CNEC CHRISTIAN COLLEGE
FORM SIX BIOLOGY
MOCK EXAMINATION (2020-2021)
PAPER 1

Time allowed: 2 hours 30 minutes
This paper must be answered in English

GENERAL INSTRUCTIONS

1 There are **TWO** sections, A and B, in this Paper. You are advised to finish Section A in about 35 minutes.

2 Section A consists of multiple-choice questions in this question paper. Section B contains conventional questions printed separately in Question-Answer Book B.

3 Answers to Section A should be marked on the Multiple-choice Answer Sheet while answers to Section B should be written in the spaces provided in Question-Answer Book B. **The Answer Sheet for Section A and the Question-Answer Book for Section B must be handed in separately at the end of the examination.**

INSTRUCTIONS FOR SECTION A (MULTIPLE-CHOICE QUESTIONS)

1 Read carefully the instructions on the Answer Sheet carefully. After the announcement of the start of the examination, you should insert the information required in the spaces provided. No extra time will be given for filling in the information after the 'Time is up' announcement.

2 When told to open this book, you should check that all the questions are there. Look for the words '**END OF SECTION A**' after the last question.

3 All questions carry equal marks.

4 **A**nswer **ALL** questions. You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answer clearly, otherwise you will lose marks if the answers cannot be captured.

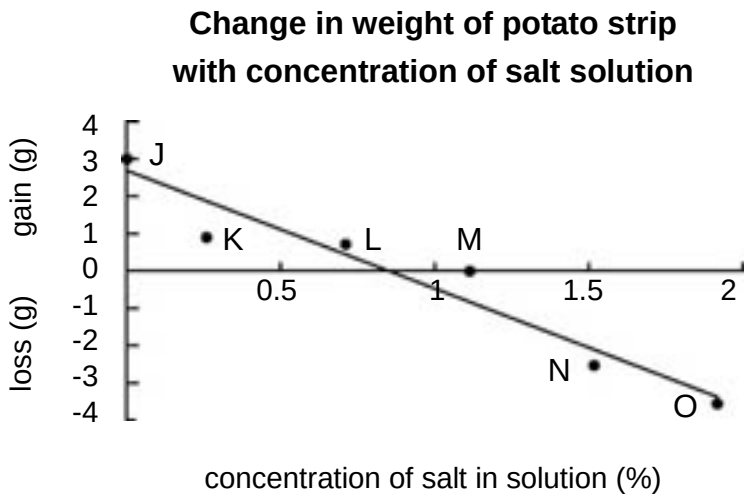
5 You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6 No marks will be deducted for wrong answers.

There are 36 questions in this section.

The diagrams in this section are NOT necessarily drawn to scale.

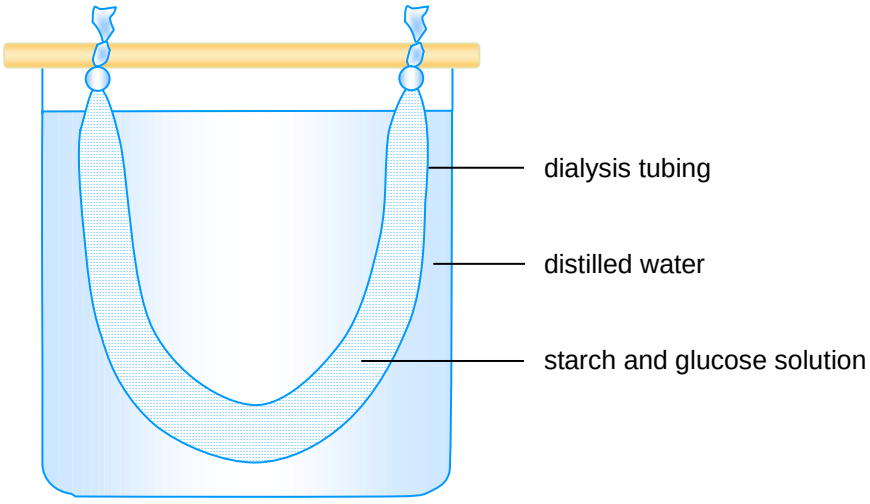
1 The graph below shows the change in the weight of a potato strip when it is immersed in salt solution of different concentrations.



The reason for joining the points by a best straight line is that

A averaging experimental results allows one to establish relationships.
B the individual points are wrong.
C the individual points are assumptions, while the best straight line is a fact.
D the best straight line shows the accuracy of the experimental results.

Directions: The following two questions (Q. 2 and Q. 3) refer to the diagram below, which shows a model demonstrating a part of the human alimentary canal.

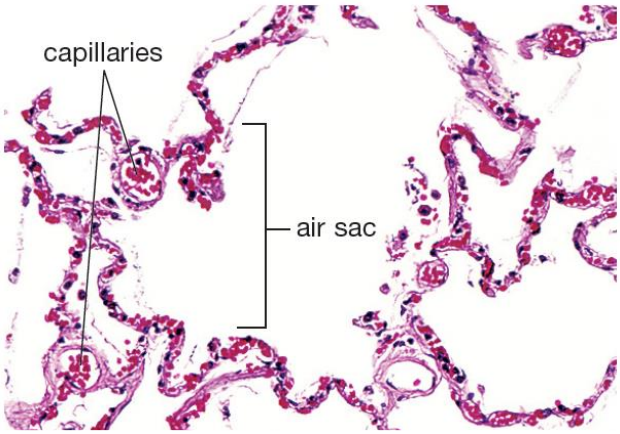


2. The water outside the dialysis tubing represents

A the water present in saliva.
B the water surrounding the villi.
C the blood supplied to the small intestine.
D the blood supplied to the oesophagus.

3. After one hour, the water outside the dialysis tubing would contain
   A glucose only.
   B starch only.
   C both glucose and starch.
   D neither glucose nor starch.

4. The photograph below shows the transverse section of the human lungs under a high-power microscope.

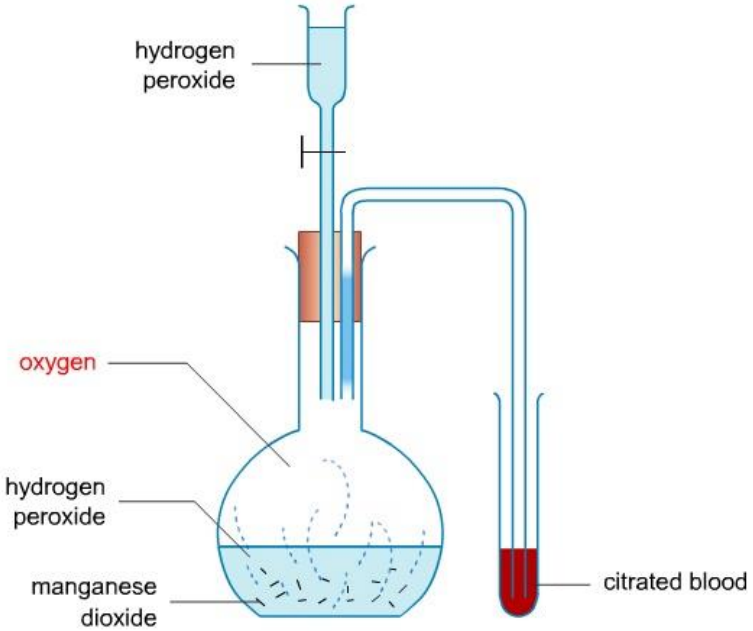


Based on the information shown in the photograph, which of the following statements correctly explain why the human lungs can carry out gas exchange efficiently?

(1) The distance of gas diffusion is short.
(2) The air sacs provide a large surface area for gas exchange.
(3) Inner surfaces are moist which allows oxygen to dissolve and diffuse across the air sacs
(4) The oxygen which enters the lungs can be carried away rapidly.

A (1) and (2) only
B (1) and (3) only
C (1), (2) and (3) only
D (1), (2) and (4) only

Directions: The following two questions (Q. 5 and Q. 6) refer to the diagram below, which shows an experimental set-up used to study the effect of oxygen on citrated chicken blood.



5. What will be the change in the colour of the blood?
   A from bright red to purplish red
   B from purplish red to bright red
   C from bright red to blue
   D no colour change

6. Which of the following statements are correct?
   (1) The colour change is reversible if carbon dioxide is bubbled into the blood.
   (2) Haemoglobin is purplish red.
   (3) At high carbon dioxide concentration, oxyhaemoglobin forms.
   A (1) and (2) only
   B (1) and (3) only
   C (2) and (3) only
   D (1), (2) and (3)

7. Which of the following is a correct match of reaction and its site of occurrence?

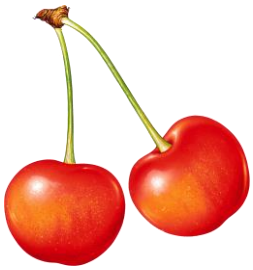
	Reaction	Site of occurrence
A	haemoglobin + oxygen --> oxyhaemoglobin	heart
B	haemoglobin + oxygen --> oxyhaemoglobin	brain
C	oxyhaemoglobin --> haemoglobin + oxygen	lungs
D	oxyhaemoglobin --> haemoglobin + oxygen	heart

8. The rate of transpiration in plants is largely dependent upon
   A the control of diffusion across the leaf cells.
   B the control of the passage of water up the xylem.
   C the physical conditions of the atmosphere.
   D the physical conditions of the soil water.

9. Which of the following combinations of parameters is most suitable for measuring the growth in the plants (or parts of plants) below?

X

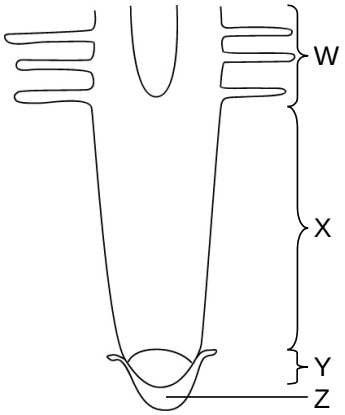
Y



Z

	X	**Y**	**Z**
A	volume	volume	weight
B	weight	surface area	weight
C	length of plumule	weight	volume
D	length of radicle	surface area	volume

Directions: The following two questions (Q. 10 and Q. 11) refer to the diagram below, which shows a section of a root.



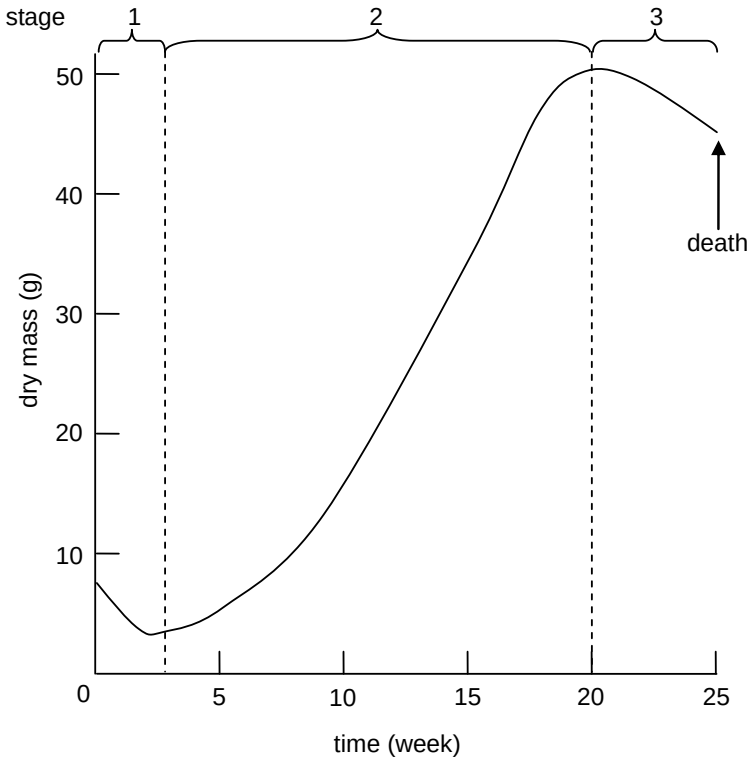
10. Which region(s) can xylem vessels be found?

A W only
B W and X only
C X and Y only
D X, Y and Z only

11. Which region allows the greatest number of cells per unit area to be observed under the microscope?

A W
B X
C Y
D Z

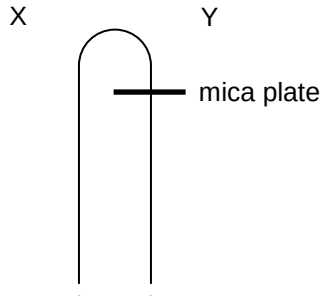
12. Which of the following statements about the growth curve of a plant below are correct?



(1) At stage 1, the stored food is oxidized for growth.
(2) At stage 2, there is no consumption of food.
(3) At stage 3, fruits and seeds are dispersed.

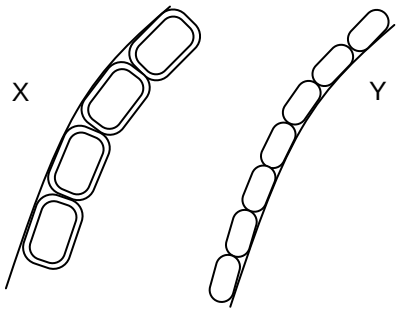
A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)

13. A young shoot is treated as shown below and placed in the dark.

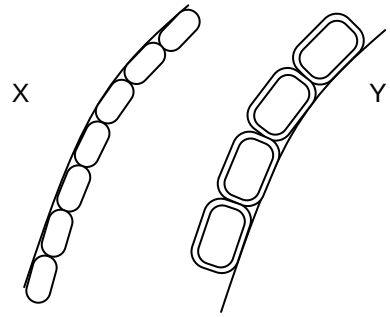


Which of the following correctly illustrates the cells of sides X and Y?

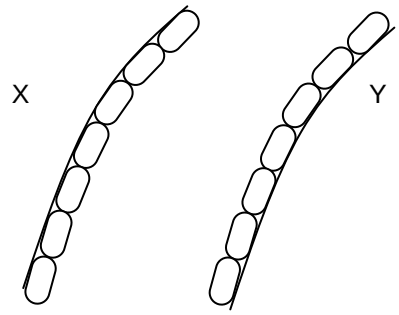
A



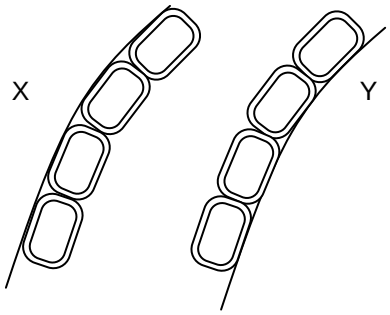
B



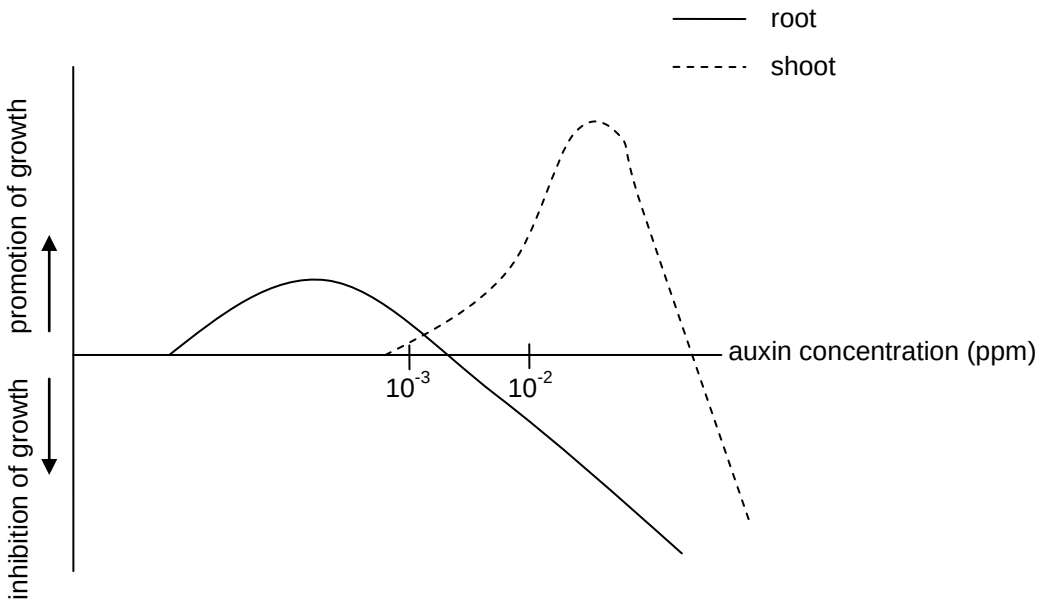
C



D



14. The graph below shows the result of an experiment designed to investigate the relationship between auxin concentration and the growth of a shoot and a root.



Auxins may be used commercially as a growth promoter in cuttings. In an application, the cut end of a leaf can be placed in a culture solution containing the growth promoter, so that the leaf can develop into a plant.

What should be the concentration of auxins in the culture solution? Why?

A about 10^{-2} ppm to inhibit the growth of the shoot
B about 10^{-1} ppm to stimulate the growth of the shoot but inhibit the growth of the root
C about 10^{-3} ppm to stimulate the growth of the shoot and the root
D about 10^{-4} ppm to stimulate the growth of the adventitious root

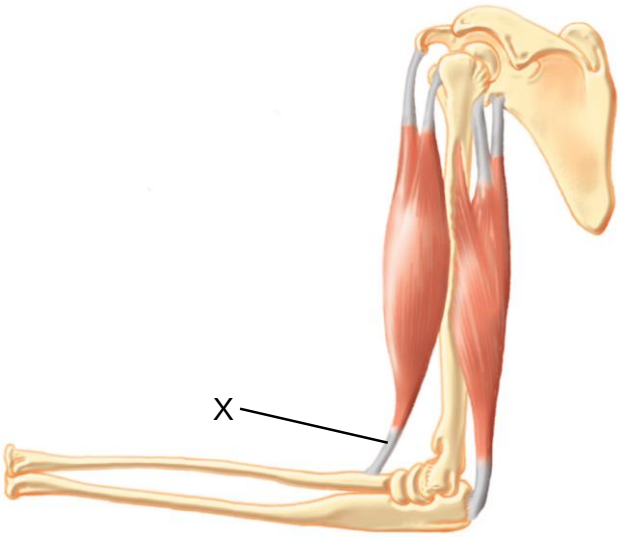
15. In a reflex arc, which of the following results in the transmission of nerve impulses in only one direction?

A Receptors can only send out nerve impulses but cannot receive them.
B Effectors can only receive nerve impulses but cannot send them out.
C Only the endings of an axon can secrete neurotransmitters.
D A synapse can only be stimulated by one type of neurotransmitters.

16. Which of the following would trigger a reflex action?
(1) Some dust particles get into the eyes.
(2) The hand touches a very hot object.
(3) Some ground pepper is inhaled into the nose.

A (2) only
B (1) and (2) only
C (2) and (3) only
D (1), (2) and (3)

17. The diagram below shows a human arm.



Which of the following statements about structure X is/are correct?

(1) Structure X contracts when the forearm is raised.
(2) Structure X can generate a force to raise the forearm.
(3) Structure X is a living tissue.

A (3) only
B (1) and (2) only
C (1) and (3) only
D (2) and (3) only

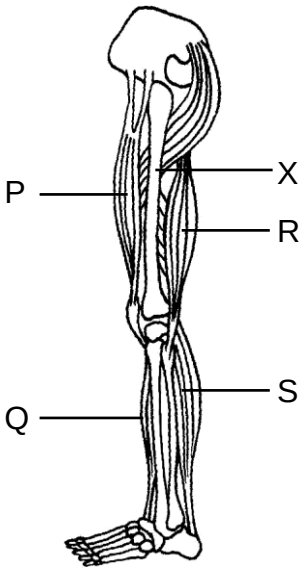
18. Cartilage can be found in

(1) the nose. (2) the oesophagus. (3) the trachea.

A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)

Directions: The following two questions (Q. 19 and Q. 20) refer to the diagrams below. Diagram I shows an athlete at the starting blocks. Diagram II shows the muscles and the bones in his left leg.

I



II

19. In diagram I, which muscles in the left leg of the athlete are contracting?

A P and Q
B P and S
C Q and R
D R and S

20. Which of the following are produced in structure X?

(1) calcium salts
(2) red blood cells
(3) white blood cells

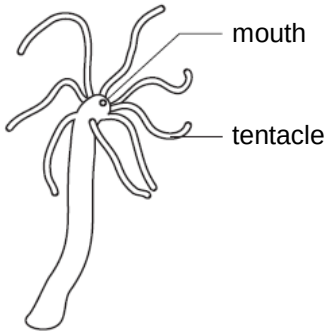
A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)

21. Which of the following promotes the loss of nitrogen from soil due to the activity of denitrifying bacteria?

A leaching of nitrate from soil in drainage water
B anaerobic conditions caused by water saturation
C high levels of phosphate from addition of fertilizers
D the presence of a leguminous crop such as clover

22. Hydra is a small freshwater animal that uses its tentacles to catch food.

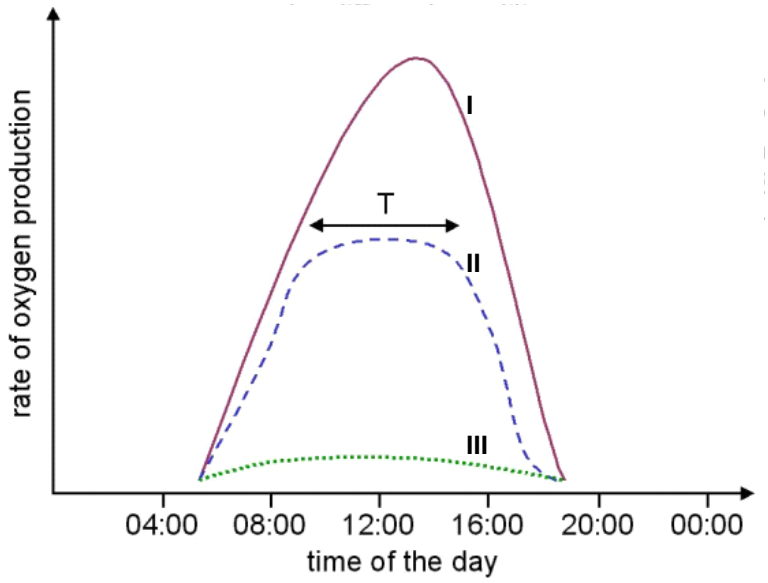
One variety (green hydra) has photosynthetic algae living in its tissues.
Another variety (colourless hydra) has no algae.
The relationship between Hydra and the algae is believed to be an example of mutualism.
Under what conditions would a comparison of the growth rates of green and colourless hydra test this hypothesis?



A light; food supplied
B light; no food supplied
C dark; food supplied
D dark; no food supplied

Directions: The following two questions (Q. 23 and Q. 24) refer to the graph below, which shows the rate of oxygen production of three plants, X, Y and Z, on a sunny day. The three plants are put under different conditions:

Plant	**Condition**
X	In a greenhouse with 3% carbon dioxide concentration
Y	In a greenhouse with atmospheric carbon dioxide concentration
Z	In a shaded area



23. Which plant does curve I represent?

A X
B Y
C Z
D cannot be determined

24. What is the limiting factor for curve II in the time period T?

A light intensity
B water supply
C chlorophyll concentration
D carbon dioxide concentration

25. The photographs below show two sports.

weightlifting

running a marathon

Which type of respiration supplies most of the energy for these two sports respectively?

	Weightlifting	**Running a marathon**
A	aerobic respiration	aerobic respiration
B	anaerobic respiration	anaerobic respiration
C	aerobic respiration	anaerobic respiration
D	anaerobic respiration	aerobic respiration

26. Which of the following shows the forms of cancer that the two screening methods aim at?

	Cervical smear	**Red blood cells in faeces**
A	cervical cancer	stomach cancer
B	cervical cancer	colon and rectal cancer
C	ovarian cancer	liver cancer
D	ovarian cancer	pancreatic cancer

27. Before treating cancer patients, doctors often classify the cancer into different stages. The classification is based on the size of the original tumor, whether the cancer cells have spread into nearby lymph nodes and whether the cancer cells have spread to other parts of the body.

What are the purposes of classifying cancer into different stages?

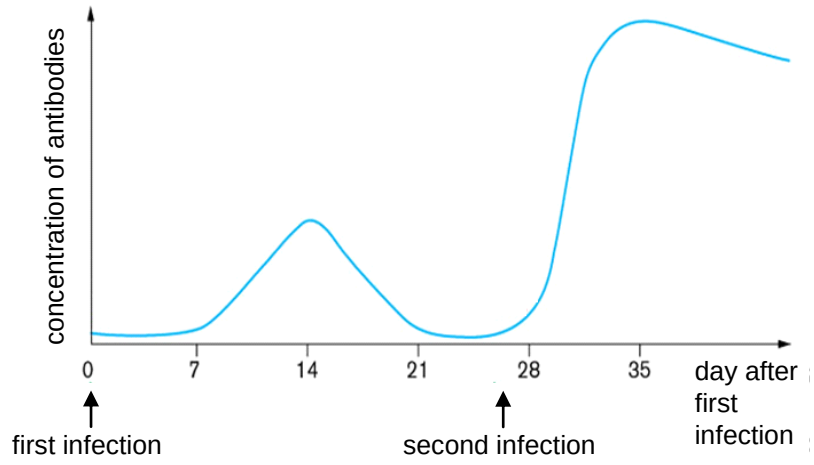
(1) To identify the cause of cancer.
(2) To decide which kind of treatment to be used.
(3) To estimate the chance of survival of the patient.

A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)

28. People with severe burns suffer from infections easily because

A pathogens can enter the body easily through the open wounds
B no more cells are available for the production of antibodies.
C the sebaceous glands can no longer produce sebum.
D . antibodies are lost from the body.

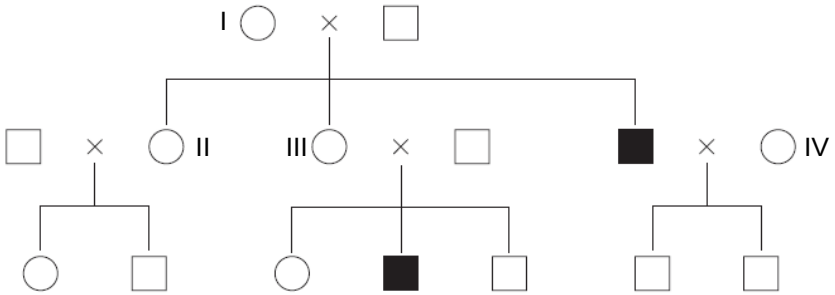
29. The diagram below shows the concentration of antibodies in the blood of a person infected with the same pathogen twice.



What can be deduced from the diagram?

A More pathogens are involved in the second infection.
B The pathogens in the first infection were inactivated before entering the body.
C More phagocytes were involved in the second infection.
D Plasma cells were produced faster in the second infection.

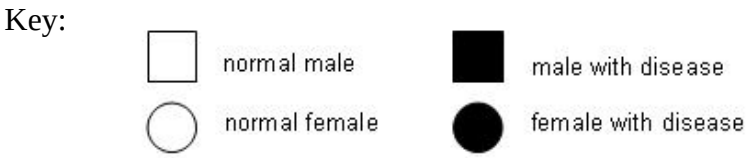
30. Colour blindness in humans is caused by an X chromosome linked recessive allele. In the pedigree chart below which two individuals must, for certain, be carriers of colour blindness?



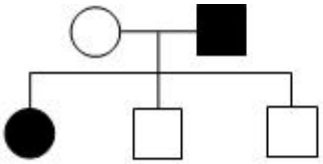
Key: □ male normal ■ male colour blind ○ female

A II and IV **B** I and III
C II and III **D** I and II

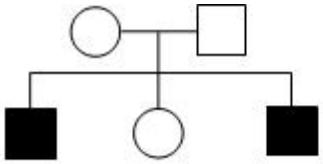
31. Which of the following pedigrees does ***not*** show a sex-linked inheritance?



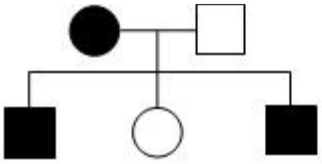
A



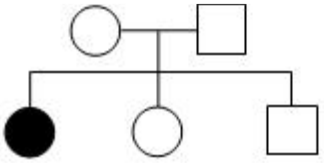
C



B



D



Directions: The following three questions (Q. 32 to Q. 34) refer to the base sequence in a DNA strand below.

CGACAAAGC

The table below shows some mRNA codons and the amino acids they code for.

mRNA codon	**Amino acid**
AGC	Serine (Ser)
UCC	Serine (Ser)
UCG	Serine (Ser)
GUU	Valine (Val)
GCU	Alanine (Ala)
CAA	Glutamine (Gln)
CGA	Arginine (Arg)

32. Which of the following is the amino acid sequence synthesized by this segment of DNA?
A Ala-Gln-Ser
B Ala-Val-Ser
C Arg-Gln-Ser
D Arg-Val-Ser

33. If a mutation occurs such that the last base C is replaced by a base G, how will the polypeptide be affected?

A One of the amino acid will be altered.
B The whole amino acid sequence will be altered.
C No polypeptide will be synthesized.
D No change will occur in the polypeptide.

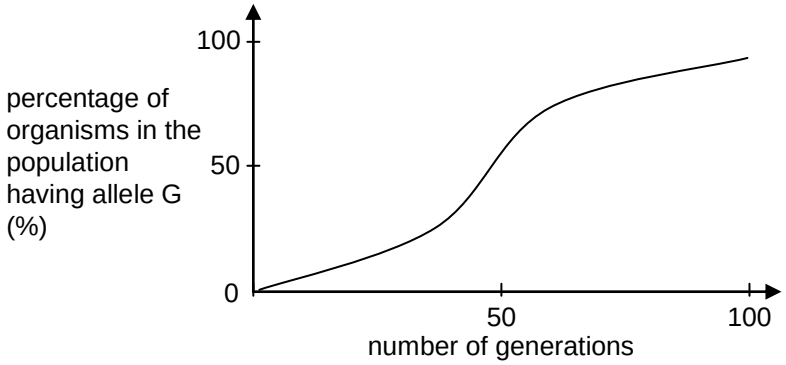
34. If a mutation occurs such that the base sequence in the DNA strand becomes CGAGAAACC, what is this kind of mutation?

A deletion
B insertion
C inversion
D substitution

35. The oldest fossil found on earth is a fossil of a prokaryote, which is estimated to have formed 3.5 billion years ago. Fossils earlier than this have never been found. Which of the following is a possible reason?

A The environment at that time was not suitable for the formation of fossils.
B All the fossils formed at that time were destroyed by earth movement.
C All the fossils formed at that time were decayed.
D Organisms at that time did not have the gene that codes for fossil formation.

36. Due to mutation, a new allele, G, arose in the population of an organism. It is dominant to another allele in the same locus, g. The diagram below shows the percentage of organisms in the population having allele G over 100 generations after the appearance of this allele.



Which of the following statements is correct?

A Allele g was completely eliminated after 100 generations as a result of natural selection.
B Individuals with genotype GG have a higher chance of survival than individuals with genotype Gg.
C Allele G is an allele for a character that favours the survival of the organisms.
D A new species formed after 100 generations.

END OF SECTION A