

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 17 June 2011 – 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.

Do any necessary calculations and rough work in this booklet. You may use a calculator if you wish.

You must not take this booklet or the answer sheet out of the examination room.

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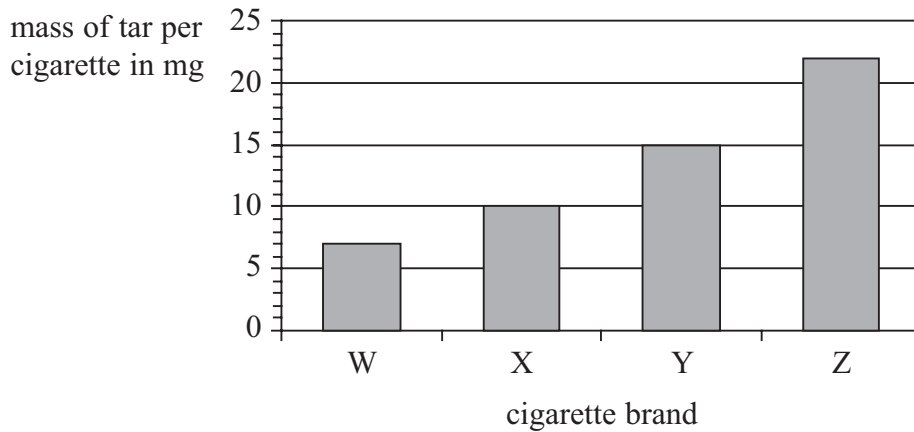
Turn over

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

The chemicals in cigarettes

Use the chart to answer questions 1 and 2.

The chart shows the mass of tar in four brands of cigarettes.



- How much tar does cigarette brand W contain?
A 5 mg
B 7 mg
C 10 mg
D 15 mg
- Cigarette brand Z is the most harmful to health.
This is because it is more likely to cause
A addiction
B liver damage
C lung cancer
D brain damage
- Nicotine in cigarettes has a similar effect on our body to caffeine.
Nicotine and caffeine are
A painkillers
B depressants
C sedatives
D stimulants

4. Smokers are more likely than non-smokers to get lung infections.
What name is given to microbes that cause infection?
- A pathogens
 - B antigens
 - C antibodies
 - D vectors

Fighting disease

The picture shows microbes that cause tuberculosis (TB).
TB is a disease that infects the lungs.

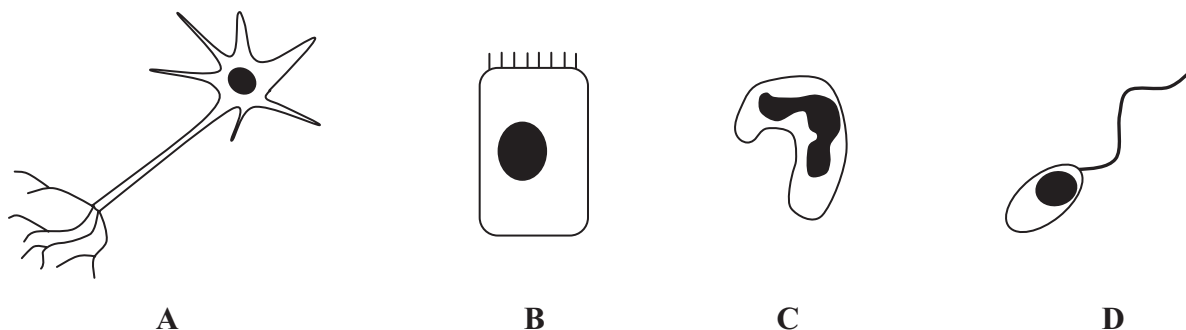


5. Which row of the table is correct for the type of microbe that causes TB?

	type of microbe	how TB is spread
A	virus	by droplets in the air
B	bacteria	by a vector
C	virus	by a vector
D	bacteria	by droplets in the air

Use the diagrams to answer questions 6 and 7.

The diagrams show four different types of animal cell.



6. Which of these cells form part of the first line of defence to help prevent TB microbes from entering the body?

7. Which of these cells ingests microbes as part of the second line of defence?

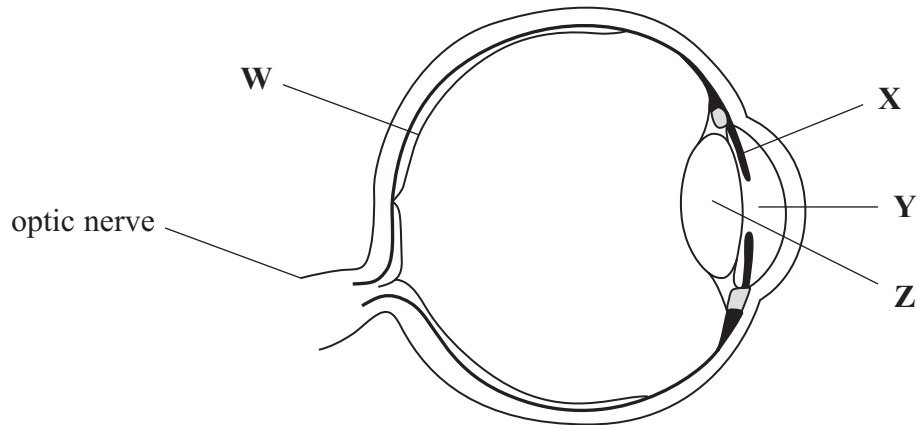
8. Mosquitoes carry a microbe that can cause malaria. When mosquitoes pierce the skin of a person they inject the microbe into the blood of the person. This method of disease transmission is known as

- A vector-borne
- B horizontal contact
- C vehicle-borne
- D vertical contact

Sense organs

Use the diagram to answer questions 9 and 10.

The diagram shows the structure of the eye.



9. Which structure contains the muscles that control the amount of light entering the eye?

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

10. Which part of the eye contains light receptor cells?

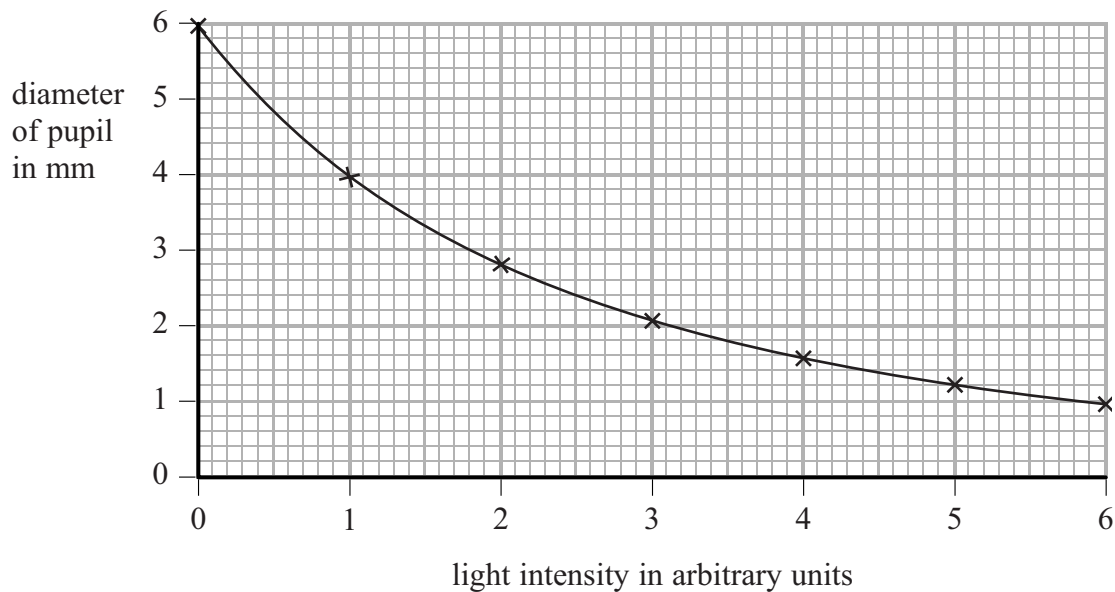
- A W
- B X
- C Y
- D Z

11. The optic nerve sends impulses to the central nervous system.
Which row of the table shows structures found in the central nervous system?

	spinal cord	peripheral nerves
A	yes	yes
B	no	no
C	no	yes
D	yes	no

Use the graph to answer questions 12 and 13.

The graph shows the size of the pupil in a student's eye at different light intensities.



12. What is the difference in the diameter of the pupil between light intensities of 2 and 4 arbitrary units?
- A 1.2 mm
 - B 1.6 mm
 - C 1.9 mm
 - D 2.8 mm
13. The graph shows that as the light intensity **decreases** the pupil
- A gets larger
 - B gets smaller
 - C gets larger then smaller
 - D is not affected

Hormones

Hormones help to keep conditions inside our body balanced.

14. Which row of the table shows the effect of insulin on the body and how it is transported to target organs?

	effect of insulin	method of transportation
A	raises blood glucose levels	chemical messenger
B	lowers blood glucose levels	chemical messenger
C	raises blood glucose levels	electrical impulse
D	lowers blood glucose levels	electrical impulse

15. Which is the target organ for insulin?

- A** brain
- B** pancreas
- C** liver
- D** lungs

16. Human insulin can be produced by genetically modified (GM) bacteria.
Which of the statements are advantages of using GM bacteria to produce human insulin?

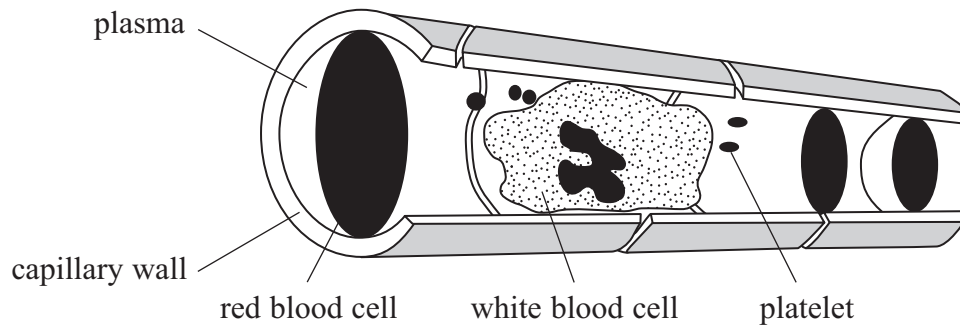
- 1 bacteria use their own genes to produce human insulin
- 2 GM bacteria multiply rapidly to produce high yields of insulin

- A** 1 only
- B** 2 only
- C** both 1 and 2
- D** neither 1 nor 2

**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**

The blood

The diagram shows some blood travelling through a blood vessel called a capillary.

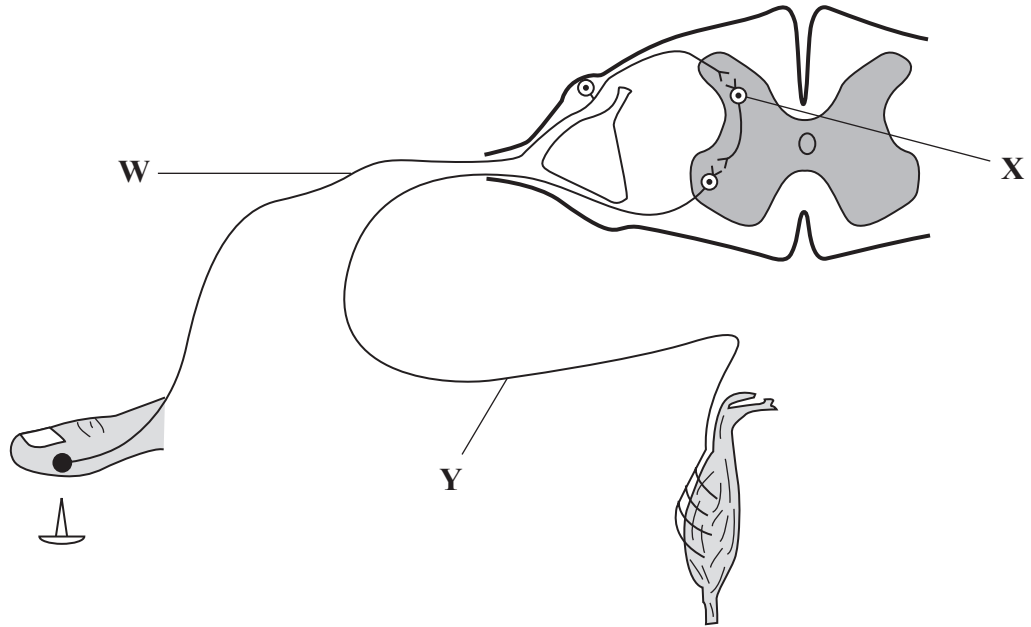


17. Capillaries are very narrow and blood cells flow through them slowly in single file. This flow is important so that each red blood cell can
- A reach the skin easily to form a scab
 - B deliver carbon dioxide to body cells
 - C pick up oxygen from muscle cells
 - D deliver oxygen to body cells
18. Plasma transports
- A hormones from glands to target organs
 - B oxygen from body cells to the lungs
 - C waste products from target organs to muscle cells
 - D carbon dioxide from the lungs to body cells
19. Some white blood cells form part of our body's third line of defence against disease. This is because they
- A produce antibodies
 - B prevent pathogens entering our body
 - C prevent antigen production
 - D produce antigens

Body responses

Use the diagram to answer questions 20, 21 and 22.

The diagram shows a finger accidentally touching a pin and the parts of the nervous system involved in the response to this action.



20. Which row of the table gives the names of neurones **W**, **X** and **Y**?

	neurone W	neurone X	neurone Y
A	sensory	motor	relay
B	relay	sensory	motor
C	motor	relay	sensory
D	sensory	relay	motor

21. How are nerve signals transmitted from neurone **W** to neurone **X**?

- A** chemicals are transmitted through the blood
- B** electrical impulses diffuse across a synapse
- C** chemicals diffuse across a synapse
- D** electrical impulses are transmitted through the blood

22. What is the effector in this reflex action?

- A** receptors in the skin
- B** the brain
- C** motor neurones
- D** muscle in the arm

23. A reflex action is
- A an involuntary response that takes place over a long period of time
 - B an involuntary response that is very quick
 - C a voluntary response that takes place over a long period of time
 - D a voluntary response that is very quick
24. Which of the statements about how drugs affect our nervous system are true?
- 1 solvents increase the speed of nerve signals from one neurone to another
 - 2 heroin is an opiate that can cause addiction
- A 1 only
 - B 2 only
 - C both 1 and 2
 - D neither 1 nor 2

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.

Drug driving

Use this information to answer questions 25 and 26.

In August 2009, an advertising campaign warning of the risks of driving after taking drugs was launched in Britain.

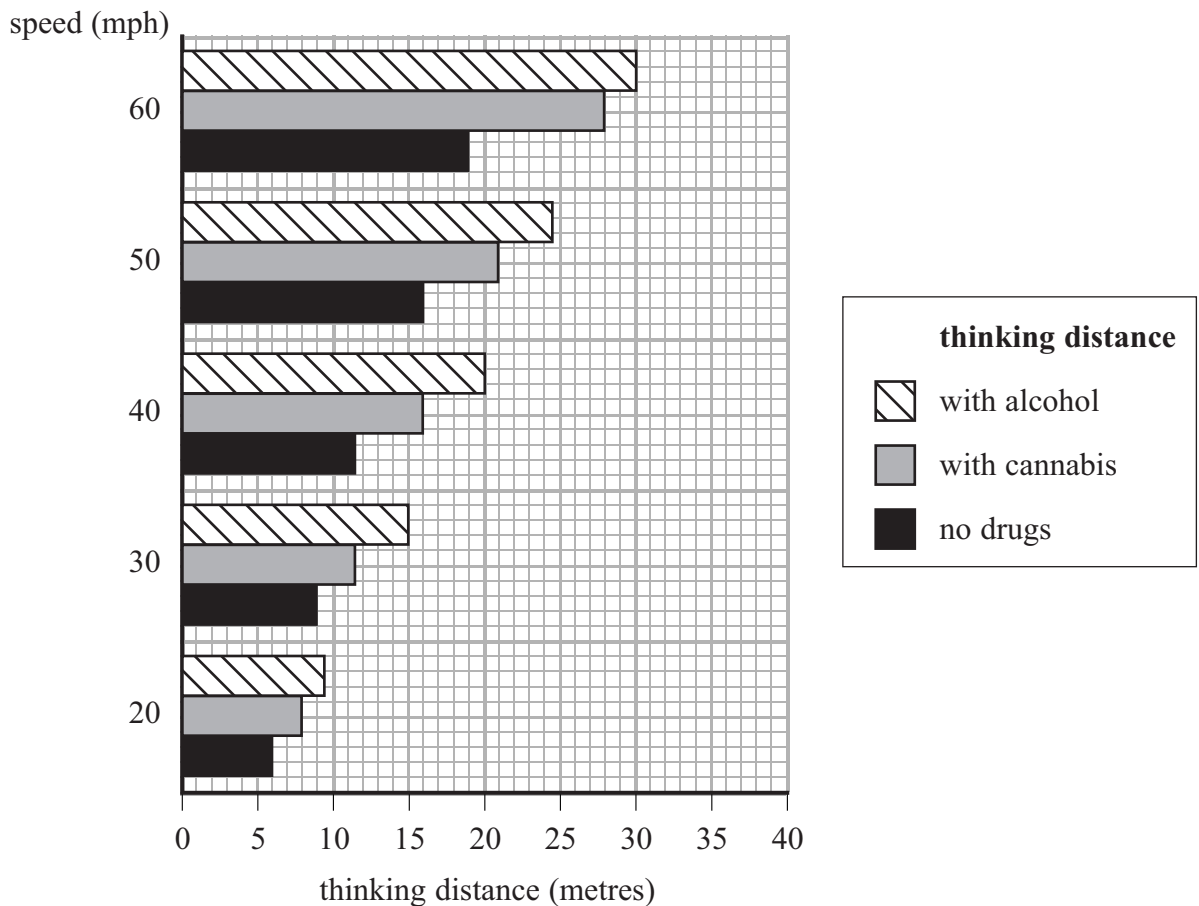


In road tests, the thinking distance of volunteer drivers was measured.

The thinking distance is the distance that a car travels after the driver has seen a hazard and before starting to brake.

The road tests were carried out using the same drivers when they were under the influence of alcohol, then cannabis and then no drugs.

The chart shows the results of the road tests.



25. The results show that
- A when no drugs are taken, the thinking distance is not affected as speed increases
 - B the thinking distance under the influence of alcohol decreases as the speed increases
 - C under the influence of cannabis, the thinking distance at 30 mph is double that at 60 mph
 - D under the influence of alcohol, the thinking distance at 60 mph is double that at 30 mph
26. The results of the road tests conclude that alcohol and cannabis
- A increase reaction times and are therefore depressants
 - B decrease reaction times and are therefore stimulants
 - C decrease reaction times and are therefore depressants
 - D increase reaction times and are therefore stimulants
27. Which of the statements are likely reasons for doctors **not** supporting the legalisation of cannabis?
- 1 taking cannabis can lead to the use of 'harder' drugs
 - 2 cannabinoids in cannabis can be used for pain relief
 - 3 smoking cannabis is harmful to health
 - 4 cannabis can be used to stimulate the appetite of AIDS patients
- A 1 and 3 only
 - B 1 and 4 only
 - C 2 and 3 only
 - D 2 and 4 only
28. Which two drugs when taken in excess are most likely to cause liver failure?
- A caffeine and alcohol
 - B paracetamol and alcohol
 - C opiates and caffeine
 - D opiates and paracetamol

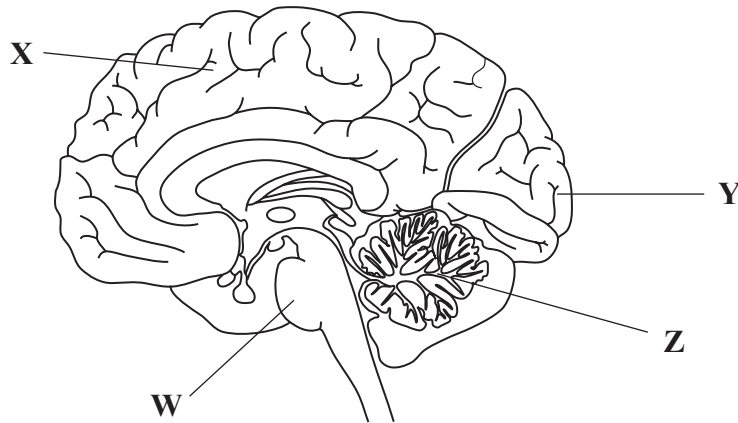
A song on the brain

Use the diagram to answer questions 29 and 30.

Music has a powerful impact on our lives.

It can change our mood, evoke memories and it can even influence how fast we drive our car.

The diagram shows various areas of the brain



29. Some people have a brain condition called synaesthesia which means that they can ‘see’ music as well as hear it.
Which areas of the brain enable people with synaesthesia to ‘see’ and hear music?
- A W and X
 - B X and Y
 - C Y and Z
 - D Z and W
30. Scientists have identified the part of the brain responsible for linking a certain song with a particular memory.
Which part of the brain is responsible for memories?
- A W
 - B X
 - C Y
 - D Z
31. Musicogenic epilepsy is a condition in some people which causes a seizure when they hear a certain type of music or song.
An epileptic seizure occurs when
- A the brain does not receive enough oxygen
 - B the transmission of impulses to muscles is blocked
 - C tumours put pressure on nerve cells in the brain
 - D excessive numbers of impulses disrupt brain function

Tuberculosis

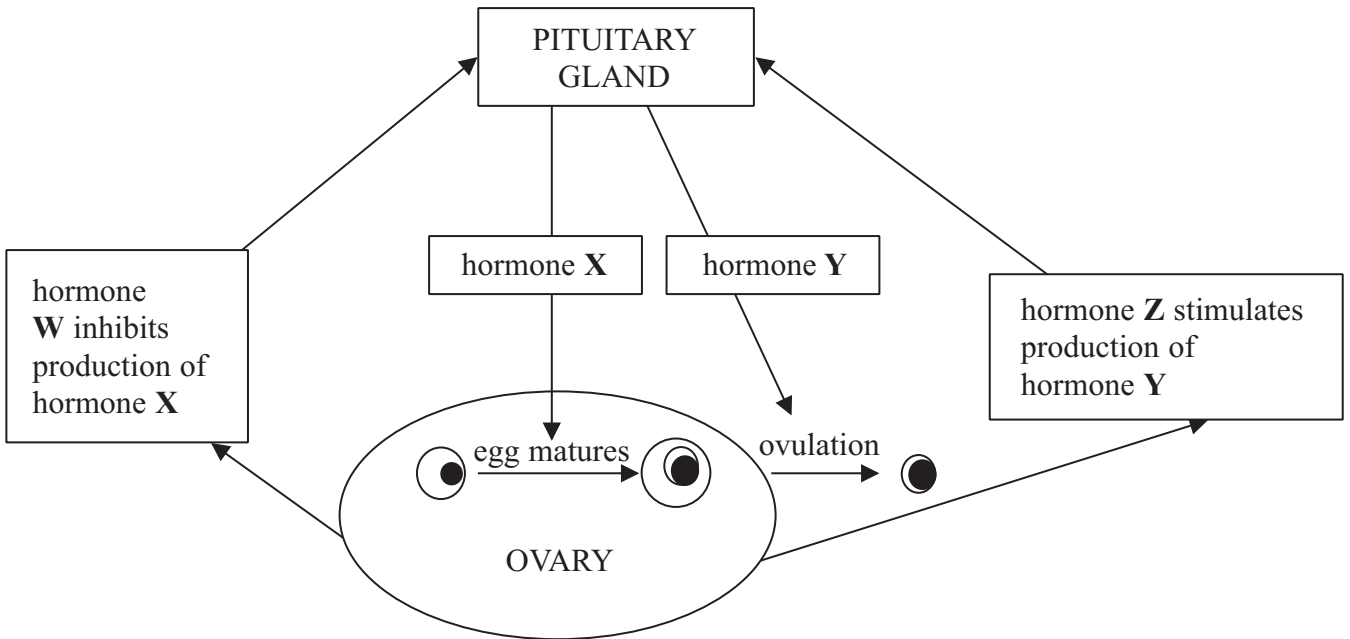
Extensively drug resistant TB (XDR-TB) is affecting 30,000 people per year. XDR-TB is a form of TB that is resistant to virtually all antibiotics. In an outbreak of this form of TB in South Africa 52 out of a total of 53 patients died. Most of these patients also carried the virus known as HIV.

32. The increase in XDR-TB is partly due to
- A patients carrying TB being isolated
 - B reliable drug supplies being used to treat all forms of TB
 - C adequate immigration controls
 - D patients not completing their treatment
33. HIV attacks the immune system. White blood cells that form part of the third line of defence against disease are destroyed. TB is more likely to affect people with HIV because
- A they produce antibodies against the TB antigens but not against the HIV antigens
 - B HIV attacks white cells involved in the inflammatory response
 - C they cannot produce white cells to ingest the TB antigens
 - D they cannot produce enough antibodies specific to the TB antigens
34. DOTS (Directly Observed Treatment Short Course) is the World Health Organisation's recommended treatment regime for TB. The introduction of DOTS in 1991 has reduced the number of deaths from TB. This is because DOTS
- A has eliminated cases of the disease in all areas
 - B has helped to reduce the number of mutant forms of TB arising
 - C patients do not need to be watched whilst taking their medication
 - D patients do not become re-infected with TB
35. The most likely reason that TB is widespread in South Asia is because
- A water treatment programmes are too expensive to implement
 - B the DOTS programme is used in poorer countries
 - C TB is more likely to mutate in hotter climates
 - D overcrowding and poverty leads to higher transmission rate

The menstrual cycle

Use the diagram to answer questions 36 and 37.

The female menstrual cycle is brought about by the interaction of several hormones. The diagram shows how these hormones interact.



36. In the early stages of the menstrual cycle, hormone Z helps to prepare the uterus lining to receive a fertilised egg.
Hormone Z is
- A oestrogen
 - B progesterone
 - C LH
 - D FSH
37. To maximise the chances of pregnancy during fertility treatment, it would be best to use
- A hormone X only
 - B hormone Y only
 - C hormone X and hormone Y
 - D hormone W and hormone Y

38. IVF is one type of fertility treatment that can be used in mature women to help them become pregnant.
What would be an ethical concern of using IVF in mature women?
- A mature women have less money to care for young children
 - B mature women are more likely to suffer poor health
 - C IVF involves the use of genetically modified embryos
 - D IVF is less likely to result in multiple births
39. Throughout pregnancy levels of progesterone
- A remain low to stimulate the production of LH
 - B increase to maintain the lining of the uterus and inhibit LH production
 - C reach a peak and then drop to stimulate the release of FSH
 - D remain at a high level to prevent ovulation but stimulate FSH production
40. Which statements are likely to cause a lower birth weight in babies born to mothers that smoke?
- 1 gas exchange in the lungs of the mother is reduced due to the build up of tar and mucus
 - 2 smokers inhale more carbon dioxide that prevents oxygen reaching the growing fetus
- A 1 only
 - B 2 only
 - C both 1 and 2
 - D neither 1 nor 2

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END