

1 copy

↑ AFFIX SEAL HERE ↑

CANDIDATE PLEASE NOTE
You must sign below and return this booklet with the Answer Sheet. Failure to do so may result in disqualification.
Signature

TEST CODE 002301

MAY/JUNE 2000

FORM TP 2054

CARIBBEAN EXAMINATIONS COUNCIL
SECONDARY EDUCATION CERTIFICATE
EXAMINATION
BIOLOGY

Paper 01 – General Proficiency

1 $\frac{1}{4}$ hours

07 JUNE 2000 (a.m.)

READ THE FOLLOWING DIRECTIONS CAREFULLY

- In addition to this test booklet, you should have an answer sheet.
- Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.
- On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

Sample Item

Which of the following diseases is due to a dietary deficiency?

- (A) Anaemia
- (B) Diabetes
- (C) Influenza
- (D) Malaria

Sample Answer

(A) (B) (C) (D)

The best answer to this item is "Anaemia", so answer space (A) has been blackened.

- If you want to change your answer, be sure to erase your old answer completely and fill in your new choice.
- When you are told to begin, turn the page and work as quickly and as carefully as you can. If you cannot answer an item, omit it and go on to the next one. You can come back to the harder item later. Your score will be the total number of correct answers.
- Figures are not necessarily drawn to scale.
- This test consists of 60 items. You will have 75 minutes to answer them.
- Do not be concerned that the answer sheet provides spaces for more answers than there are items in this test.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

↑
AFFIX SEAL HERE
↓

1. Two organisms were found in the same tree. They were examined and their characteristics recorded as shown in the table below.

	X	Y
Hard exoskeleton	√	√
Antennae	√	√
Wings	x	√
Segmented body	√	√
4 pairs of legs	√	x

Key Present Absent

2. Which of the following statements about a food chain is true?

- (A) Energy from the sun is transferred from one organism to subsequent organisms.
- (B) Each of its members depends on heat energy obtained directly from the sun.
- (C) Energy changes from one type to another, that is from heat to light to chemical.
- (D) The sun traps light energy at the start of the food chain.

3. Which of the following would be the BEST advice to give students wishing to set up an aquarium with a naturally balanced ecosystem?

Which of the following statements is supported by the information in the table?

- (A) Both X and Y are insects.
- (B) Both X and Y are arthropods but only Y is an insect.
- (C) X is an insect but Y is not.
- (D) Neither X nor Y is an insect.

- (A) Put in the same number of plants and animals.
- (B) Leave out herbivorous fish which would destroy the plants.
- (C) Keep the tank away from direct sunlight.
- (D) Put in a few scavengers such as water snails.

Item 4 refers to relationships between some organisms.

- I. Barnacles on a shark's back
- II. Shark/man
- III. Man/malaria protozoan

Which of the following correctly identifies these relationships?

- | | I | II | III |
|--------|---------------|---------------|------------|
| 4. (A) | Commensalism | Predator/prey | Mutualism |
| (B) | Commensalism | Predator/prey | Parasitism |
| (C) | Predator/prey | Commensalism | Mutualism |
| (D) | Predator/prey | Mutualism | Parasitism |

Item 5 refers to the following information.

ZANAX is a group of organisms with the following features:

- Body divided into two parts - head and segmented abdomen
- One pair of appendages on each abdominal segment
- Mouth parts adapted for sucking

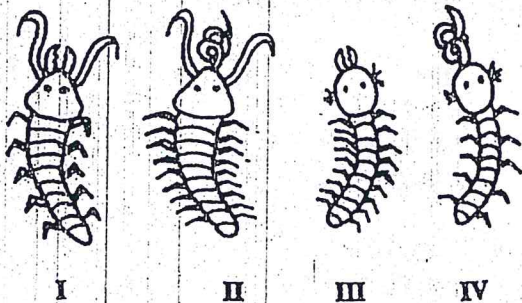
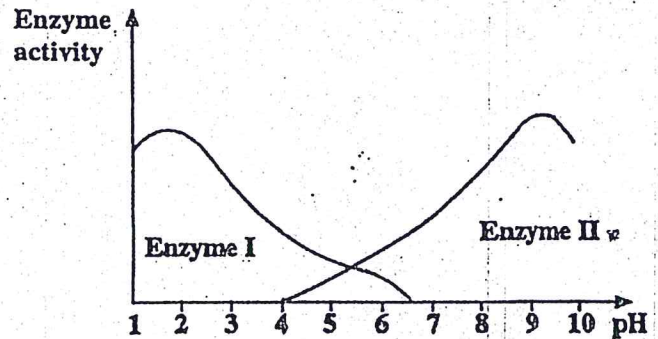


Figure 1

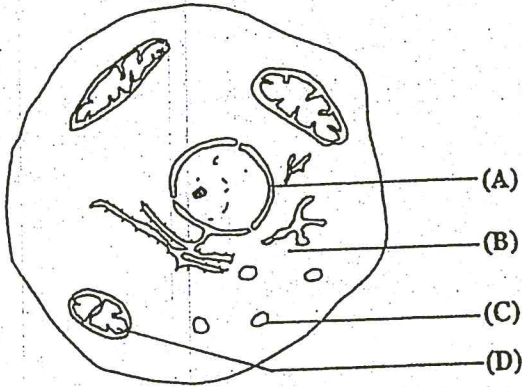
5. Which of the following organisms in Figure 1 above would belong to the group ZANAX?
- (A) I only
 - (B) II only
 - (C) I and III only
 - (D) II and IV only

Items 6 - 7 refer to the following graph which shows the activity of two enzymes in the human digestive system.



6. Which of the following could be Enzyme II?
- (A) Pepsin
 - (B) Renin
 - (C) Trypsin
 - (D) Ptyalin
7. Enzyme I will function BEST in the
- (A) mouth
 - (B) stomach
 - (C) small intestine
 - (D) large intestine

Items 8 - 9 refer to the following diagram which represents an animal cell seen with the electron microscope. Some cell structures are labelled (A) - (D).



When you are answering items 8 - 9 a particular choice from the above may be made more than once, once or not at all.

Which of the structures

8. is responsible for energy production?
9. consists mainly of water?

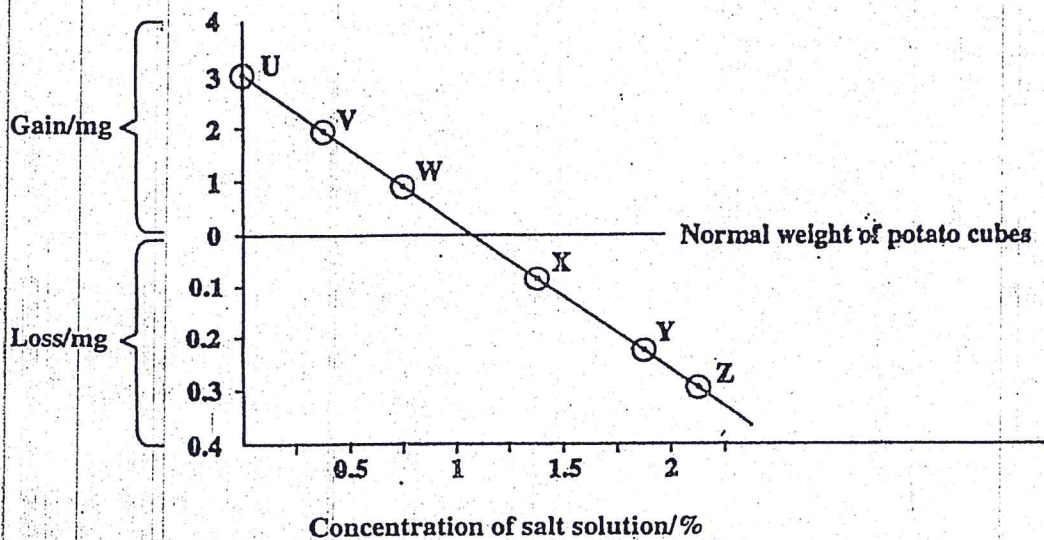
10. During pregnancy, the developing foetus receives from its mother protection against infections, a perfectly balanced diet, warmth and oxygen. Which of these can a mother no longer provide for her new-born infant?

- (A) Oxygen
- (B) Food
- (C) Antibodies
- (D) Warmth

11. Which of the following would be found in the urine of a healthy person?

- I. Urea
 - II. Glucose
 - III. Amino acids
 - IV. Mineral salts
- (A) I and III only
 - (B) I and IV only
 - (C) II, III and IV only
 - (D) I, II, III and IV

Items 12 - 13 refer to the following information.



Six potato cubes, (U, V, W, X, Y, Z), of equal weight were put into six different concentrations of salt water for two hours. They were removed and excess water wiped off. They were weighed and results plotted on the graph above.

12. The process that was investigated is

- (A) respiration
- (B) osmosis
- (C) diffusion
- (D) hydrolysis

13. Cubes X, Y and Z show a decrease in weight. The BEST explanation for this is that

- (A) water molecules moved from the potato cubes to the solution
- (B) mineral salts moved from the potato cubes to the solution
- (C) some of the starch moved from the potato cubes to the solution
- (D) some of the starch was converted to soluble sugars

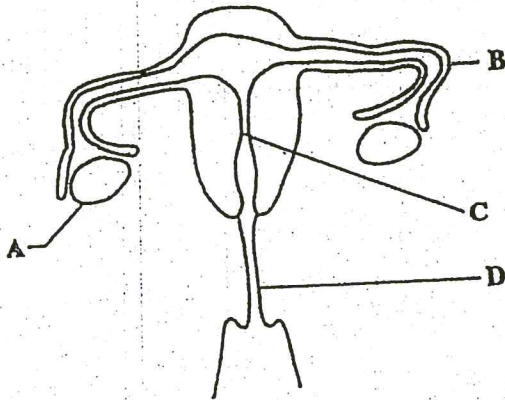
14. After being in an airconditioned room for half an hour, which of the following changes would take place in the skin?

- (A) Vasodilation and increase in heat loss
- (B) Vasoconstriction and increase in sweating
- (C) Vasoconstriction and reduced sweating
- (D) Vasodilation and decrease in heat loss

15. Which of the following MOST directly controls increase in size in the flowering plant?

- (A) Light
- (B) Auxin
- (C) Carbon dioxide
- (D) Oxygen

Item 16 refers to the following diagram of the human female reproductive system, with structures labelled (A) - (D).



16. Where does development of the foetus occur?

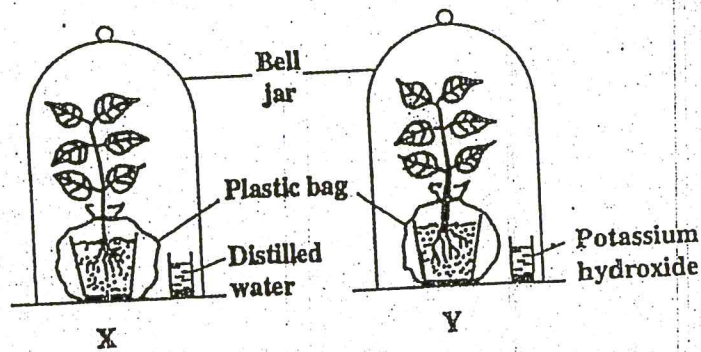
17. Respiratory enzymes are MOSTLY located in the

- (A) cilium
- (B) nucleus
- (C) alveolus
- (D) mitochondrion

18. A girl looks up from the book she is reading outdoors at a flock of birds in flight. Which of the following is MOST likely to occur within her eyes?

- (A) The pupils get larger.
- (B) The pupils remain the same.
- (C) The lenses become less convex.
- (D) The lenses become more convex.

Items 19-20 refer to the following diagrams, X and Y, which illustrate how an investigation into a metabolic process was set up.



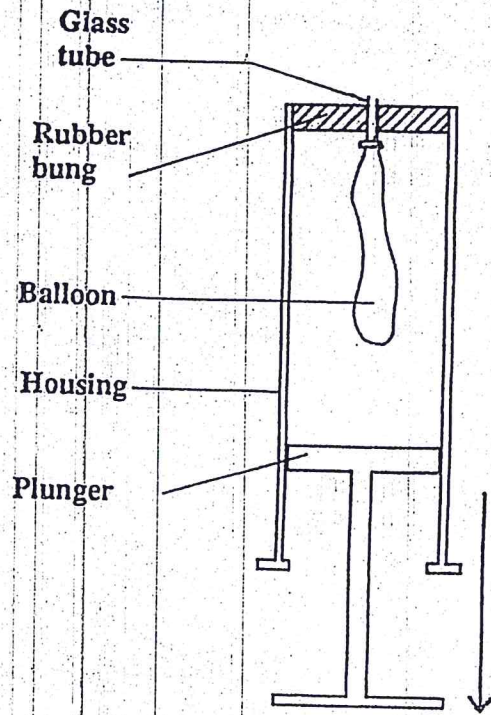
19. The aim of the investigation was to see

- (A) the effect of potassium hydroxide on the growth of plants
- (B) the effect of water on the growth of plants
- (C) if carbon dioxide is necessary for photosynthesis
- (D) if oxygen is necessary for photosynthesis

20. Before the experiment was set up, the plants were placed in a dark cupboard for about twenty-four hours. This step was necessary to

- (A) reduce the quantity of sugar produced during photosynthesis
- (B) allow the plant to get its store of carbon dioxide
- (C) ensure that any starch produced was removed from the leaves
- (D) stop further reduction of carbon dioxide to carbohydrate

Items 21 - 23 refer to the following diagram of a model showing how breathing takes place.



21. The part of the model which represents the diaphragm is the

- (A) rubber bung
- (B) balloon
- (C) plunger
- (D) housing

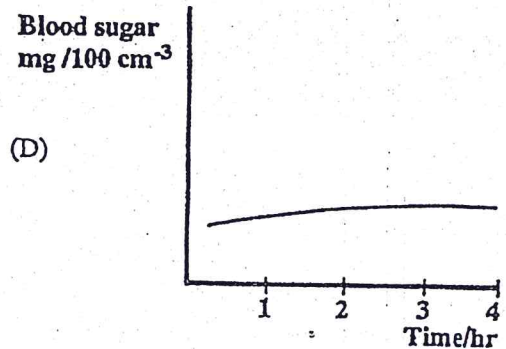
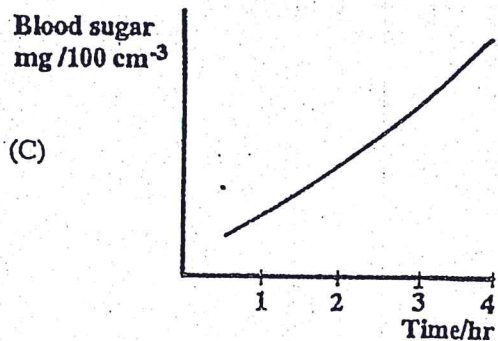
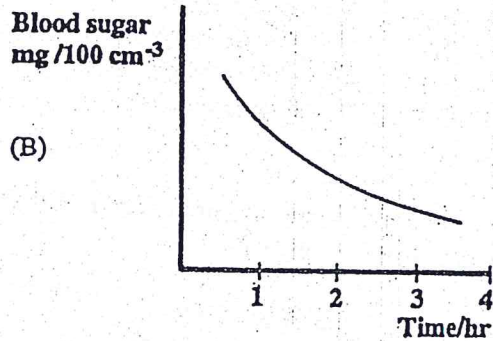
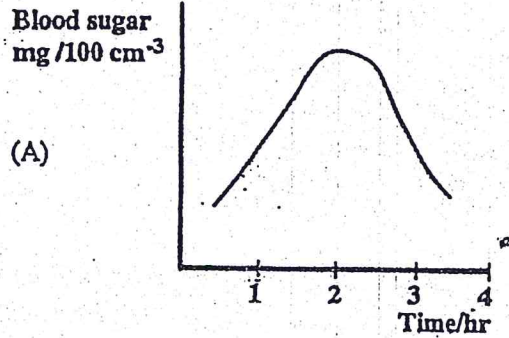
22. Which of the following would occur when the plunger is moved in the direction of the arrow shown in the diagram?

- (A) The balloon will expand.
- (B) A vacuum will be created.
- (C) The volume of the apparatus will decrease.
- (D) The pressure within the housing will increase.

23. Which part of the respiratory system functions like the balloon when the plunger is moved?

- (A) Alveolus
- (B) Bronchus
- (C) Diaphragm
- (D) Trachea

24. Which of the following graphs represents blood sugar level in a normal individual after taking a meal that is high in carbohydrates?



25. After vigorous exercise, the muscles involved show a marked increase in the concentration of

- (A) glucose
- (B) glycogen
- (C) lactic acid
- (D) citric acid

26. Which of the following are important in the diet for development of strong bones and teeth?

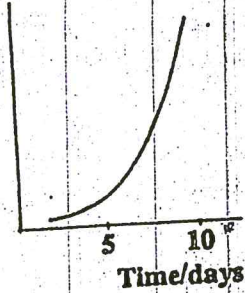
- (A) Calcium and iron
- (B) Phosphorus and iron
- (C) Vitamin C and calcium
- (D) Phosphorus and calcium

27. The main function of cartilage at the end of long bones is to

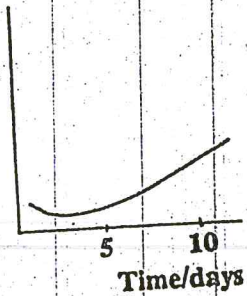
- (A) lubricate joints
- (B) increase flexibility
- (C) reduce friction
- (D) protect nerves

28. Which of the following graphs BEST illustrates the growth of seedlings in the dark?

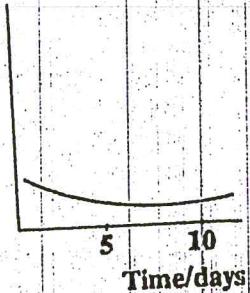
(A) Seedling height/cm



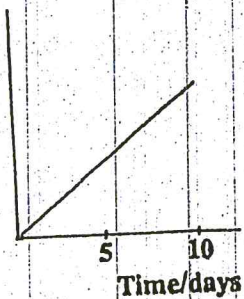
(B) Seedling height/cm



(C) Seedling height/cm



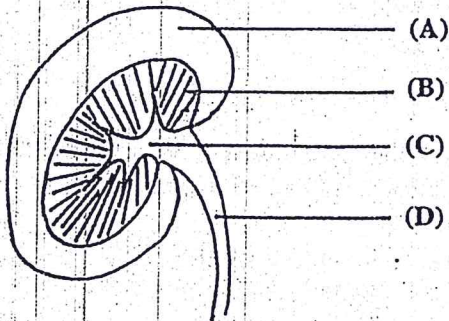
(D) Seedling height/cm



29. An individual wears glasses (spectacles) with convex lenses because

- (A) his eyeballs are of irregular shape
- (B) his lenses are becoming cloudy
- (C) images form behind the retina
- (D) insufficient light is entering his pupils

Items 30 - 31 refer to the following section through a kidney, with parts labelled (A) to (D).



Match each of the items below with one of the parts labelled above, each of which may be used more than once, once or not at all.

30. Site of urine collection

31. Site of osmoregulation

32. Which of the following is NOT a reason why plants depend on animals?

- (A) Pollination
- (B) Dispersal of fruits and seeds
- (C) Carbon dioxide
- (D) Oxygen

33. The following are descriptions of blood vessels.

- I. Thin wall, large lumen, takes blood away from organs and tissues
- II. Tiny, thin-walled vessel adapted for diffusion; close to cells
- III. Thick wall, small lumen, takes blood to organs and tissues

Which of the following sequences correctly identifies the blood vessels described above?

	I	II	III
(A)	Artery	vein	capillary
(B)	Vein	capillary	artery
(C)	Capillary	vein	artery
(D)	Artery	capillary	vein

34. The diagram below represents a seedling that has been growing in the dark.



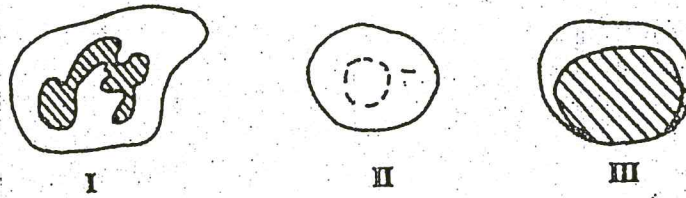
The plumule of the seedling is showing a

- (A) negative response to gravity
- (B) negative response to light
- (C) positive response to gravity
- (D) positive response to light

35. A plant organ is a fruit if it

- (A) contains an embryo
- (B) stores food for the embryo
- (C) has a tough outer coat
- (D) was formed from an ovary

Item 36 refers to the diagrams below which show components found in human blood.



36. I, II and III respectively are

- | | | | |
|-----|-------------|-------------|-------------|
| (A) | Erythrocyte | lymphocyte | phagocyte |
| (B) | Phagocyte | erythrocyte | lymphocyte |
| (C) | Phagocyte | lymphocyte | erythrocyte |
| (D) | Lymphocyte | erythrocyte | phagocyte |

37. Which of the following parts of a leaf does NOT contain chlorophyll?

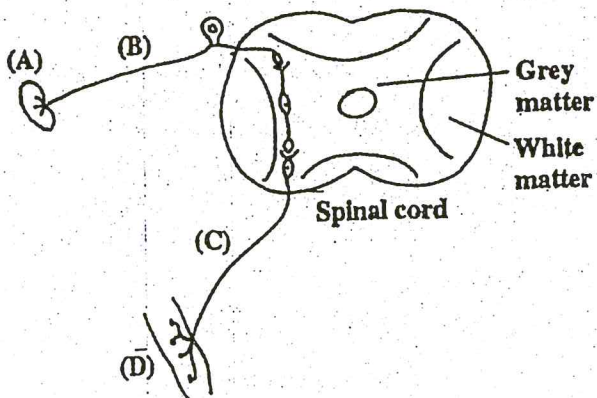
- (A) Cuticle
- (B) Guard cell
- (C) Palisade layer
- (D) Spongy layer

39. On what type of day is the rate of transpiration likely to be lowest?

- (A) Cool and sunny
- (B) Cloudy and windy
- (C) Hot and windy
- (D) Cloudy and cool

Item 38 refers to the following diagram of a reflex arc, with parts labelled (A) to (D).

38. Which part takes messages to the central nervous system?



40. The reactants in aerobic respiration are

- (A) water and carbon dioxide
- (B) water and oxygen
- (C) glucose and oxygen
- (D) glucose and carbon dioxide

41. Some plants, such as Bryophyllum (Wonder-of-the-world), can be propagated from buds at the leaf margin. The buds develop into complete plantlets while still attached to the leaf margin. These plants also flower and produce seeds. The development of the plantlets and the seed

- (A) both take place by mitosis
- (B) both take place by meiosis
- (C) take place by mitosis for the seed and meiosis for the plantlets
- (D) take place by meiosis for the seed and mitosis for the plantlets

42. Which of the following combinations of sex chromosomes is found in the nuclei of non-reproductive cells of humans?

	In the male	In the female
(A)	XY	YY
(B)	XX	XY
(C)	YY	XY
(D)	XY	XX

43. After spraying mosquitoes in a particular area with the same insecticide for a long time, the insecticide lost its effectiveness. This was MOST likely due to

- (A) artificial selection
- (B) development of resistant forms of the mosquitoes
- (C) use of insufficient quantities of insecticide
- (D) change in concentration of the insecticide

44. Which of the following results from genetic engineering?

- (A) An organism may show new traits.
- (B) New characteristics are created.
- (C) Different organisms are created.
- (D) Artificially made organisms may evolve.

45. A man with normal vision married a woman who also had normal vision. Some of their children were colour-blind. To what sex would these colour-blind children belong?

- (A) It cannot be predicted.
- (B) Female only.
- (C) Both male and female.
- (D) Male only.

46. Which of the following structures contains the factors that control the cell characteristics?

- (A) Mitochondrion
- (B) Cell membrane
- (C) Chloroplast
- (D) Chromosome

47. Mutations provide a basis for evolutionary changes because

- (A) they lead to a decrease in the number of alleles
- (B) they lead to an increase in the number of alleles
- (C) the majority of mutant genes are harmful
- (D) the majority of mutant genes are recessive

48. Structure Q below represents a body cell.



Which of the following would represent the nucleus of a gamete from the same organism?

- (A)
- (B)
- (C)
- (D)

Item 49 refers to the following information.

It is possible to produce new carrot plants from a few cells from a mature carrot.

49. Which of the following is NOT a part of the process described above?

- (A) Cloning
- (B) Mitosis
- (C) Meiosis
- (D) Tissue culture

50. An animal which carries a disease-causing organism but is not adversely affected by it is known as a

- (A) host
- (B) vector
- (C) parasite
- (D) pathogen

Item 51 refers to the following methods of disease treatment/control.

- I. Improved personal hygiene
- II. Isolation of persons with the disease
- III. Good sanitary practices e.g. proper garbage disposal
- IV. Careful food preparation

51. These methods are used in the treatment/control of a disease that is

- (A) inherited
- (B) infectious
- (C) caused by inadequate supply of nutrients
- (D) caused by malfunction of body systems

52. A new disease, fatal to human beings, was discovered in a farming community. Another mammal was also found to show some symptoms of the disease. Serum from the blood of these mammals was given to those persons in the community who did not yet have the disease. This was an example of

- (A) infection
- (B) transfusion
- (C) an antitoxin
- (D) an immunization

53. When a person receives a vaccine, his/her immune system is stimulated to produce

- (A) antigens
- (B) antibiotics
- (C) antibodies
- (D) antitoxins

Items 54 - 55 refer to the following table.

Species	No. of Throws of a Quadrat									
	1	2	3	4	5	6	7	8	9	10
P	7	7	14	28	2	1	0	0	4	3
Q	18	21	36	3	10	3	1	5	5	6
R	10	18	46	0	12	10	8	2	16	4
S	1	0	0	0	1	3	4	1	21	2

54. The information in the table can be used to calculate

- (A) density only
- (B) frequency only
- (C) density and frequency
- (D) frequency and cover

55. The area in which the quadrat on the 3rd throw fell is probably

- (A) under a large tree
- (B) close to a source of water
- (C) a very sandy area
- (D) close to a walk way

56. Soil fertility may BEST be increased in the short term by the

- (A) rotation of crops
- (B) addition of manure
- (C) addition of lime
- (D) terracing of land

Items 57 - 58 are based on the following information and table.

During the dry season, some 5th form students compared the properties of the soils in the school's long jump pit, on the footpath near the school and in the school's garden. They obtained the following results.

Soil	X	Y	Z
% Air	10	40	30
% Water	12	10	35
% Water retained	60	20	40
% Large particles	30	70	70

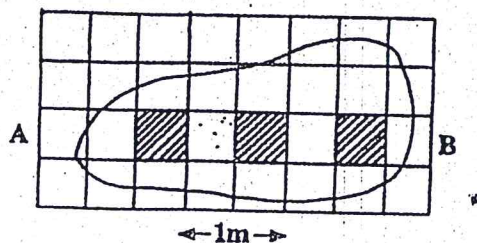
57. Soils X, Y and Z came respectively from the

- (A) footpath, long jump pit, school garden
- (B) school garden, long jump pit, footpath
- (C) footpath, school garden, long jump pit
- (D) long jump pit, footpath, school garden

58. The soil types of X, Y and Z respectively are

- (A) clayey, loamy, sandy
- (B) loamy, sandy, clayey
- (C) sandy, loamy, clayey
- (D) clayey, sandy, loamy

Items 59 - 60 refer to the following diagram which was included in a student's record of an ecological study of a pond.



59. The shaded areas MOST likely represent

- (A) sampling areas
- (B) squares in the net
- (C) transects
- (D) troughs

60. If the study were carried out along the line A to B, this section could be described as a

- (A) quadrat
- (B) ribbon
- (C) track
- (D) transect

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

