of processing information and an increase in reaction time
B a decrease in the rate of processing information and a decrease in reaction time
C an increase in the rate of processing information and a decrease in reaction time
D a decrease in the rate of processing information and an increase in reaction time

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31. Opiates are drugs that affect the nervous system. They are sometimes prescribed to patients with certain medical conditions.

The statements are about the use of opiates.

1 Opiates cause addiction by increasing communication across synapses
2 Opiates offer very strong pain relief
3 Opiates allow terminally ill patients to live much longer

Which are true?

A 2 only
B 1 and 2 only
C 2 and 3 only
D 1, 2 and 3

32. Some people suffer from a brain disorder known as Parkinson's disease.
Parkinson's disease can cause slowness in movement and speech impairment.
Parkinson's disease causes

A a loss of communication between neurones in the brain
B an increase in communication across synapses
C less oxygen to reach muscles
D an increase in the rate at which electrical messages are transmitted to muscles

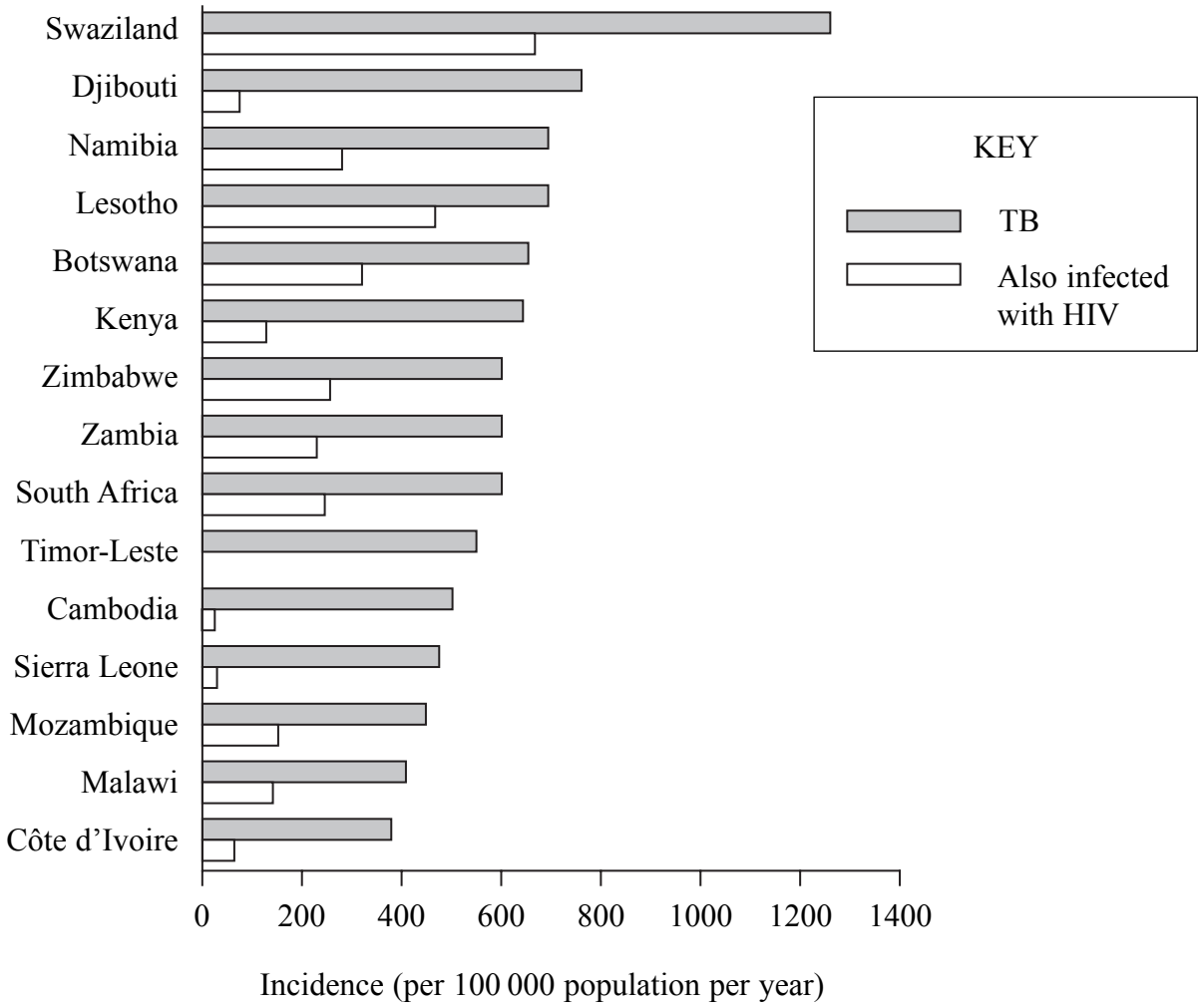
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Tuberculosis (TB)

Use the information to help you answer questions 33 and 34.

The Human Immunodeficiency Virus (HIV) attacks certain white blood cells.
This destroys the immune system.
People infected with HIV can develop a disease called Auto Immune Deficiency Syndrome (AIDS).
AIDS sufferers are more vulnerable to diseases such as TB.

The graph shows fifteen countries with a high incidence of TB.
It also shows the number of people with TB who are also infected with HIV.



33. The graph shows that

A the greater the incidence of HIV the greater the incidence of TB
B the greater the incidence of HIV the lower the incidence of TB
C there is a proportional increase in the incidence of TB as the incidence of HIV increases
D there is no clear correlation between the incidence of TB and the incidence of HIV

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34. Which country has the highest **proportion** of TB sufferers with HIV?

A Swaziland
B Botswana
C Timor Leste
D Lesotho

35. The data collected on the incidence of TB and HIV could be unreliable because

A not all cases of TB and HIV may have been identified
B people are being cured of TB which will affect the data
C drug-resistant forms of the bacteria arise which are not included in the data
D the data was collected from a large number of people

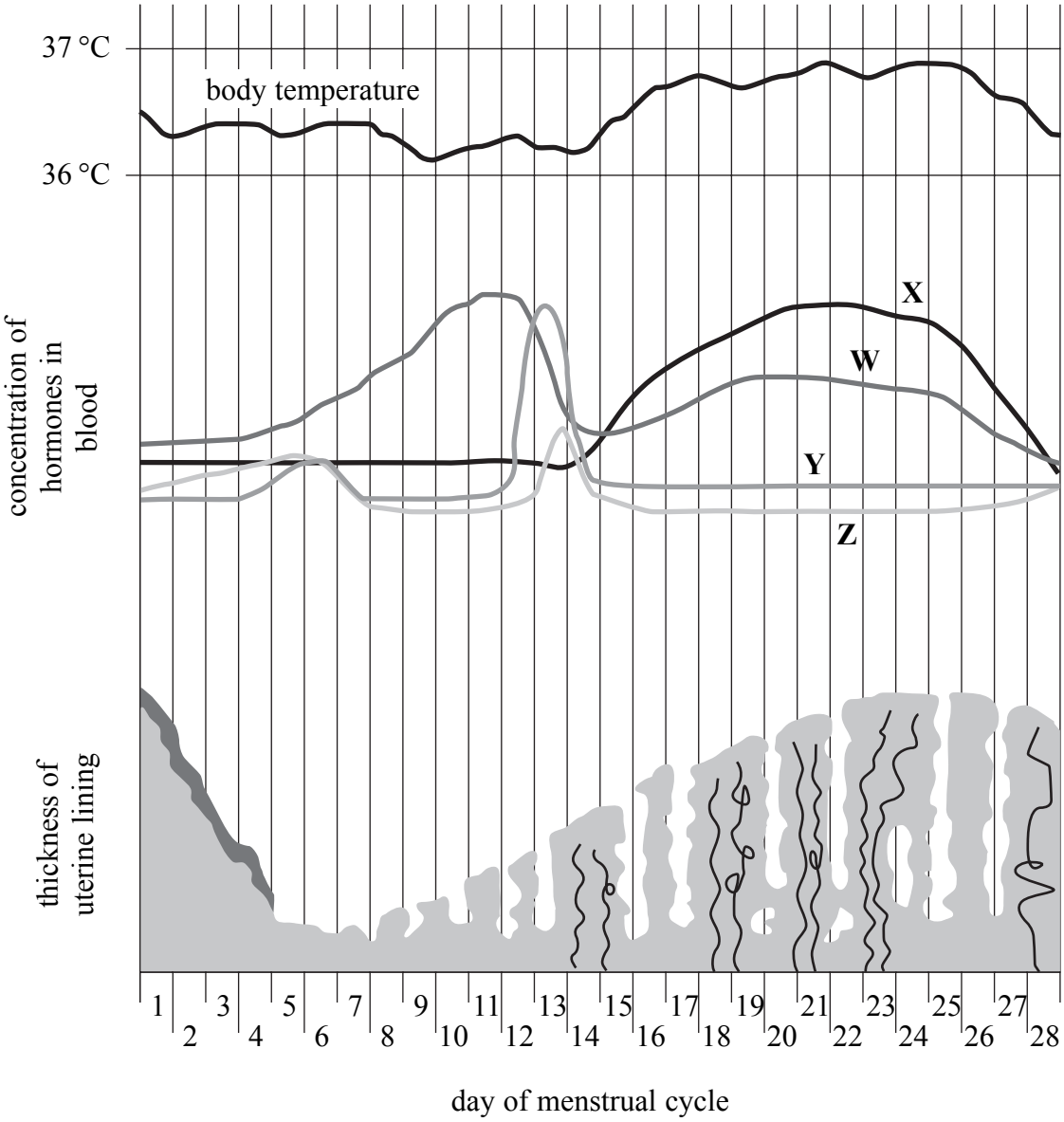
36. The incidence of TB is very high in many African countries.
The most likely reason for this is because

A African countries have more vectors than other countries
B resistant forms of the TB bacteria are more likely to arise in warmer countries
C overcrowding and poverty lead to higher transmission rates
D the DOTS programme is not used in poorer countries

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The menstrual hormones

Use the diagram to answer questions 37 to 40.



key
Y – Luteinising hormone (LH)
Z – Follicle stimulating hormone (FSH)

37. What is the role of hormone **W** in the menstrual cycle?

A causes the lining of the uterus to breakdown during menstruation
B to stimulate the release of hormone **X** from the ovaries
C causes the body temperature to decrease following ovulation
D initiates the repair and thickening of the uterus lining

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38. The following statements refer to the data shown on the diagram.

- High concentrations of hormone **W** stimulate the release of LH
- Low concentrations of hormone **W** and high concentrations of hormone **X** cause a rise in body temperature
- The concentrations of LH and FSH in the blood follow a similar trend

How many of the statements are valid conclusions that can be drawn from the diagram?

A none
B one
C two
D three

39. Sex hormones are used in the contraceptive pill.
The contraceptive pill

A prevents ovulation and increases FSH production
B stimulates ovulation and inhibits FSH production
C prevents the uterus lining thickening and inhibits LH production
D stimulates the thickening of the uterus lining and increases LH production

40. FSH can be given to less fertile women during fertility treatment.
FSH can help a woman to become pregnant because it

A decreases the number of times a woman will ovulate in one month
B causes more eggs to mature in the ovaries during one cycle
C encourages fertilisation of an egg by a sperm
D maintains the lining of the uterus in preparation for a fertilised egg

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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6	C
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9	A
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34	D
35	A
36	C
37	D
38	C
39	C
40	B

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Edexcel GCSE

Science (5006)

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B1b – Topics 3 and 4

Foundation and Higher Tier

Friday 19 June 2009 – Morning

Time: 20 minutes

Materials required for examination	**Items included with question papers**
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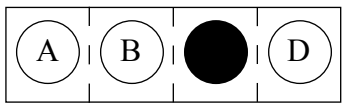
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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Smoking

Carbon monoxide is a poisonous gas found in cigarette smoke.
A machine called a Smokerlyzer can detect the amount of carbon monoxide in a person's breath.



Sue tested the breath of four people using the Smokerlyzer.
The results of this test are shown in the table.

people	percentage of carbon monoxide in breath
Mike	1.9
Beverlyn	1.3
Richard	3.6
Faiza	2.1

1. Which person had smoked a cigarette just before the test?

A Mike
B Beverlyn
C Richard
D Faiza

2. Carbon monoxide passes into the blood and is carried by red blood cells.
This means that red blood cells carry less

A glucose
B carbon dioxide
C nitrogen
D oxygen

3. Which substance in cigarette smoke causes lung cancer?

A tar
B carbon dioxide
C carbon monoxide
D nicotine

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4. People become addicted to the nicotine in cigarettes.
Nicotine causes this addiction by affecting the

A lungs
B brain
C blood vessels
D heart

Sensing change

Our nervous system detects changes and is able to respond to these changes.
This can protect us from harm.

5. Which row of the table shows the pathway when a person detects a sound?

	sense organ	**nerve**
A	eye	sensory
B	eye	motor
C	ear	sensory
D	ear	motor

6. Our reaction time is a measure of how quickly we respond to a stimulus.
Reaction time is best measured using a

A stop clock
B thermometer
C ruler
D pulse monitor

7. Which drug can slow down our reactions?

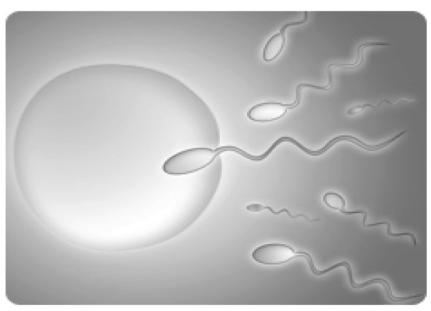
A caffeine
B paracetamol
C nicotine
D alcohol

8. Which of the following is an example of a reflex action?

A sneezing
B picking up an object
C writing
D eating an apple

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Fertilisation



9. *In vitro* fertilisation (IVF) is a treatment that can be used by couples that cannot have children naturally.
IVF involves

A fertilisation inside the female body
B fertilisation inside the male body
C fertilisation outside the body
D no fertilisation of the egg by the sperm

10. There are concerns about the use of IVF.
The statements below are about IVF treatment.

- Women over the age of 60 can use IVF to become pregnant.
- IVF creates more embryos than are needed, so some are destroyed.
- Children of parents that used IVF are as healthy as children of parents that did not use IVF.

How many of the statements are most likely to cause concern?

A one
B two
C three
D none

11. Contraceptive pills contain hormones which prevent a woman from becoming pregnant.
One of these hormones is called

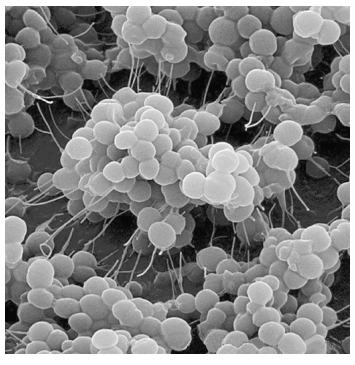
A glucose
B lysozyme
C insulin
D oestrogen

12. Which part of the blood transports hormones?

A red blood cells
B white blood cells
C platelets
D plasma

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Fighting disease



David Scharf/Science Photo Library

The picture shows one type of microbe that lives on the surface of our skin.
Microbes are also found inside our body and some can cause disease.

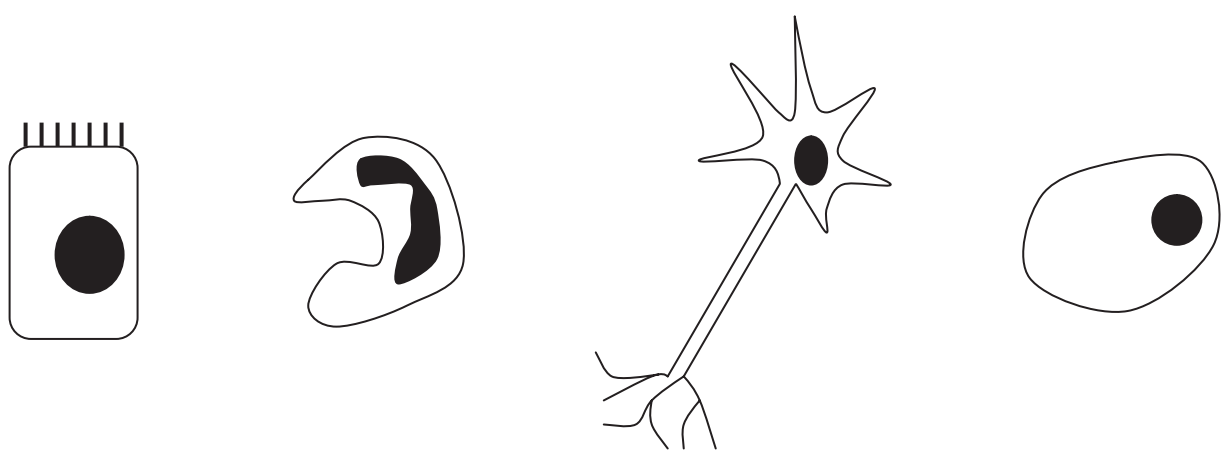
13. What name is given to a microbe that causes disease?

A pathogen
B antigen
C infection
D foreign body

14. How does our skin help to prevent us getting a disease?

A It has hair which traps heat making it too hot for microbes to survive
B It produces sweat which cools down the skin making it too cold for microbes to survive
C It acts as a physical barrier which helps to prevent microbes entering our body
D It is a sense organ that tells our brain when harmful microbes are present

15. The diagrams show four different animal cells.



A **B** **C** **D**

Which cell ingests microbes inside our body?

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16. Bluetongue is a disease that affects sheep and cattle. Tiny biting insects pierce the skin and inject the bluetongue microbe into the blood of the animal.
This type of disease transmission is known as

A vector-borne
B vehicle-borne
C direct contact
D horizontal contact

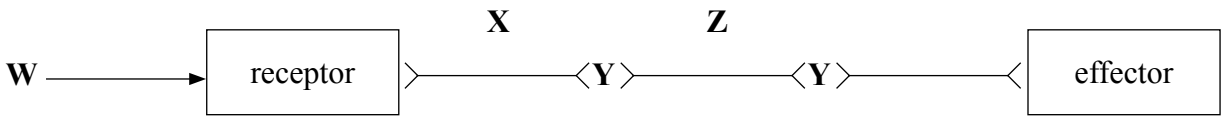
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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Sending messages

Use the diagram to answer questions 17 to 20.

The diagram shows a reflex arc that helps our eye adjust to differences in light intensity.



17. **W** is

A a neurone
B a stimulus
C a synapse
D a response

18. **Z** is

A a sensory neurone
B a motor neurone
C a synapse
D a relay neurone

19. Which letter on the diagram represents a synapse?

A W
B X
C Y
D Z

20. What is the effector that responds to changes in light intensity?

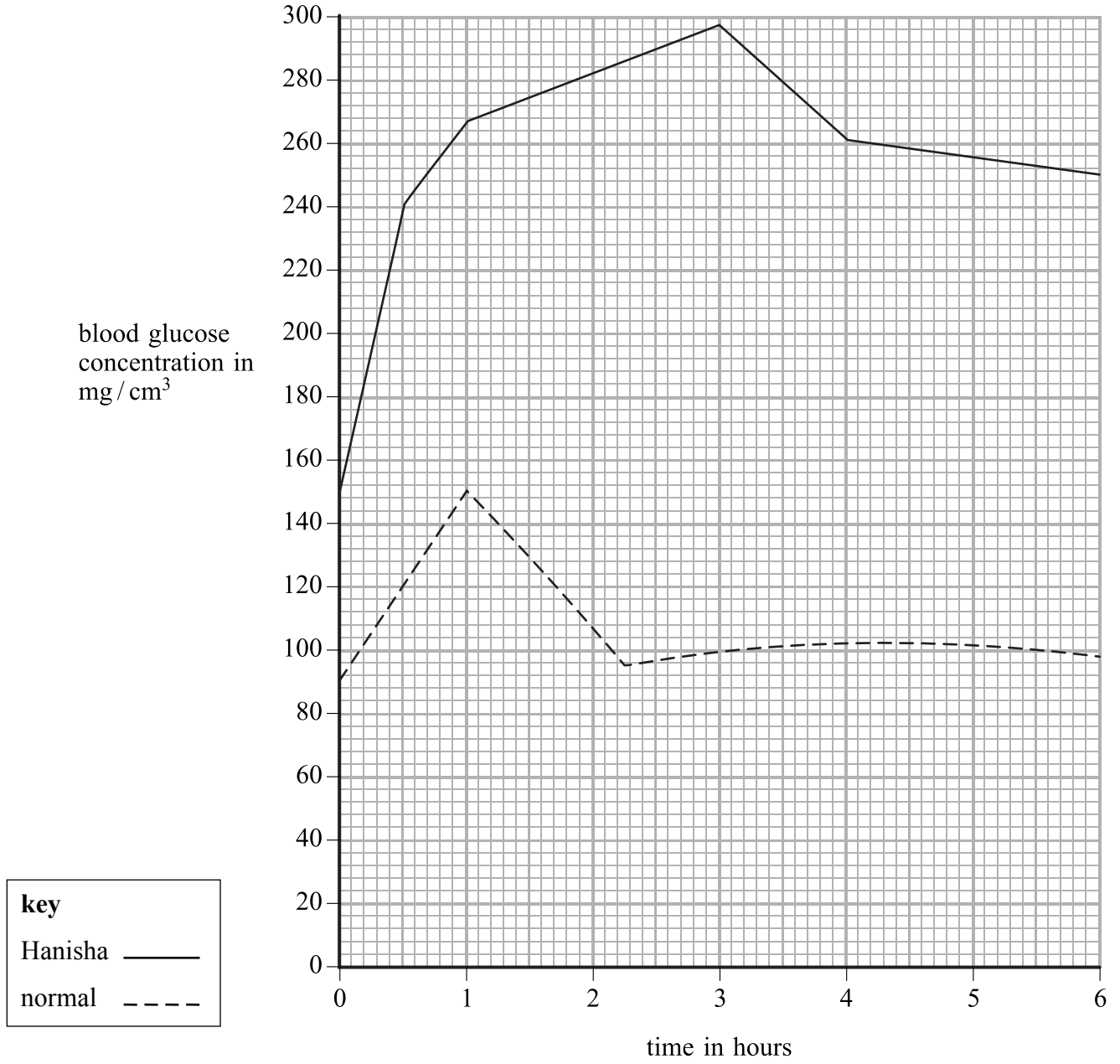
A iris
B lens
C pupil
D ciliary muscle

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Hormones

A doctor carried out a Glucose Tolerance Test (GTT) to find out the concentration of glucose in Hanisha's blood. This test was carried out immediately before, and every hour for 6 hours after she drank a sugary drink.

The graph shows how Hanisha's blood glucose concentration compared to that of a person with normal blood glucose concentration.



21. What is the difference between Hanisha's blood glucose concentration and normal blood glucose concentration half an hour after taking the sugary drink?

A 120 mg/cm^3
B 220 mg/cm^3
C 240 mg/cm^3
D 300 mg/cm^3

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22. What is the name of the hormone that causes the change in normal blood glucose concentration after 1 hour?

A pancreas
B glycogen
C insulin
D progesterone

23. The doctor was concerned about the concentration of glucose in Hanisha's blood.
The doctor thought that Hanisha may be

A a diabetic
B an alcoholic
C infertile
D pregnant

24. The statements are about genetically modifying bacteria to produce hormones.

- Plasmids are used to transfer genes from bacteria into humans
- Human DNA is cut using enzymes
- Hormones are used to insert human DNA into bacteria

How many statements are true?

A none
B one
C two
D three

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

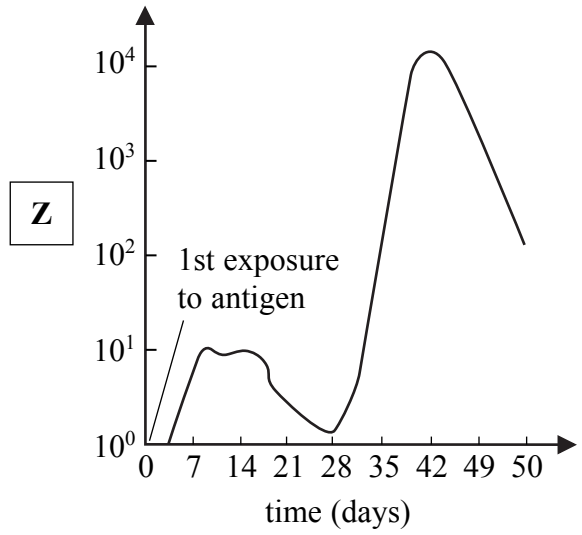
Foundation tier candidates do not answer any more questions after question 24.

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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Self defence

The graph shows how our third line of defence reacts when it encounters an antigen.



25. **Z** on the graph represents the concentration of

A red blood cells
B white blood cells involved in ingestion
C antibodies
D antigens

26. On what day did a second exposure to the same antigen occur?

A 7
B 14
C 28
D 42

27. Our third line of defence is also known as the specific immune response.
This response is specific because each different

A antigen has its own matching antibody
B antigen has its own matching white blood cell
C white blood cell has its own matching antibody
D antibody has its own matching pathogen

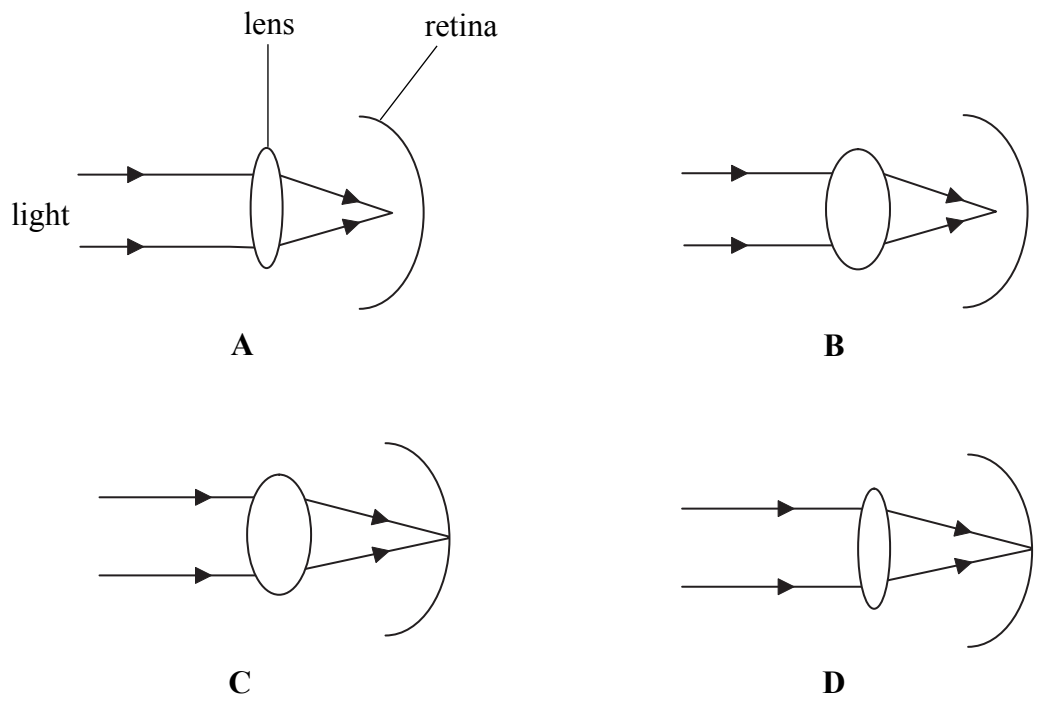
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28. Resistant forms of the bacterium that causes tuberculosis (TB) have developed. The most likely reason for the increase in their numbers is because patients

A do not complete their course of treatment
B are not prescribed the correct drugs
C live in conditions where disease transmission is more likely
D do not always seek treatment

Responding to stimuli

To see clear, sharp images, our eye needs to be able to focus on nearby and distant objects. This is called accommodation.



29. Which diagram correctly shows the eye focusing on a distant object?

30. Which structure in the eye, apart from the lens, focuses light on the retina?

A receptor
B iris
C pupil
D cornea

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31. Which row of the table shows the neurones that deliver the impulses from the brain to the effector and the response that the effector has to bright light?

	neurones	**effector muscles involved in the response**	**response**
A	motor	radial	contract
B	motor	circular	contract
C	sensory	radial	relax
D	sensory	circular	relax

32. Morphine is a strong painkiller that can be used to treat burns victims in severe pain.
Morphine

A reduces electrical communication across synapses
B increases electrical communication across synapses
C reduces chemical communication across synapses
D increases chemical communication across synapses

Brain disorders

Schizophrenia is a mental disorder that is associated with cannabis use. Scientific evidence suggests that the younger a person starts smoking cannabis, the more likely they are to have schizophrenia in later life.

33. People with schizophrenia, as a result of smoking cannabis, have reduced memory and reduced thinking skills.
This indicates that cannabis affects the

A cerebellum
B medulla
C hypothalamus
D cerebrum

34. Misuse of certain drugs can have mental and physical effects on an individual.
Which drug, if misused, will have only a physical effect on an individual?

A nicotine
B alcohol
C paracetamol
D heroin

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35. Brain function can be altered by factors other than drugs. Blocked blood vessels can reduce the amount of oxygen reaching certain parts of the brain.
This could cause

A Parkinson's disease
B a stroke
C epilepsy
D brain tumours

36. Progesterone can cause premenstrual tension (PMT) which affects behaviour and emotions. Progesterone does this by increasing communication between particular neurones in the brain.
Progesterone acts in a similar way to

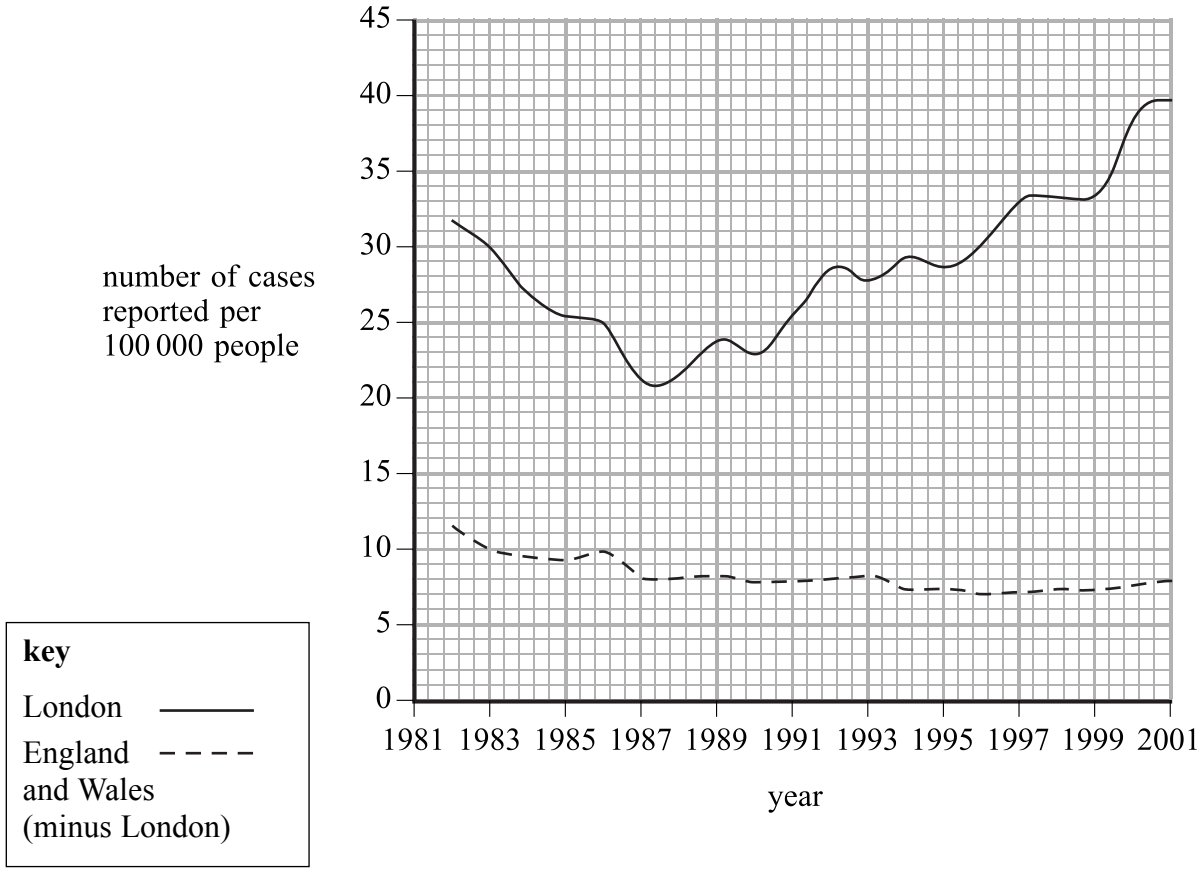
A stimulants
B depressants
C sedatives
D painkillers

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Tuberculosis (TB)

Use this information to help you answer questions 37 and 38.

In 1993 the World Health Organization declared TB a global emergency.
The graph shows the number of cases of TB reported in London and the number of cases reported in the rest of England and Wales over a 20 year period.



37. Using the information in the graph, which statement is correct?

A There were no changes in the number of cases reported in England and Wales (minus London)
B The number of cases in London decreased up until 1997 and then rose steadily
C The number of cases in London showed the greatest increase between 1999 and 2000
D In 1983 there were three times more cases in England and Wales (minus London) than in London

38. In 2001 the population of London reached almost 7 200 000.
Approximately how many cases of TB were reported in London in that year?

A 2 880
B 28 800
C 40 000
D 400 000

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39. London has more cases of TB than the rest of England and Wales.
The most likely reason is because London

A has less effective healthcare routines than the rest of England and Wales
B has fewer foreign-born people than in the rest of England and Wales
C has a greater population density than in the rest of England and Wales
D has a greater number of vectors than in the rest of England and Wales

40. The most valid way to collect information on the number of people infected with TB is to count the number of

A vaccines issued
B deaths reported
C cases reported
D patients treated using DOTS

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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B1b – Topics 3 and 4

Foundation and Higher Tier

Friday 6 March 2009 – Morning

Time: 20 minutes

Materials required for examination
Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers
Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

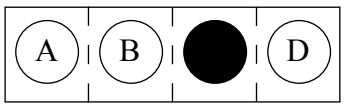
Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

Before the test begins:

Check that the answer sheet is for the correct test and that it contains your candidate details.

How to answer the test:

For each question, choose the right answer, A, B, C or D and mark it in HB pencil on the answer sheet.
For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

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Turn over

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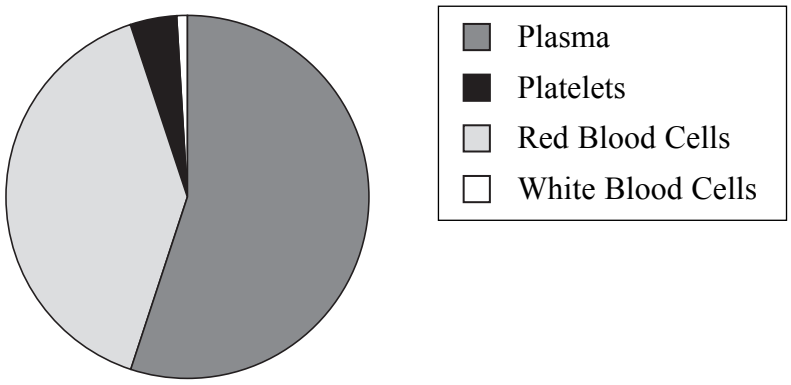
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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Simon's blood test

Simon has been feeling ill. He is tired all the time. Simon went to his doctor for a blood test. The results are shown in the pie chart.



1. Simon's blood contains mainly

A plasma
B platelets
C red blood cells
D white blood cells

2. The doctor said Simon's red blood cell count was low.
What is the role of red blood cells in the body?

A to defend against disease
B to carry oxygen
C to carry dissolved glucose
D to aid blood clotting

3. The doctor also checked the glucose levels in Simon's blood.
Hormones control glucose levels.
How are hormones carried around the body?

A bonded to red blood cells
B bonded to white blood cells
C dissolved in the plasma
D dissolved in the platelets

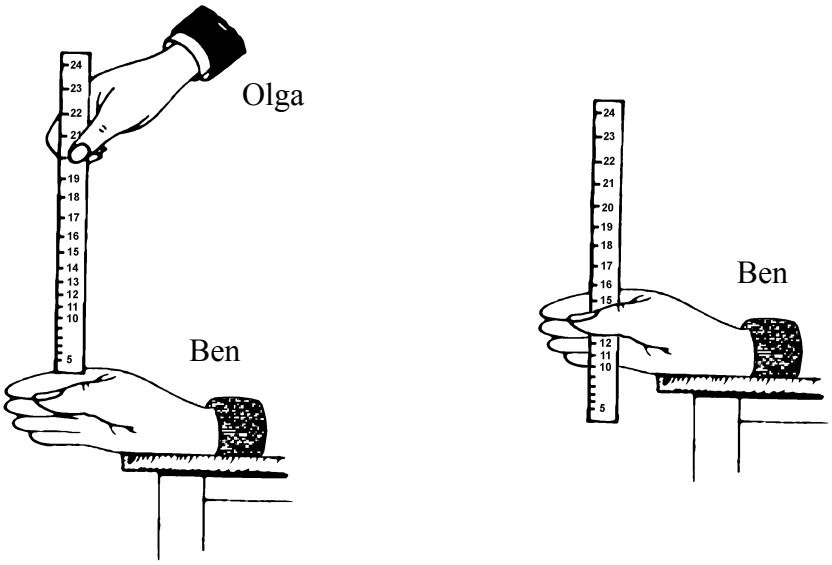
4. Which hormone controls glucose levels in the blood?

A insulin
B oestrogen
C progesterone
D testosterone

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Measuring reaction times

Olga and Ben are doing an experiment to measure their reactions. Olga drops a ruler from just above Ben's hand and he tries to catch it as quickly as possible. She repeats this experiment twice. Ben then does the same for Olga.
The results are shown in the table.



distance ruler fell before being caught	
Olga	**Ben**
15 cm	20 cm
16 cm	18 cm
11 cm	25 cm

5. What was Olga's average reaction distance?

A 14 cm
B 15 cm
C 21 cm
D 42 cm

6. What was used in this experiment to measure their reactions?

A stopwatch
B pulse meter
C ruler
D thermometer

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7. Why did they do the experiment three times?

A to make the results more reliable
B to make the results less accurate
C to get the correct result
D to make the results the same

8. What would be most likely to make Ben's reactions slower?

A using nicotine patches
B taking caffeine
C drinking alcohol
D taking paracetamol

Smoking ban hits pub profits

A poll of pub landlords showed there had been a significant loss in trade since the start of the smoking ban in July 2007.
July and August profits were down by 20% on the previous year's trade.

9. What is likely to be a cause for the reduction in trade in pubs during July and August 2007?

A people are becoming more health conscious and giving up smoking
B some people are drinking more in pubs
C people can no longer drink and smoke inside pubs
D pubs are no longer popular with non smokers

10. Why has the government banned people from smoking in public?

A to stop people drinking as much alcohol
B to protect people from the effects of tobacco smoke
C to increase the number of people smoking at home
D to increase the taxes from tobacco

11. Smoking cigarettes causes lung cancer because

A the nicotine is addictive
B the tar is addictive
C the nicotine is a carcinogen
D the tar is a carcinogen

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12. Carbon monoxide is produced when smoking cigarettes.
This can cause problems because carbon monoxide

A stops the red blood cells from carrying as much oxygen
B makes the heart beat slower
C is a major contributor to global warming
D is very addictive

Julia's fright

13. Julia was driving down the motorway when, out of the corner of her eye, she saw a plane rising into the air. This caused her to duck and she almost crashed her car.
This response is known as the ducking reflex.
What type of response is this?

A involuntary response
B voluntary response
C accommodation
D the iris reflex

14. Accommodation ensures that you can

A focus on near and distant objects
B move yourself out of danger
C react to light to protect the retina
D react to light to protect the lens

15. Which parts of the eye enable accommodation to take place?

A lens and pupil
B lens and ciliary muscle
C iris and ciliary muscle
D iris and pupil

16. As you get older your eyes are less able to change focus. Many older people have to wear glasses.
Glasses for people who cannot focus on distant objects

A magnify images to enable people to see close objects
B magnify images to enable people to see distant objects
C allow the lens of the eye to focus on distant objects
D alter the shape of the lens of the eye to allow focussing

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Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Caffeine

Caffeine is a drug that speeds up the transmission of nerve impulses.

17. What is the name given to this type of drug?

A depressant
B hallucinogen
C analgesic
D stimulant

18. What is the most common method of taking caffeine?

A injection
B drinking
C smoking
D inhaling

19. People sometimes take caffeine supplements.
What is the most likely reason to take a caffeine supplement?

A to increase alertness
B to increase reaction time
C to aid sleep
D to reduce pain

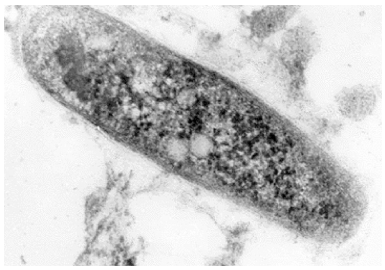
20. Caffeine causes faster communication between two neurones.
Which row of the table correctly describes the gap between the neurones and the method of communication?

	gap between neurones	**method of communication**
A	synapse	electrical
B	synapse	chemical
C	relay	electrical
D	relay	chemical

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Tuberculosis (TB)

The picture shows an organism that causes tuberculosis.



21. What type of organism causes tuberculosis?

A bacteria
B fungi
C protoctista
D virus

22. Organisms that cause diseases like tuberculosis or malaria are

A antibodies
B antigens
C vectors
D pathogens

23. How does the body try to get rid of a tuberculosis infection?

A white blood cells ingest the organism
B red blood cells ingest the organism
C antigens break down the organism
D antibodies break down the organism

24. Tuberculosis is most likely to be spread

A in water
B through droplets in the air
C by insects
D by hand to hand contact

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

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Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Mosquitoes

Mosquitoes are carriers of the protozoan *Plasmodium.*
Plasmodium can pass into the bloodstream of a person and cause malaria.

25. What is this type of disease transmission?

A direct contact
B indirect contact
C vertical infection
D vector borne

26. What is the body's main physical barrier against malaria?

A the cilia
B the skin
C white blood cells
D vaccination

27. When mosquitoes suck human blood it can cause an inflammatory response.
The inflammatory response is part of the second line of defence against infection.
Another second line of defence involves

A white blood cells ingesting bacteria
B red blood cells ingesting a virus
C white blood cells producing antibodies
D platelet formation under the skin

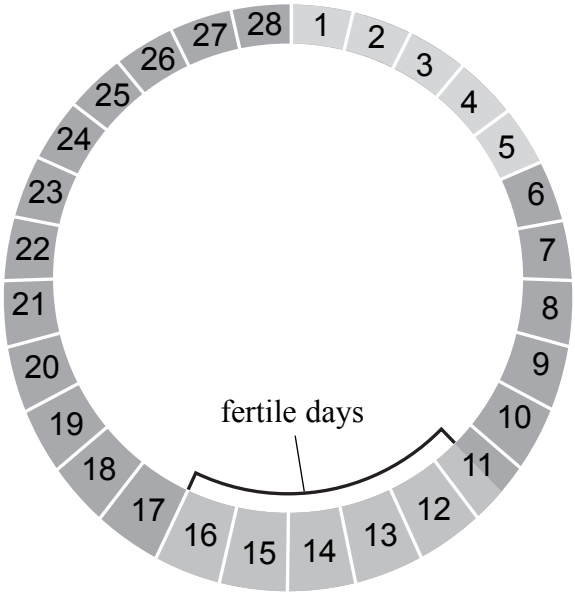
28. Dogs are vectors of rabies, a disease caused by a virus. The virus is transmitted to humans in a similar way to *Plasmodium.*
Rabies is passed to humans by

A dogs licking food for human consumption
B dog faeces being touched by humans
C dogs biting through human skin
D dog fleas biting through human skin

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The menstrual cycle

The diagram shows Janet's usual menstrual cycle.
She is a 53 year old woman who is not pregnant.



29. What happens between day 1 and day 5 of the menstrual cycle?

A fertilisation
B implantation
C menstruation
D ovulation

30. In which part of the cycle is Janet most likely to ovulate?

A days 1 – 5
B days 11 – 16
C days 17 – 21
D days 22 – 28

31. What is the most likely cause of high levels of oestrogen and progesterone throughout the whole of the menstrual cycle?

A Janet is constantly menstruating
B Janet is infertile and cannot ovulate
C Janet is pregnant with twins
D Janet is taking the combined contraceptive pill

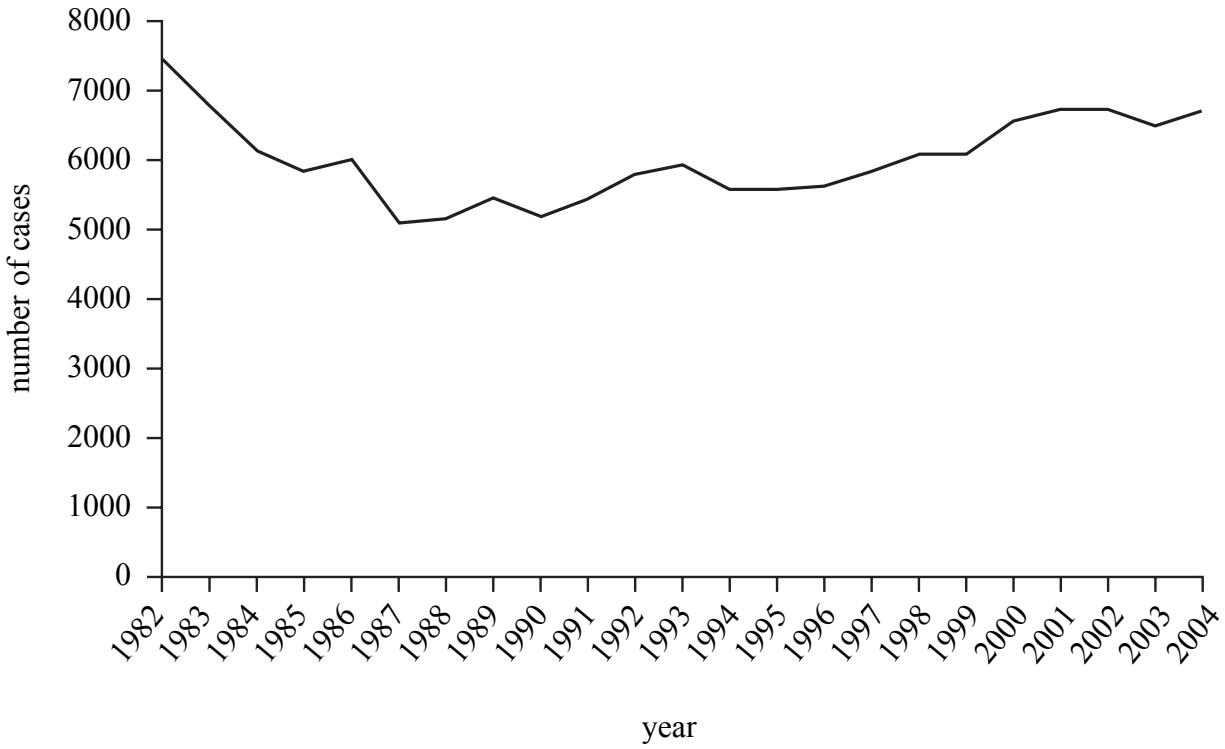
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32. What would be an ethical concern of giving IVF treatment to Janet in particular?

A IVF is more likely to result in multiple births
B IVF involves the use of genetically modified embryos
C Janet is more likely to have health problems
D Janet can choose the sex of her baby with IVF

Tuberculosis (TB) trends

The following graph shows the number of cases of TB in Britain between 1982 and 2004.



33. Using information from the graph, which of the following statements is correct?
The number of cases of TB

A has fallen steadily since 1982
B has remained steady
C was at its lowest in 1987
D has fallen below 5000 only once

34. What is the most likely reason for the increase in TB cases since 1995?

A decreased population in Britain
B decreased numbers of immigrants into Britain
C increased numbers of people relocating to rural areas
D increased numbers of people in urban areas

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35. TB can now be cured using drug therapy and DOTS.
Why would this treatment be a problem for the health service?

A the treatment is expensive in terms of drugs only
B the treatment is expensive in terms of drugs and staff
C the treatment needs funding for new drug development
D the treatment cannot be carried out in hospitals

36. These are 2 statements about the treatment of tuberculosis

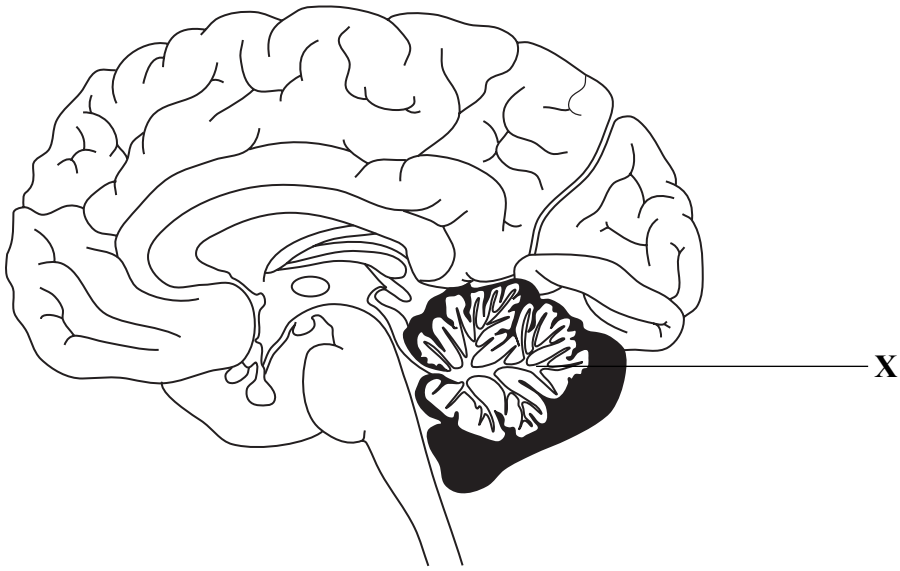
1 DOTS treatment relies on the use of one expensive antibiotic
2 Some strains of tuberculosis are resistant to antibiotics

Which statements are **not** true?

A 1 only
B 2 only
C both 1 and 2
D neither 1 or 2

The amazing human brain

The human brain is an incredible organ. It controls many of the responses in the human body and yet we only use a very small proportion of it.



37. The section labelled X is the part which controls balance and muscles.
What is the name of this section of the brain?

A cerebellum
B cerebral hemispheres
C medulla
D pituitary gland

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38. Which section of the brain controls automatic responses such as breathing?

A cerebellum
B cerebral hemispheres
C medulla
D pituitary gland

39. Some responses are known as reflexes.
What is the correct pathway for a reflex from stimulus to response?

A receptor → sensory neurone → relay neurone → motor neurone → effector
B receptor → relay neurone → sensory neurone → motor neurone → effector
C effector → sensory neurone → relay neurone → motor neurone → receptor
D effector → motor neurone → relay neurone → sensory neurone → receptor

40. These are two statements about diseases that affect the brain

1 Grand mal epilepsy affects the electrical signals in the brain
2 Parkinson's disease causes the body to shake uncontrollably

Which statements are true?

A 1 only
B 2 only
C both 1 and 2
D neither 1 or 2

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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