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Paper Reference(s)

**5006                      5026**

# **Edexcel GCSE**

## **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**

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.

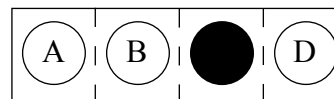
**Before the test begins:**

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

**Your senses**

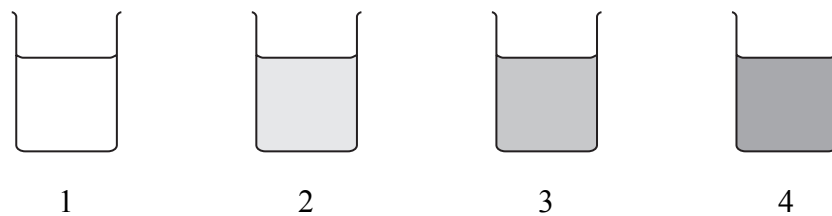
Three students were asked to take part in an investigation where they had to decide on the sweetness of four drinks.

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

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

### 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

### 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.

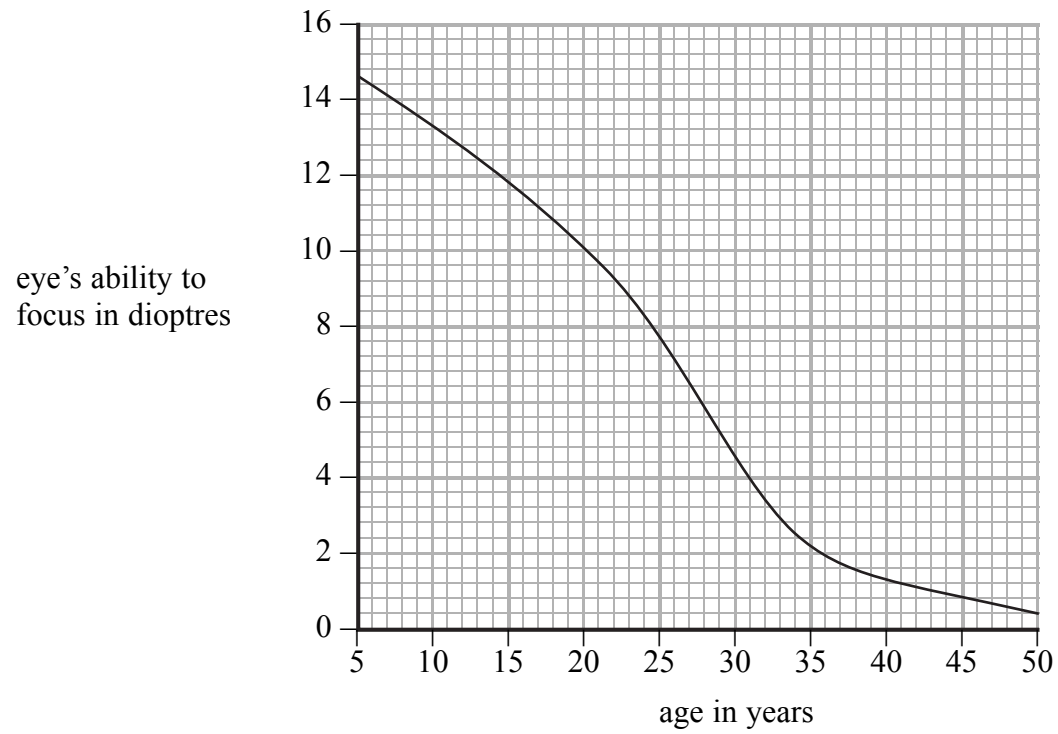
13. Which part of the eye changes its shape when focusing?

- 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

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?

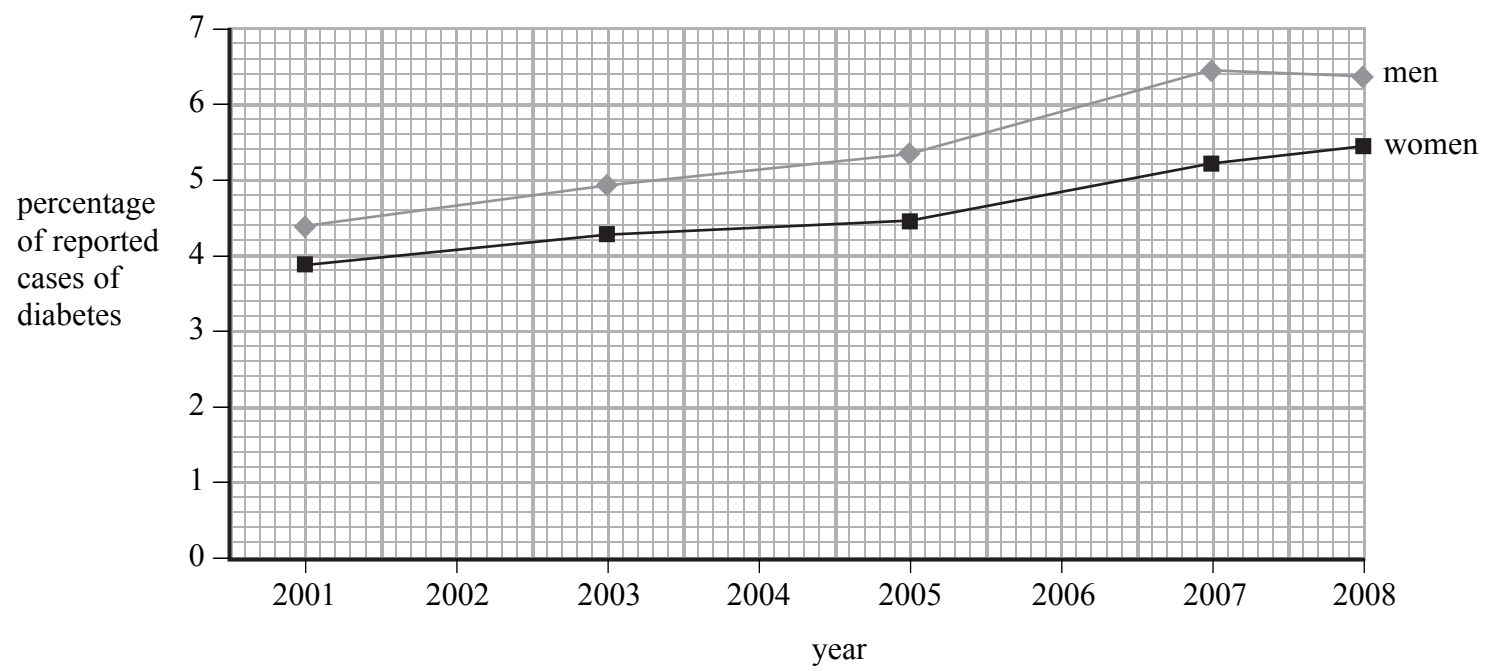
- A At age 31 the eye can focus half as well as it can at age 20
  - B The ability of the eye to focus increases with age
  - C The ability of the eye to focus decreases with age
  - D There is no link between age and the ability to focus
16. There is a substance in human tears which helps to destroy bacteria.  
This substance is

- A oestrogen
- B insulin
- C lysozyme
- D glucose

**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

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

|          | <b>hormone</b> | <b>organ which releases this hormone</b> |
|----------|----------------|--|
| <b>A</b> | insulin        | liver                                    |
| <b>B</b> | insulin        | pancreas                                 |
| <b>C</b> | oestrogen      | liver                                    |
| <b>D</b> | 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?

|          | <b>type of drug</b> | <b>effect on reaction times</b> |
|----------|---------------------|---------------------------------|
| <b>A</b> | stimulant           | increases                       |
| <b>B</b> | stimulant           | decreases                       |
| <b>C</b> | depressant          | increases                       |
| <b>D</b> | depressant          | decreases                       |



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**

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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.**

**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

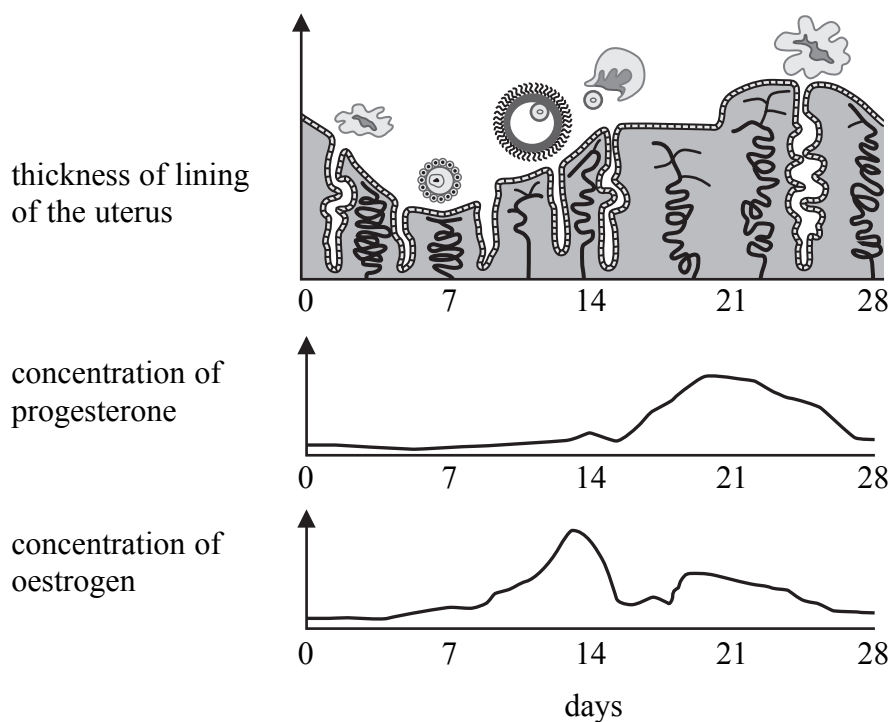
### Infertility

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

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 |

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

- 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?

| <b>methods of transmission</b> |                           |                                 |
|--------------------------------|---------------------------|---------------------------------|
|                                | <b>sexual activity</b>    | <b>sharing infected needles</b> |
| <b>A</b>                       | direct horizontal contact | vehicle borne                   |
| <b>B</b>                       | direct vertical contact   | vector borne                    |
| <b>C</b>                       | direct horizontal contact | vector borne                    |
| <b>D</b>                       | direct vertical contact   | vehicle borne                   |

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

**END**

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