| 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 12 November 2010 – Afternoon

Time: 20 minutes

| **Materials required for examination** | **Items included with question papers** |
|---|---|
| Multiple Choice Answer Sheet<br>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.

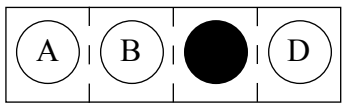
**Foundation tier candidates:** answer questions 1 – 24.
**Higher tier candidates:** answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

**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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***Turn over***



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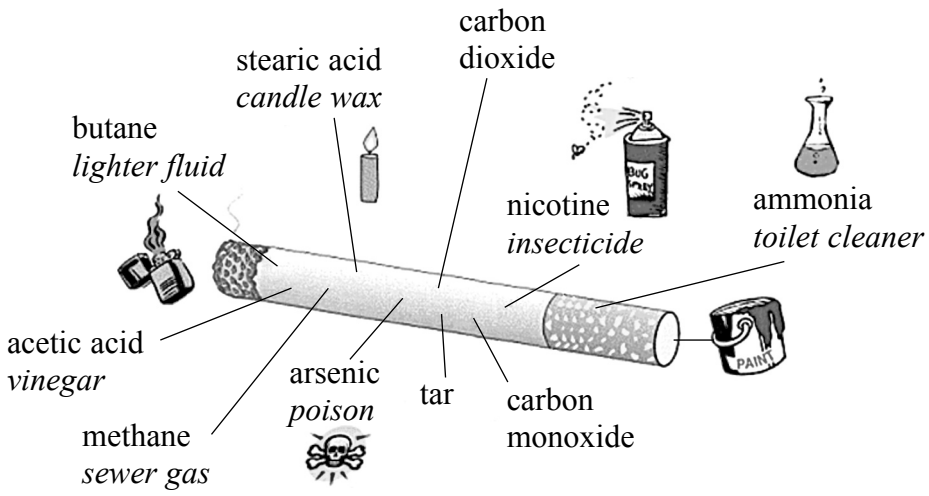
**Questions 1 to 16 must be answered by Foundation tier candidates only.**
**Higher tier candidates start at question 17.**

## The 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

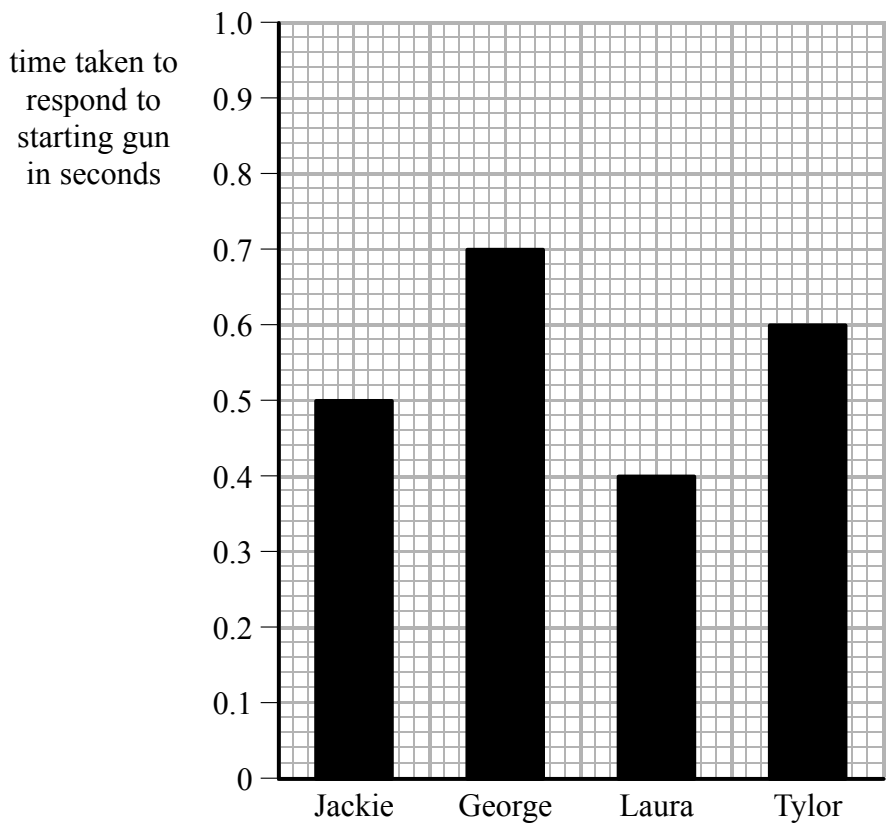
**4.** Smokers are more likely to get lung infections than non-smokers.
These lung infections can be caused by viruses carried

**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

**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.

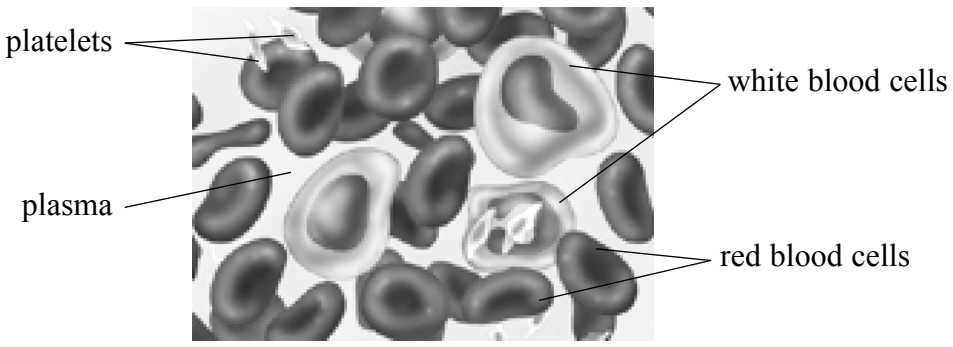
| **student** | **drink** |
|---|---|
| Jackie | wine |
| George | coffee |
| Laura | water |
| Tylor | beer |

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

## 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

**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

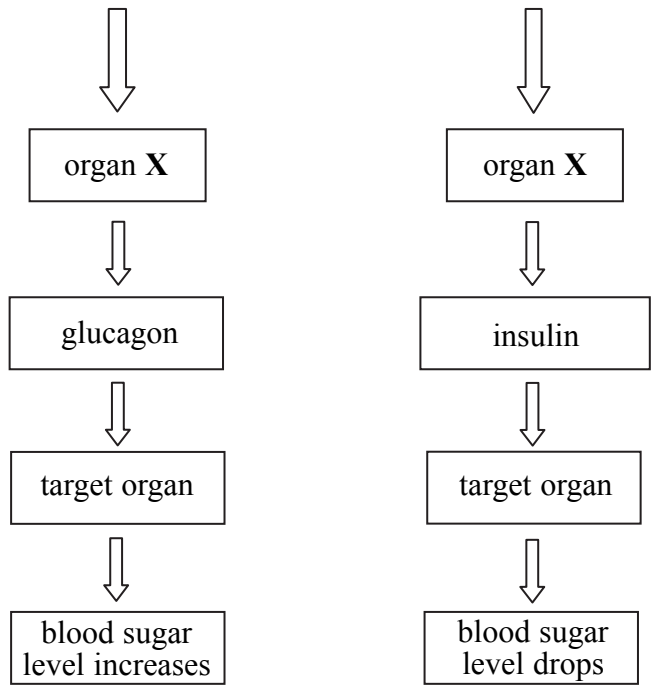
**A** none
**B** one
**C** two
**D** three

**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

**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

**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**

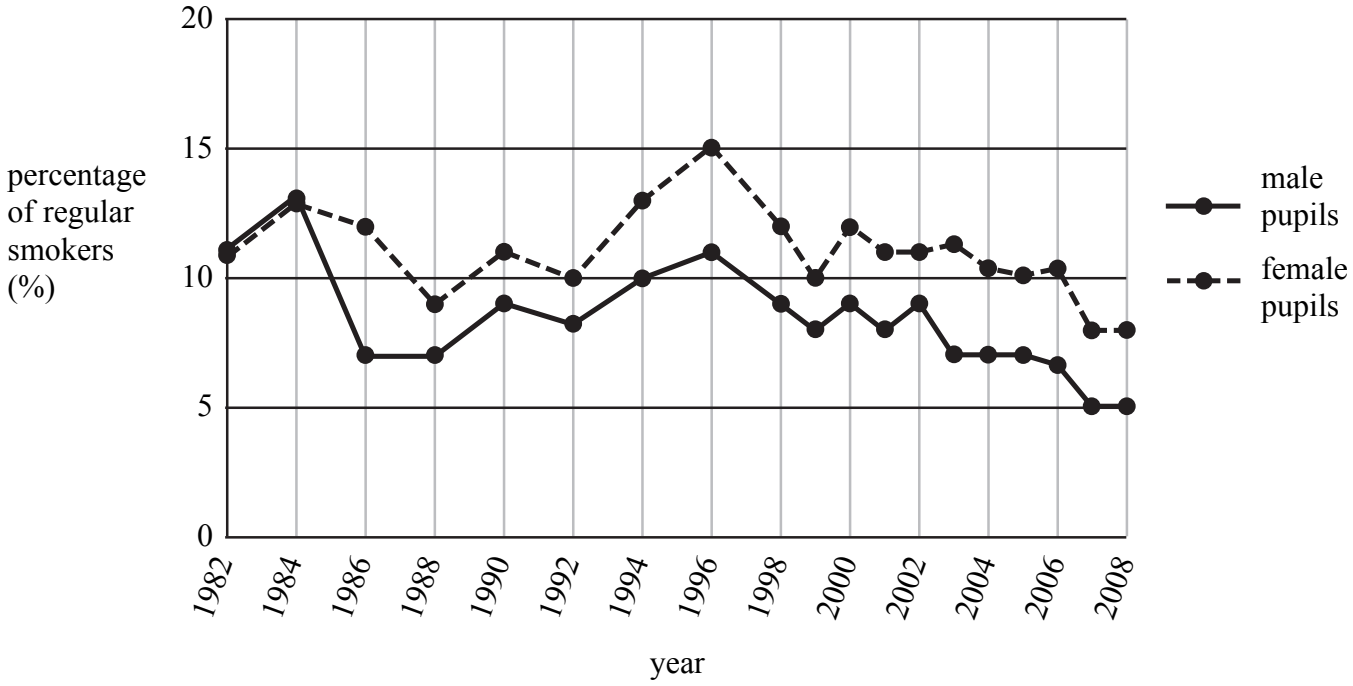
**Foundation tier candidates do not answer any more questions after question 24.**

**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

**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?

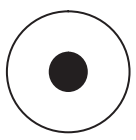
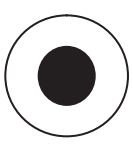
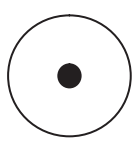
- nicotine does not affect the circulatory system
- opiates act at the synapses which helps to relieve pain
- alcohol and cannabinoids slow down nerve transmission

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

## 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

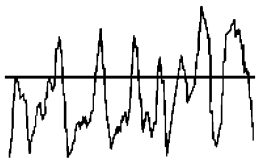
**31.** The changes in the size of the pupil are brought about by

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

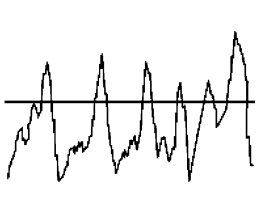
**32.** Brain injuries can reduce the amount of oxygen going to the brain.
A lack of oxygen to the brain could result in

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

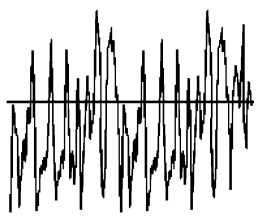
**33.** An EEG (electroencephalograph) can be used to measure electrical activity in the brain.
The diagram shows an EEG of a healthy person.



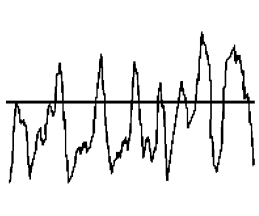
Which EEG is most likely to be that of a person suffering from an epileptic seizure?



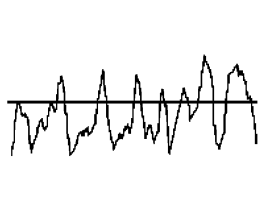
**A**



**B**

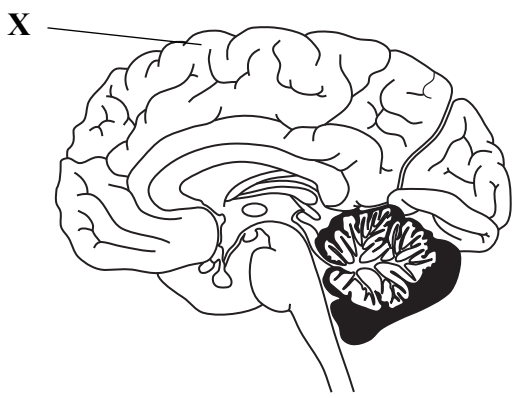


**C**



**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

## 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

**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**

**END**

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