

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 19 June 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.

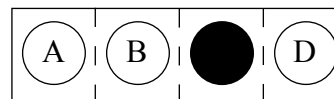
Before the test begins:

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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**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

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

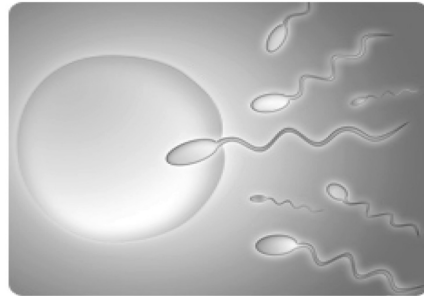
7. Which drug can slow down our reactions?

- 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

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

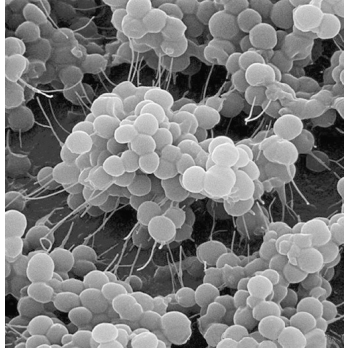
11. Contraceptive pills contain hormones which prevent a woman from becoming pregnant.
One of these hormones is called

- 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

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.

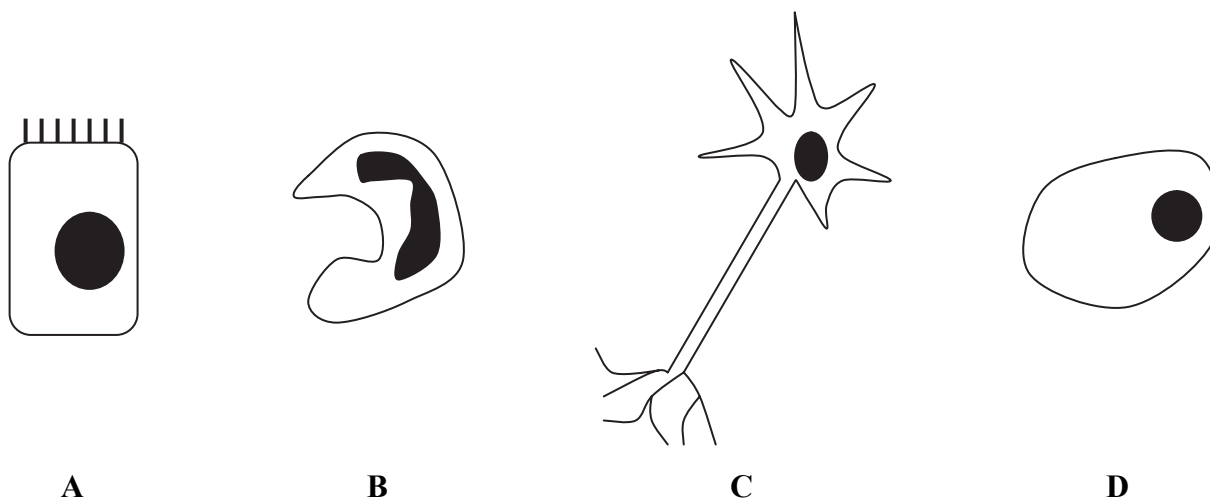
13. What name is given to a microbe that causes disease?

- 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.



Which cell ingests microbes inside our body?

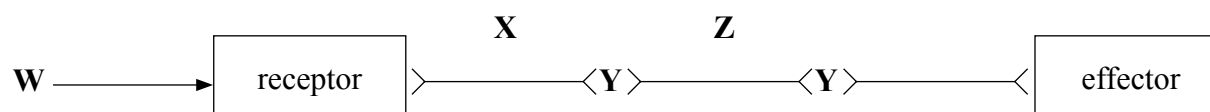
- 16.** Bluetongue is a disease that affects sheep and cattle. Tiny biting insects pierce the skin and inject the bluetongue microbe into the blood of the animal.
This type of disease transmission is known as
- A** vector-borne
 - B** vehicle-borne
 - C** direct contact
 - D** horizontal contact

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.

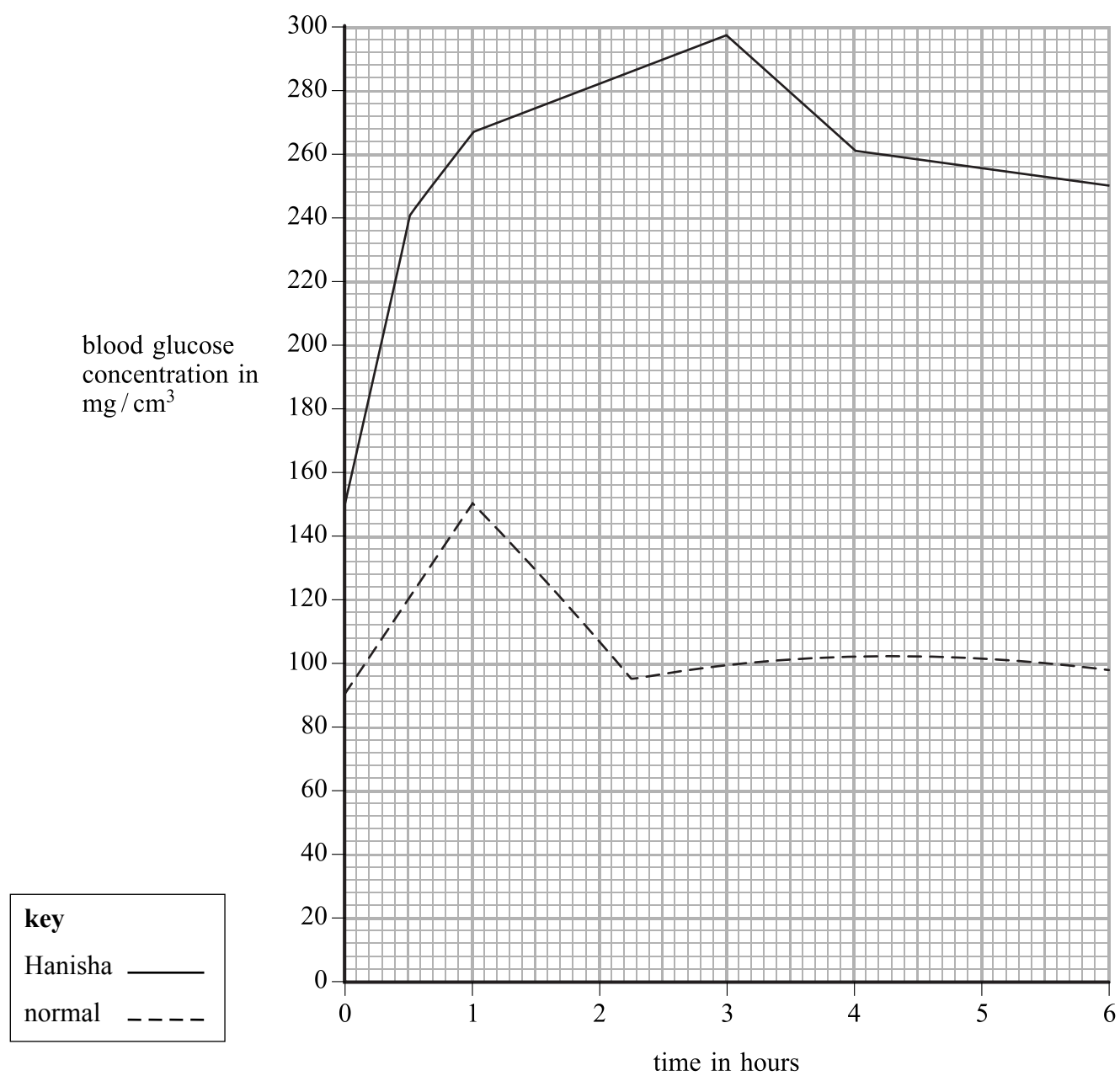


17. W is
- A a neurone
 - B a stimulus
 - C a synapse
 - D a response
18. Z is
- A a sensory neurone
 - B a motor neurone
 - C a synapse
 - D a relay neurone
19. Which letter on the diagram represents a synapse?
- A W
 - B X
 - C Y
 - D Z
20. What is the effector that responds to changes in light intensity?
- A iris
 - B lens
 - C pupil
 - D ciliary muscle

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

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

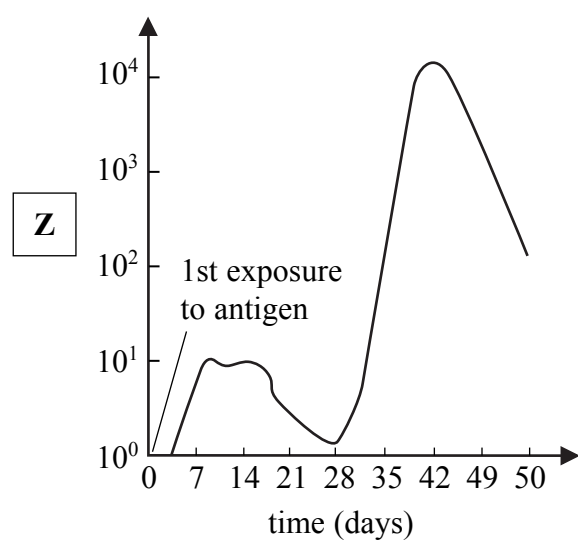
TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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.

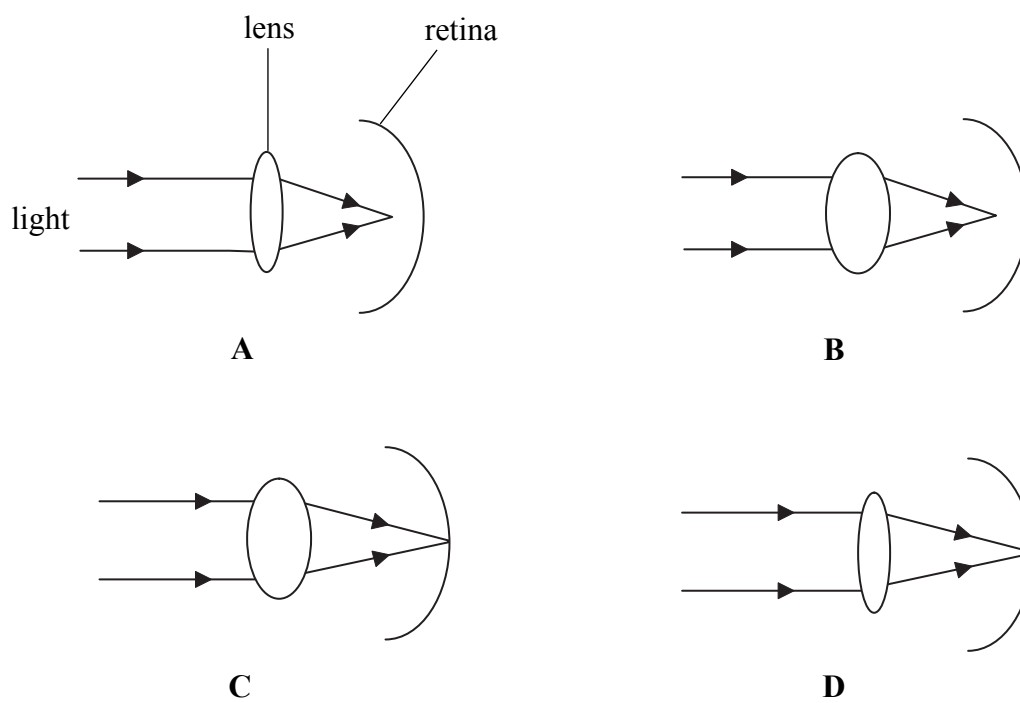


25. Z on the graph represents the concentration of
- A red blood cells
 - B white blood cells involved in ingestion
 - C antibodies
 - D antigens
26. On what day did a second exposure to the same antigen occur?
- A 7
 - B 14
 - C 28
 - D 42
27. Our third line of defence is also known as the specific 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

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

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

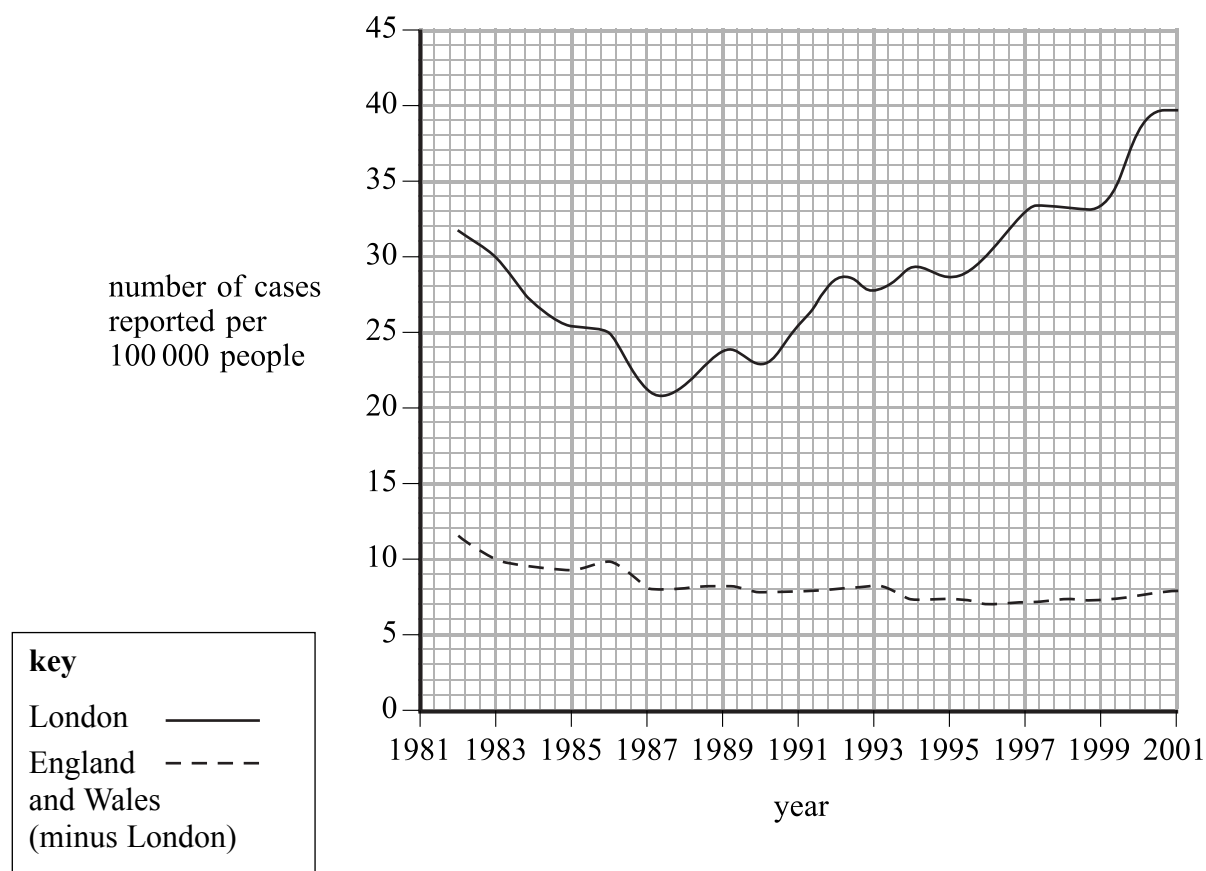
- 35.** Brain function can be altered by factors other than drugs. Blocked blood vessels can reduce the amount of oxygen reaching certain parts of the brain.
This could cause
- A** Parkinson's disease
 - B** a stroke
 - C** epilepsy
 - D** brain tumours
- 36.** Progesterone can cause premenstrual tension (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

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

- 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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