

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**

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.**

**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?

	<b>solvents</b>	<b>alcohol</b>
<b>A</b>	yes	no
<b>B</b>	no	yes
<b>C</b>	yes	yes
<b>D</b>	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

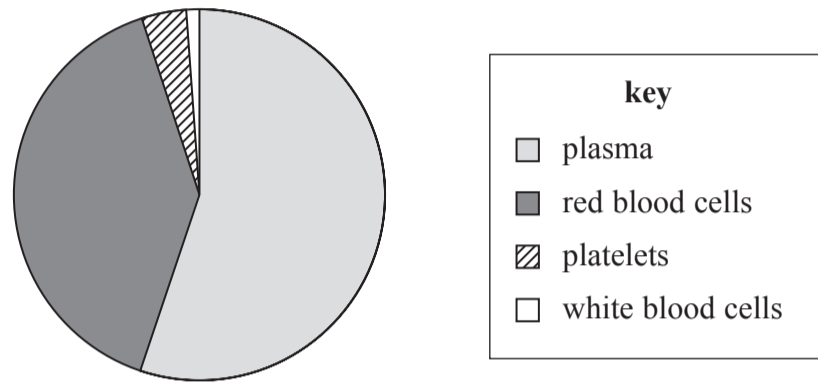
4. Paracetamol can only be bought in small amounts because an overdose can cause

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

### Richard's blood

Richard had a blood sample taken at the hospital.

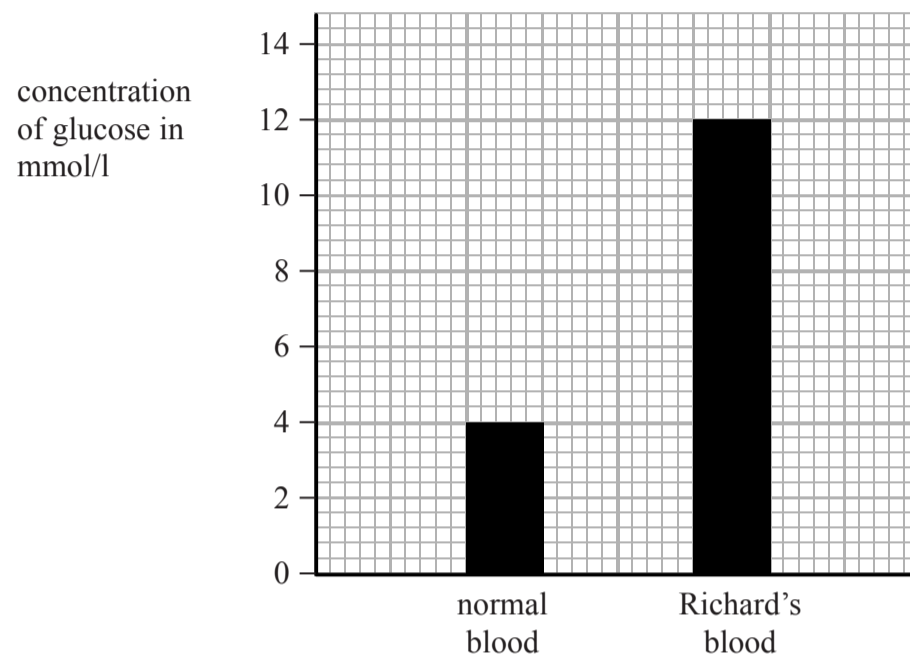
5. The pie chart shows the four main parts of Richard's blood.



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

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?

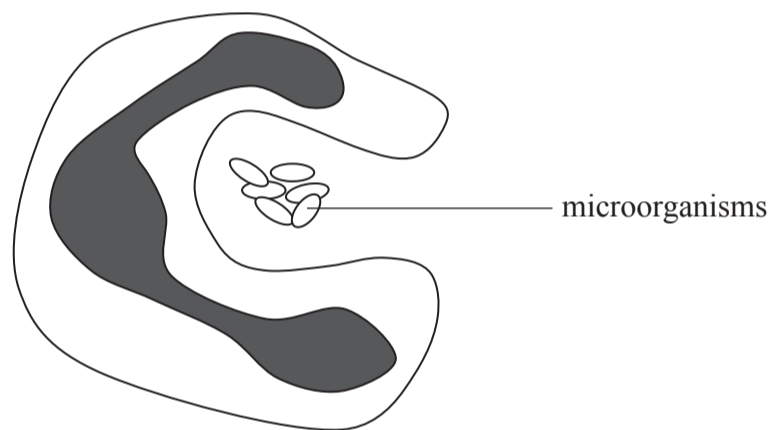
- A 4 mmol/l  
 B 8 mmol/l  
 C 10 mmol/l  
 D 12 mmol/l
9. The doctor explained that Richard's blood glucose concentration was too high because his pancreas was not making enough
- A insulin  
 B glycogen  
 C antigens  
 D plasma
10. Hormones control the concentration of glucose in the blood. Which 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

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

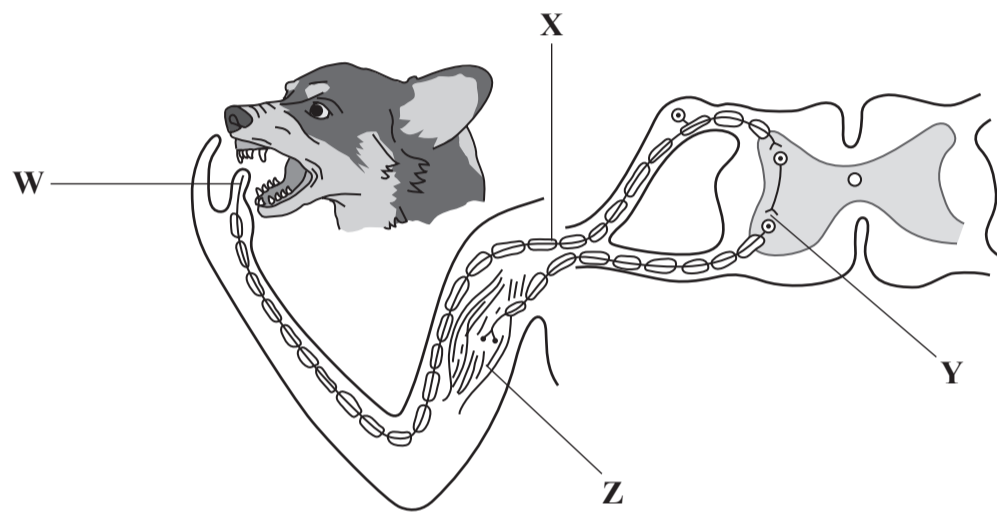
14. What name is given to microorganisms that cause disease?
- A pathogens
  - B vectors
  - C foreign bodies
  - D antigens
15. How many of these statements are correct for TB?
- TB is caused by a bacterium
  - TB is transmitted from person to person through airborne droplets
  - TB is spread more rapidly 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

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

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.

age (years)	number of		
	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



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**

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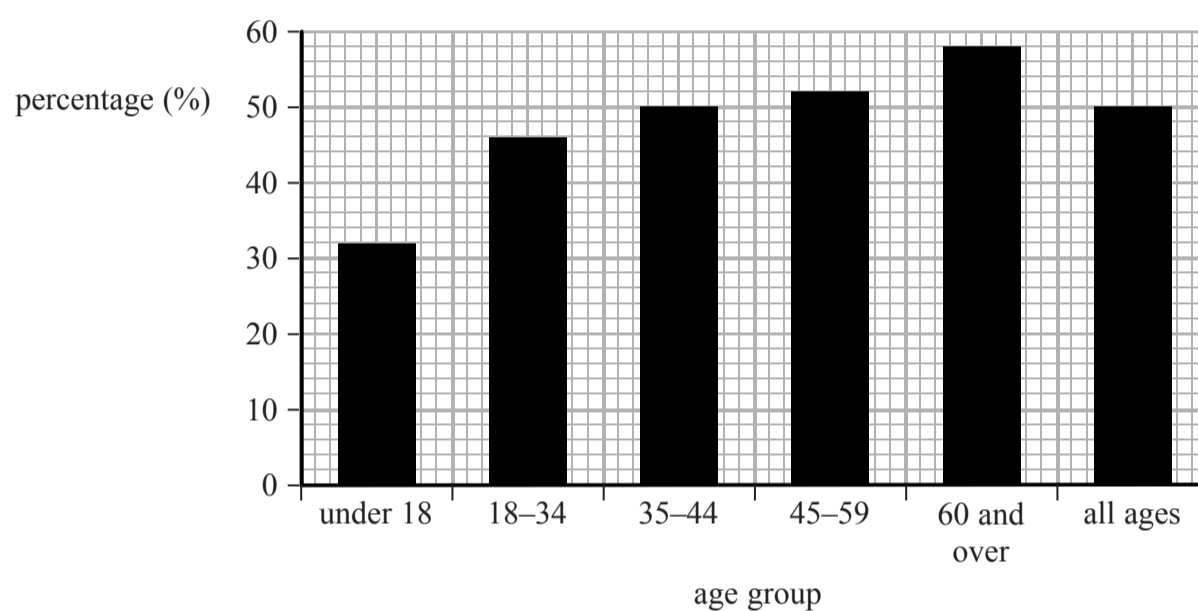
**Foundation tier candidates do not answer any more questions after question 24.**

**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

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

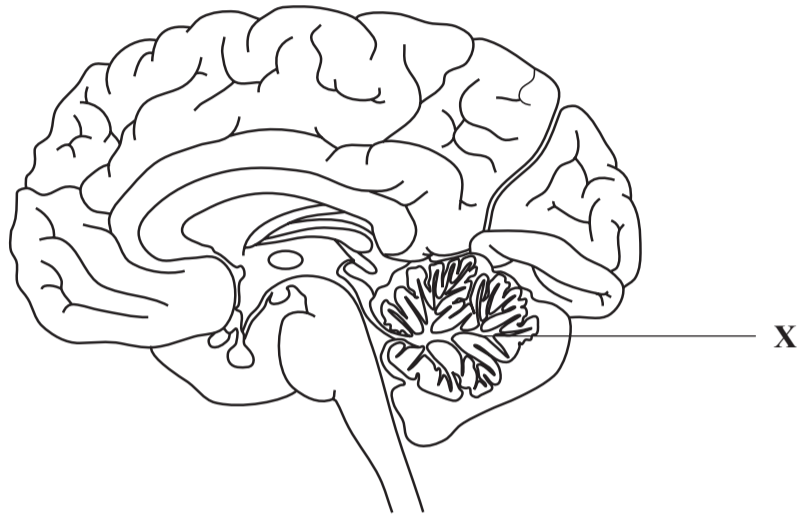
The menstrual cycle is controlled by several hormones.  
The concentration of these hormones inside a female can be altered using different drugs which can increase or decrease the chance of becoming pregnant.

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

- 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

**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

### 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
<b>Armenia</b>	357	374	368	352	331	306	308	313
<b>Azerbaijan</b>	819	841	843	911	848	861	872	882
<b>Belgium</b>	158	167	158	150	144	144	137	129
<b>Bulgaria</b>	420	462	450	417	370	412	367	398
<b>Czech Republic</b>	176	158	145	134	127	120	111	103
<b>Germany</b>	927	832	728	694	644	591	541	491
<b>Italy</b>	572	541	542	518	509	503	496	532
<b>United Kingdom</b>	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

*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

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**TOTAL FOR HIGHER TIER PAPER: 24 MARKS**

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