

Surname	Initial(s)
Signature	

Paper Reference(s)

**5006                      5026**

# **Edexcel GCSE**

**Science (5006)**

**Biology (5026)**

B1b – Topics 3 and 4

**Foundation and Higher Tier**

Friday 5 March 2010 – 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.

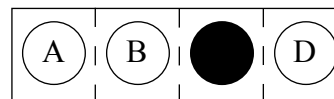
**Before the test begins:**

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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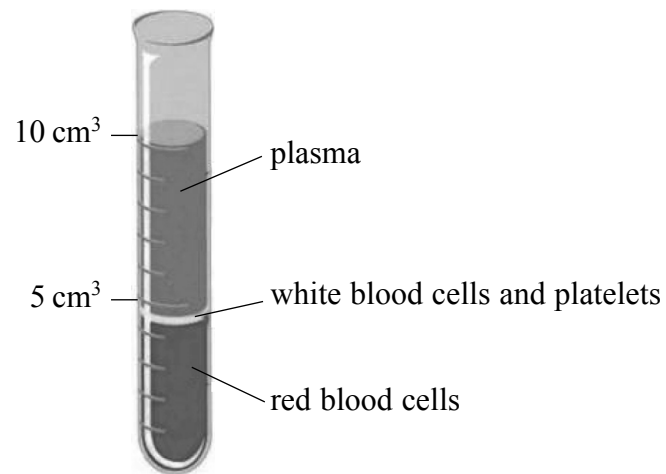
*Turn over*

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**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  $\text{cm}^3$  of Graham's blood sample was plasma?  
**A** 1.0  $\text{cm}^3$   
**B** 4.5  $\text{cm}^3$   
**C** 5.5  $\text{cm}^3$   
**D** 10.0  $\text{cm}^3$
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

### 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		Hearing the fly	
attempt	time (seconds)	attempt	time (seconds)
1	0.499	1	0.717
2	0.396	2	0.441
3	0.398	3	0.562
mean	0.431	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

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

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

**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?

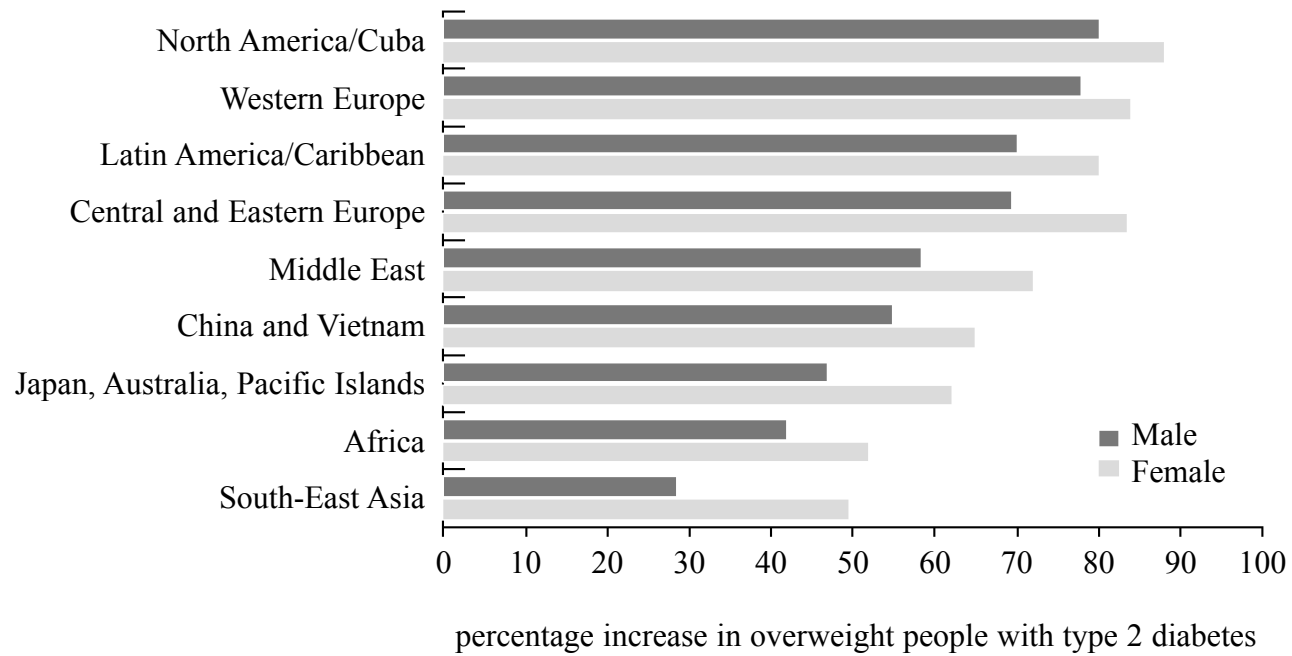
- A 3
- B 4
- C 7
- D 40

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

### 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

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**

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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.

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

### 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

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

Estimated Tuberculosis Deaths  
1990 – 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

### 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

**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

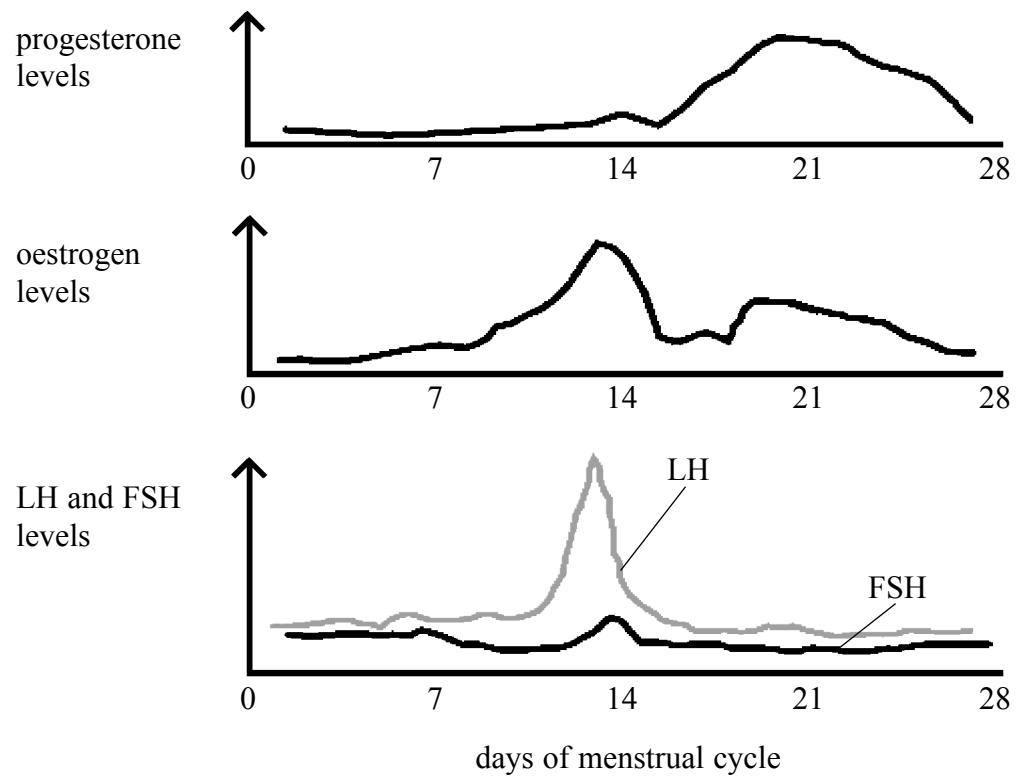
How many of these statements are true?

- A** none
- B** one
- C** two
- D** three

### 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

**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**

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**END**

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