

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 20 November 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.

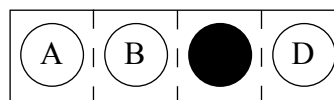
Before the test begins:

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

Smokers to face picture warnings

Pictures showing the dangers of smoking will be printed on all tobacco products by the end of 2009.

The minimum age for buying tobacco in England and Wales has also been increased from 16 to 18, bringing it in line with the age for buying alcohol.

1. Smoking tobacco causes
 - A liver disease
 - B heart disease
 - C viral infections
 - D diabetes

2. Pregnant women who smoke put the health of their unborn babies at risk. A substance in cigarette smoke attaches to red blood cells. It stops the unborn baby from receiving enough oxygen. What is this substance?
 - A carbon dioxide
 - B nicotine
 - C carbon monoxide
 - D tar

3. Some people buy products to help reduce their craving for cigarettes. What substance in these products helps people to reduce their craving for cigarettes?
 - A nicotine
 - B carbon monoxide
 - C caffeine
 - D tobacco

4. It is illegal for anyone under the age of 18 to buy alcohol. Which organ is most damaged by drinking a lot of alcohol?
 - A heart
 - B lungs
 - C brain
 - D liver

Blood and disease

A blood transfusion is when donated blood is passed directly into the blood of a patient through a needle.

5. These statements are some functions of the blood.

- fight infections
- deliver nutrients to the cells
- provide muscles with oxygen

How many of these statements are functions of red blood cells?

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

6. Blood is checked for disease-causing organisms before it is given to a patient. Disease-causing organisms are called

- A** antigens
- B** antibodies
- C** pathogens
- D** infections

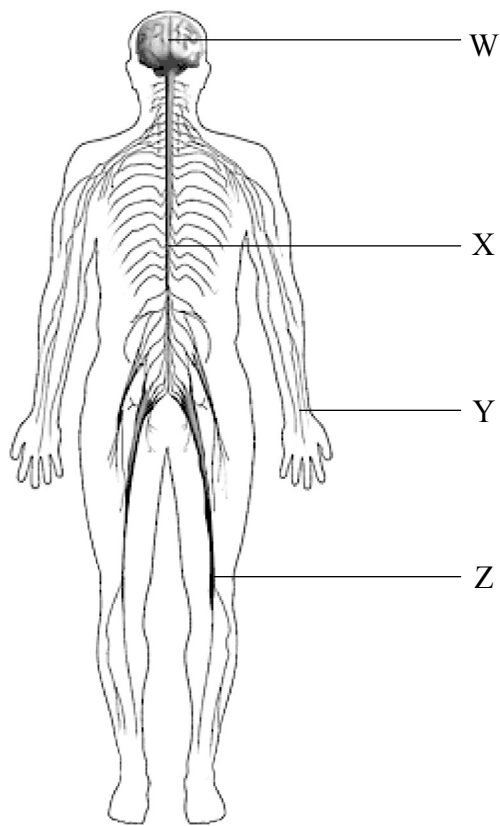
7. A person could catch a disease if 'dirty' needles were used. What is this type of disease transmission called?

- A** direct horizontal
- B** direct vertical
- C** vector-borne
- D** vehicle-borne

8. Which row of the table shows the cause of tuberculosis (TB) and how it is transmitted from person to person?

	cause of TB	transmission
A	virus	through sneezing
B	bacteria	through sneezing
C	virus	through drinking water
D	bacteria	through drinking water

Our nervous system



9. Which letters on the diagram represent the central nervous system (CNS)?
- A W and X
 - B W and Y
 - C X and Y
 - D X and Z
10. Our peripheral nervous system is made up of
- A motor neurones only
 - B sensory neurones only
 - C relay neurones only
 - D sensory and motor neurones

11. Which row of the table shows how messages are carried across synapses and around the body by our nervous system?

	across synapse	around the body
A	electrical	electrical
B	chemical	chemical
C	electrical	chemical
D	chemical	electrical

12. The list below shows some drugs that affect our nervous system.

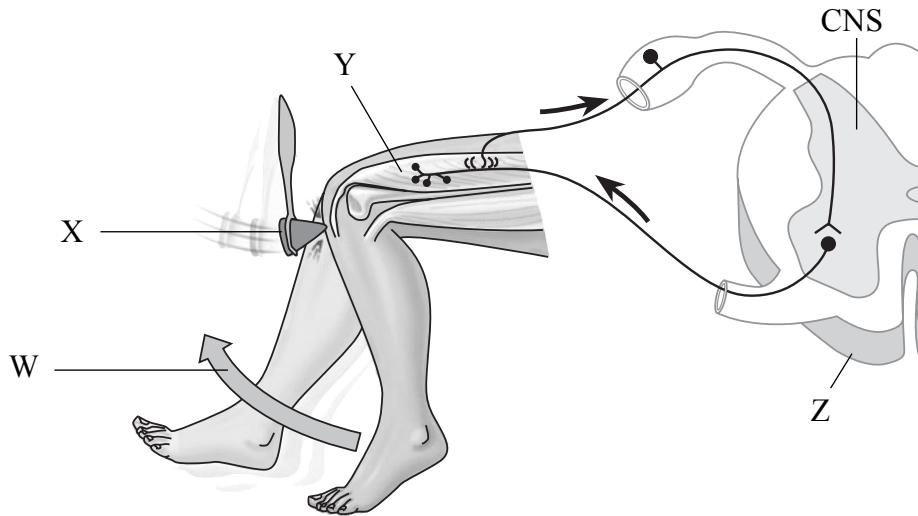
- caffeine
- cannabis
- a sedative
- nicotine

How many of these drugs will slow down reactions?

- A** one
B two
C three
D four

Testing reactions

Doctors can carry out a knee jerk test to find out the health of a patient's nervous system. The base of the knee is tapped gently with a rubber hammer. A quick response by the patient indicates a healthy nervous system.



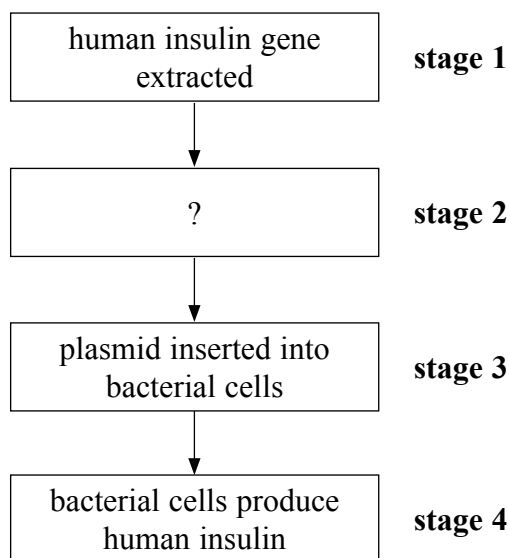
13. The response to the knee jerk test is caused by a stimulus. Which letter represents the stimulus?
- A W
 - B X
 - C Y
 - D Z
14. Which letter represents the effector organ in the knee jerk test?
- A W
 - B X
 - C Y
 - D Z
15. The neurone from the CNS to the effector organ is a
- A receptor neurone
 - B sensory neurone
 - C motor neurone
 - D relay neurone
16. A person cannot control their response to the knee jerk test. The knee jerk response is an example of
- A a voluntary reflex action
 - B a voluntary non-reflex action
 - C an involuntary reflex action
 - D an involuntary non-reflex action

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.

Making use of hormones

Use the information to help you answer questions 17 and 18.

The diagram below shows the stages involved in producing human insulin from bacteria.



17. Stage 2 involves

- A inserting the human insulin gene into human DNA
- B inserting the human insulin gene into plasmids
- C cutting out the human insulin gene from human DNA
- D cutting out the human insulin gene from bacterial plasmids

18. An advantage of stage 4 is that

- A humans have fewer side effects from insulin produced by mammals
- B bacteria need to have special conditions in which to grow and produce insulin
- C it is cheaper and less time consuming to produce large amounts of insulin
- D vegetarians cannot use insulin as it is made by bacteria

19. Which row of the table shows the human organ which produces insulin and the target organ for the insulin?

	organ producing insulin	target organ
A	kidneys	liver
B	pancreas	kidneys
C	kidneys	pancreas
D	pancreas	liver

20. Some people with diabetes cannot produce insulin. These people need to take medication to
- A raise blood glucose levels
 - B lower blood glucose levels
 - C make target cells less sensitive to glucose
 - D increase the amount of glucose produced by cells

Having babies

Use the information in the table to answer questions 21 and 22.

The table shows a comparison between the number of births after fertility treatment and the number of births by women who did not have fertility treatment in the UK in 2006.

	total number of births	number of single births	number of twins	number of triplets or more
women with fertility treatment	10 242	7 922	2 286	34
all UK births (including women with fertility treatment)	737 679	726 482	10 963	149

21. What was the total number of single births without fertility treatment?
- A 7 922
 - B 10 242
 - C 718 560
 - D 737 679
22. The data from the table suggests that
- A more women are receiving fertility treatment than ever before
 - B fewer women are receiving fertility treatment than ever before
 - C women receiving fertility treatment are more likely to have twins or triplets
 - D women receiving fertility treatment are less likely to have twins or triplets
23. Eggs can be fertilised with sperm outside the body. This is called
- A *in vitro* fertilisation
 - B *in vivo* fertilisation
 - C *in utero* fertilisation
 - D *inter-utero* fertilisation

24. The use of fertility treatment raises ethical issues for some people.
The reason for this is because fertility treatment
- A always results in multiple births
 - B is only given to clients over the age of 50
 - C is only given to women on high income
 - D produces many embryos some of which are discarded

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

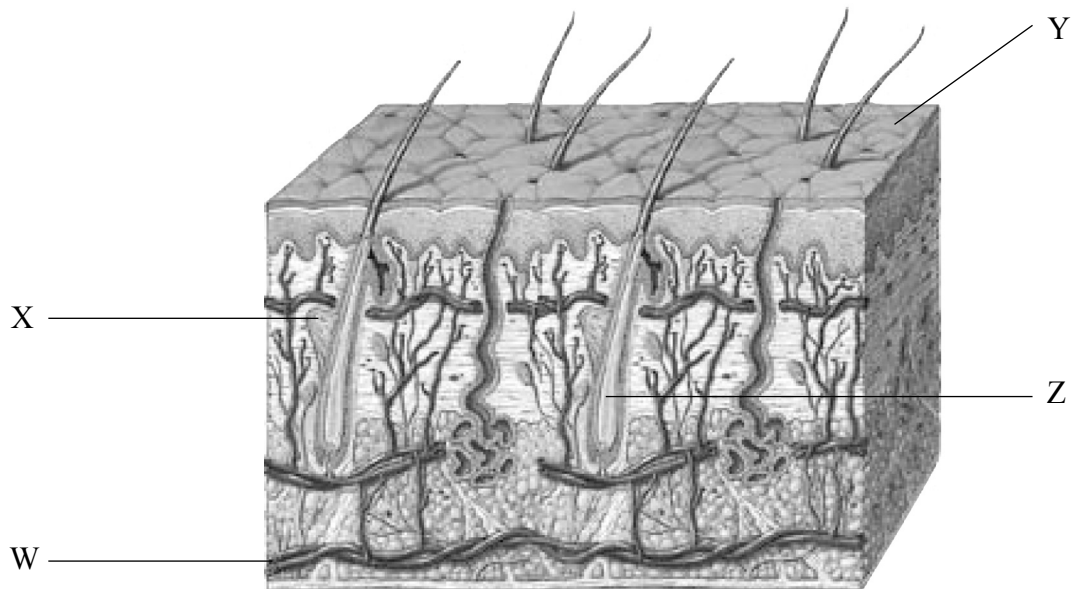
Foundation tier candidates do not answer any more questions after question 24.

Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Defence against disease

Use the diagram to help you answer questions 25 and 26.

The diagram shows the structure of the skin.



25. Which is a physical barrier against microorganisms?

- A W
- B X
- C Y
- D Z

26. Which produces a substance that acts as a chemical barrier against microorganisms?

- A W
- B X
- C Y
- D Z

27. White cells form part of our third line of defence.
Our third line of defence involves
- A ingestion of microbes by white cells and inflammation of infected area
 - B ingestion of microbes by white cells but no inflammation of infected area
 - C white cells producing antigens against antibodies
 - D white cells producing antibodies against antigens
28. Which is involved in protecting our body from microorganisms by forming a clot in a wound?
- A platelets
 - B white blood cells
 - C lysozyme
 - D hormones

Brain attack

A statement from the Department of Health states:

‘Strokes are the third biggest cause of death in the UK and the largest single cause of severe disability. Each year more than 110,000 people in England will suffer from strokes. These patients cost the NHS over £2.8 billion.’

29. The statements below give some causes and symptoms of brain disorders.

- An increase in electrical activity in the brain causing jerky movements
- Brain tumours can damage blood vessels causing them to burst
- Blocked blood vessels causing death of brain tissue
- Accidental damage to the brain causing internal bleeding

How many of the statements describe a cause of a stroke?

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

30. People that have suffered severe strokes are likely to show

- A an increase in the rate of processing information and an increase in reaction time
- B a decrease in the rate of processing information and a decrease in reaction time
- C an increase in the rate of processing information and a decrease in reaction time
- D a decrease in the rate of processing information and an increase in reaction time

- 31.** Opiates are drugs that affect the nervous system. They are sometimes prescribed to patients with certain medical conditions.

The statements are about the use of opiates.

- 1 Opiates cause addiction by increasing communication across synapses
- 2 Opiates offer very strong pain relief
- 3 Opiates allow terminally ill patients to live much longer

Which are true?

- A** 2 only
B 1 and 2 only
C 2 and 3 only
D 1, 2 and 3
- 32.** Some people suffer from a brain disorder known as Parkinson's disease. Parkinson's disease can cause slowness in movement and speech impairment. Parkinson's disease causes
- A** a loss of communication between neurones in the brain
B an increase in communication across synapses
C less oxygen to reach muscles
D an increase in the rate at which electrical messages are transmitted to muscles

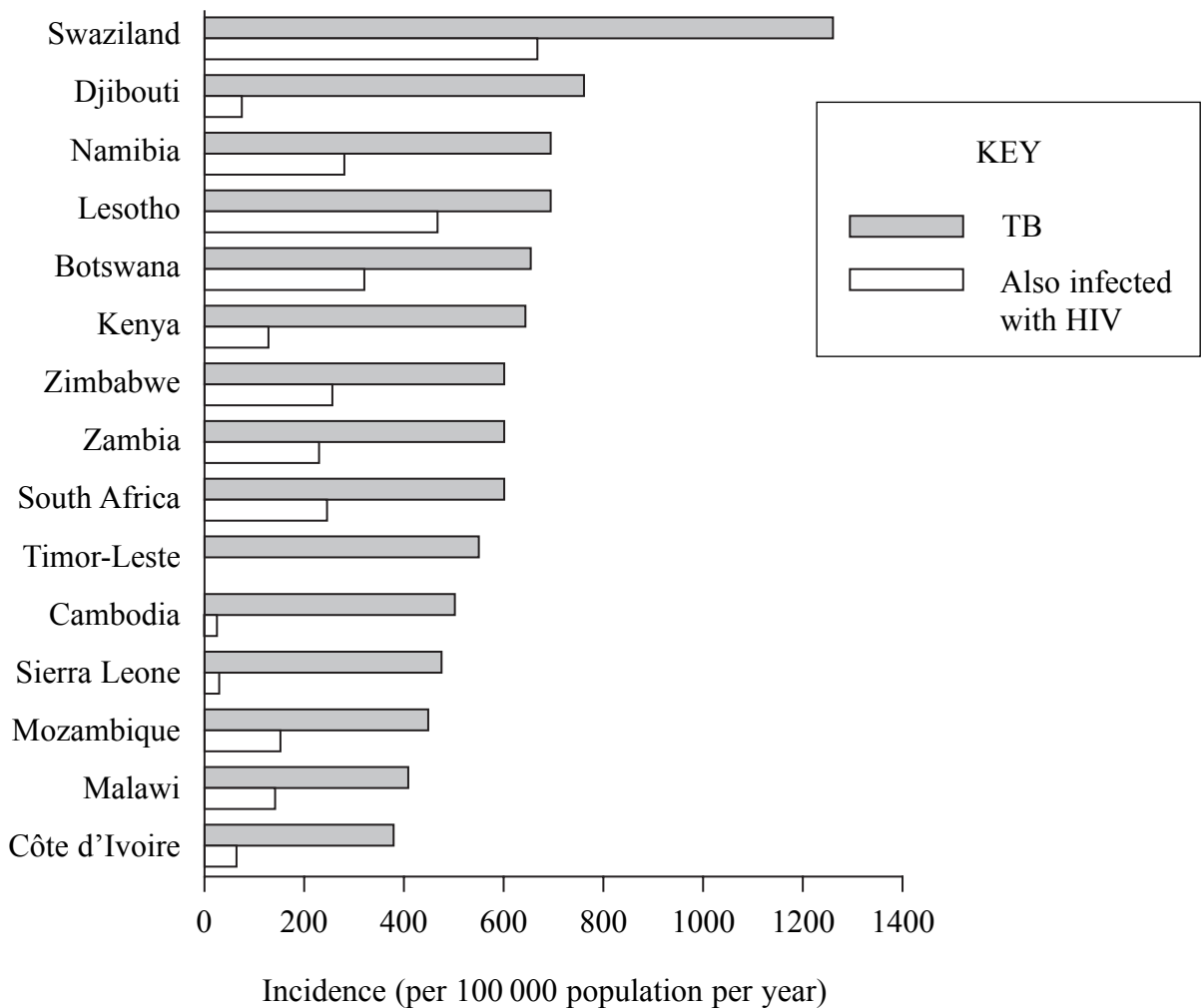
Tuberculosis (TB)

Use the information to help you answer questions 33 and 34.

The Human Immunodeficiency Virus (HIV) attacks certain white blood cells. This destroys the immune system.

People infected with HIV can develop a disease called Auto Immune Deficiency Syndrome (AIDS). AIDS sufferers are more vulnerable to diseases such as TB.

The graph shows fifteen countries with a high incidence of TB. It also shows the number of people with TB who are also infected with HIV.

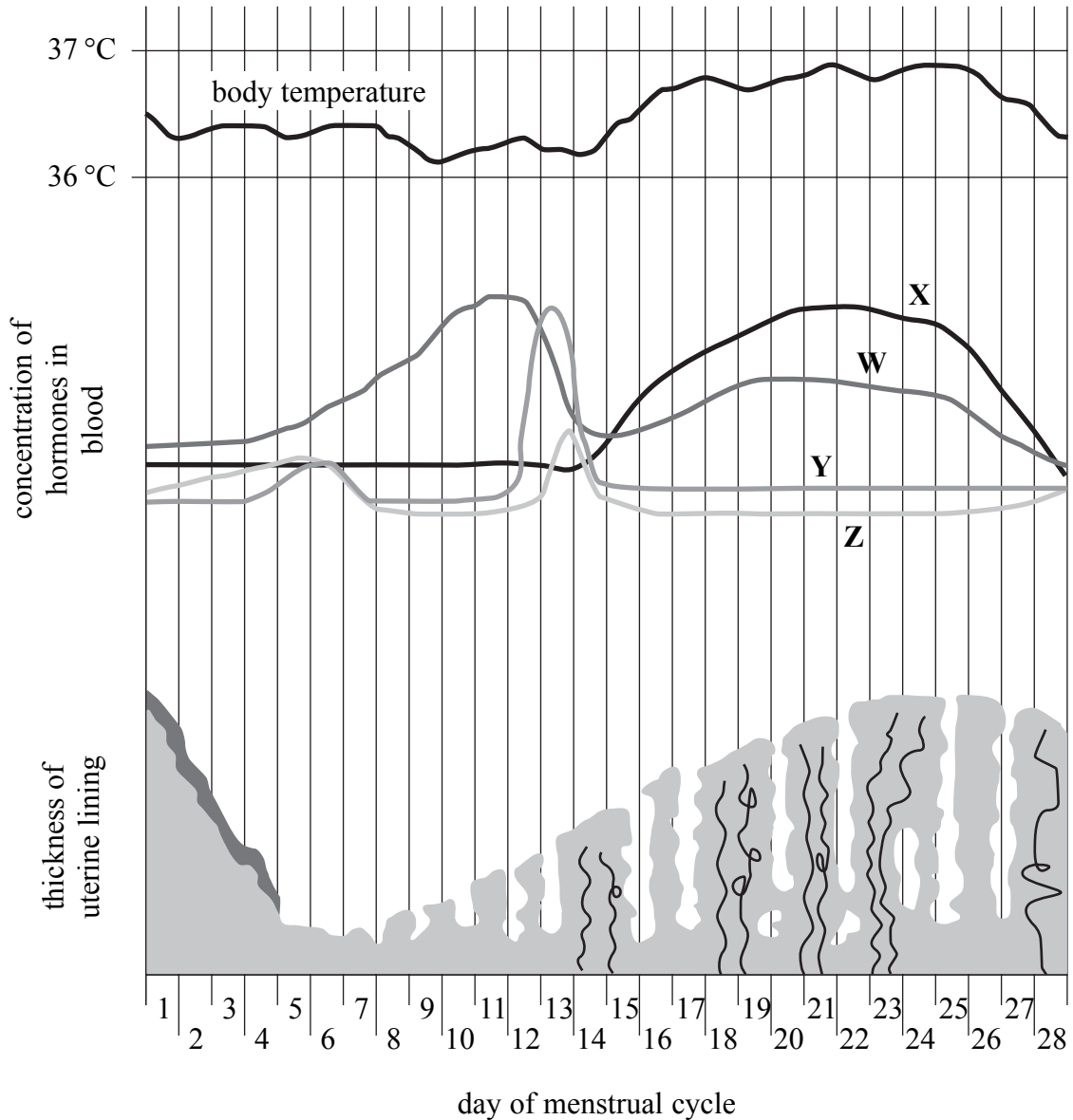


33. The graph shows that
- A the greater the incidence of HIV the greater the incidence of TB
 - B the greater the incidence of HIV the lower the incidence of TB
 - C there is a proportional increase in the incidence of TB as the incidence of HIV increases
 - D there is no clear correlation between the incidence of TB and the incidence of HIV

34. Which country has the highest **proportion** of TB sufferers with HIV?
- A Swaziland
 - B Botswana
 - C Timor Leste
 - D Lesotho
35. The data collected on the incidence of TB and HIV could be unreliable because
- A not all cases of TB and HIV may have been identified
 - B people are being cured of TB which will affect the data
 - C drug-resistant forms of the bacteria arise which are not included in the data
 - D the data was collected from a large number of people
36. The incidence of TB is very high in many African countries.
The most likely reason for this is because
- A African countries have more vectors than other countries
 - B resistant forms of the TB bacteria are more likely to arise in warmer countries
 - C overcrowding and poverty lead to higher transmission rates
 - D the DOTS programme is not used in poorer countries

The menstrual hormones

Use the diagram to answer questions 37 to 40.



key	
Y	Luteinising hormone (LH)
Z	Follicle stimulating hormone (FSH)

37. What is the role of hormone **W** in the menstrual cycle?

- A** causes the lining of the uterus to breakdown during menstruation
- B** to stimulate the release of hormone **X** from the ovaries
- C** causes the body temperature to decrease following ovulation
- D** initiates the repair and thickening of the uterus lining

38. The following statements refer to the data shown on the diagram.
- High concentrations of hormone **W** stimulate the release of LH
 - Low concentrations of hormone **W** and high concentrations of hormone **X** cause a rise in body temperature
 - The concentrations of LH and FSH in the blood follow a similar trend

How many of the statements are valid conclusions that can be drawn from the diagram?

- A none
B one
C two
D three
39. Sex hormones are used in the contraceptive pill.
The contraceptive pill
- A prevents ovulation and increases FSH production
B stimulates ovulation and inhibits FSH production
C prevents the uterus lining thickening and inhibits LH production
D stimulates the thickening of the uterus lining and increases LH production
40. FSH can be given to less fertile women during fertility treatment.
FSH can help a woman to become pregnant because it
- A decreases the number of times a woman will ovulate in one month
B causes more eggs to mature in the ovaries during one cycle
C encourages fertilisation of an egg by a sperm
D maintains the lining of the uterus in preparation for a fertilised egg

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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