

Item 1 refers to the food chain below which shows the feeding relationships in a freshwater habitat.

Microscopic → Mosquito → Small → Large
Alga Larva Fish Fish

1. The organism to which the LEAST amount of energy is available is the

- (A) microscopic alga
- (B) mosquito larva
- (C) small fish
- (D) large fish

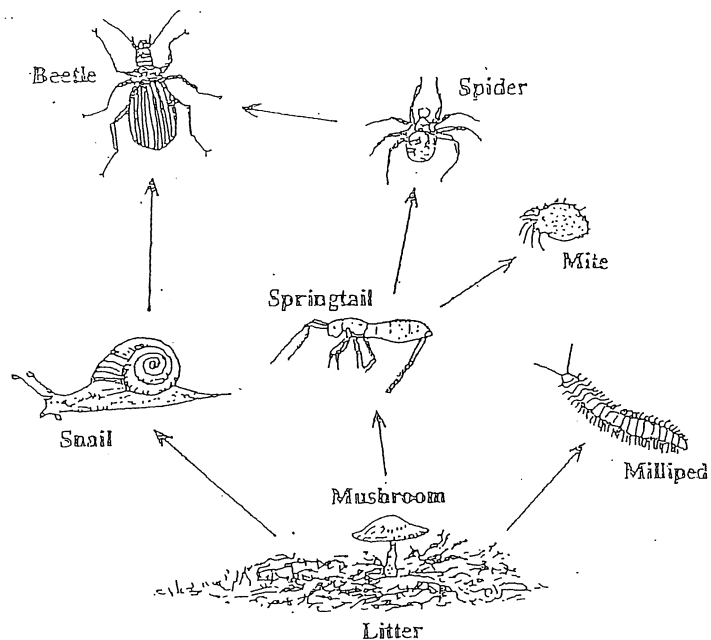
2. A plant which has reduced leaves with no chlorophyll, lacks a proper root system, and flowers abundantly, is MOST likely to be found

- (A) in a habitat where water is scarce
- (B) living parasitically on another plant
- (C) growing in an area where there are few insects
- (D) existing as a commensal with other green plants

3. In an ecosystem, the organisms which make solar energy available to all other organisms are the

- (A) producers
- (B) decomposers
- (C) primary consumers
- (D) secondary consumers

Item 4 refers to the following diagram which represents a food web found in leaf litter.



4. Which of the following statements about the food web are true?

- I. The beetle is a top carnivore.
- II. The spider and the mite are competitors.
- III. The mushroom is a producer.

- (A) I and II only
- (B) I and III only
- (C) II and III only
- (D) I, II and III

5. Which of the following organisms would MOST likely live in the same habitat?

- I. Amoeba
- II. Prayingmantis
- III. Guppy (fish)
- IV. Fern
- V. Algae

- (A) II and V only
- (B) III and IV only
- (C) I, II and V only
- (D) I, III and V only

6. Which of the following structures may be used to distinguish between a plant cell and an animal cell?

- (A) Vacuoles
- (B) Cell walls
- (C) Mitochondria
- (D) Cell membranes

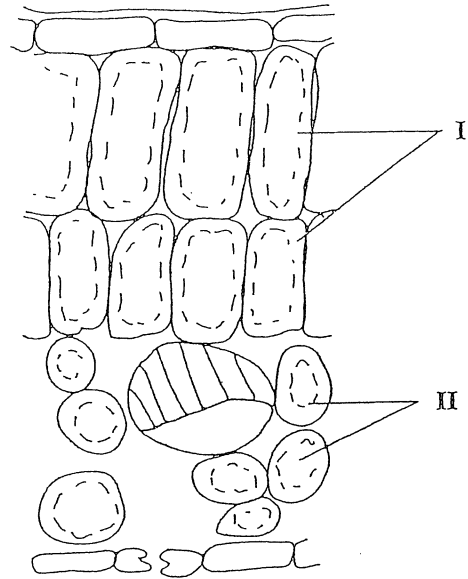
7. Which of the following pairs of function and organelle is NOT correctly matched?

Function	Organelle
(A) Osmotic control	Membrane
<input checked="" type="radio"/> (B) Polypeptide chain synthesis	Chloroplast
(C) Hereditary materials	Nucleus
(D) Release of energy	Mitochondrion

8. When a seedling loses water to the atmosphere faster than it can be obtained from the soil, the turgidity of the cells

- (A) increases and the seedling wilts
- (B) decreases and the seedling wilts
- (C) increases and the seedling does not wilt
- (D) decreases and the seedling does not wilt

Item 9 refers to the diagram below which shows the cross section through a dicotyledonous leaf.



9. Which of the following is NOT true of the cells labelled I and II in the diagram above?

- (A) I makes most of the food.
- (B) I has a relatively larger surface area.
- (C) II receives less energy from the sun.
- (D) II possesses more chloroplasts than I.

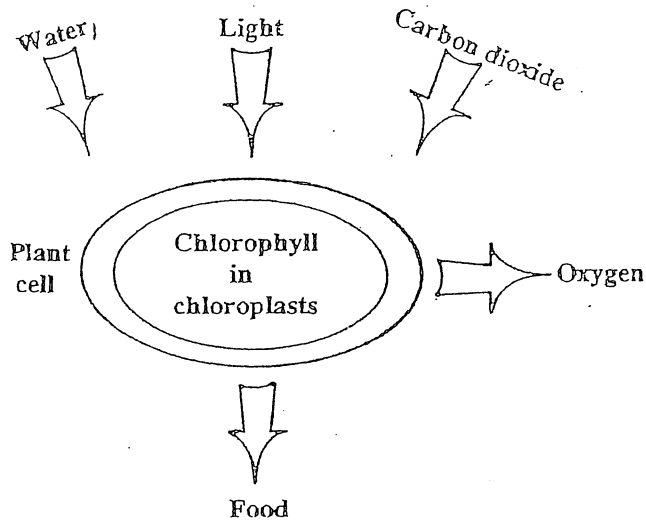
10. Bile empties into the

- (A) duodenum
- (B) caecum
- (C) ileum
- (D) stomach

11. Sodium hydroxide and weak copper sulphate solution will produce a violet colour with molecules of

- (A) fat
- (B) starch
- (C) sugar
- (D) protein

Items 12 - 13 refer to the following diagram which represents a metabolic process carried out in plants.



12. The process represented is

- (A) digestion
- (B) respiration
- (C) photosynthesis
- (D) protein synthesis

13. The food produced is

- (A) fat
- (B) starch
- (C) protein
- (D) amino acid

14. When enzymes are boiled they are unable to function. This is because an increase in temperature

- (A) destroys food materials
- (B) increases the rate of enzyme action
- (C) denatures the protein of enzymes
- (D) converts complex sugars to simple sugars

15. West Indian cherries are rich in Vitamin C. Which of the following BEST describes the benefit a boy derives from consuming West Indian cherries (fruit) everyday?

- I. Increase in the absorption of iron
- II. Prevention of bleeding gums
- III. Increase in the absorption of calcium

- (A) I only
- (B) I and II only
- (C) I and III only
- (D) I, II and III

16. Which of the following options is true for aerobic and anaerobic respiration?

	Aerobic	Anaerobic
(A)	Does not use O ₂ .	Uses O ₂ .
(B)	Occurs in the cytoplasm.	Occurs in the mitochondria.
<input checked="" type="radio"/> (C)	Releases large amounts of energy.	Releases small amounts of energy.
(D)	At least one product is organic.	Products are always inorganic.

17. Cigarette smoking sometimes makes it difficult for air to get into the lungs. This is MOST likely due to

- (A) constriction of the bronchioles
- (B) contraction of the diaphragm
- (C) stretching of the alveoli
- (D) raising of the ribs

18. Which of the following statements BEST describes the function of ATP?

- (A) It stores food.
- (B) It is a means of energy transfer.
- (C) Large quantities of energy can become available.
- (D) It speeds up chemical reactions in the cell.

19. Which of the following processes accounts for the movement of oxygen across a respiratory surface?

- (A) Diffusion
- (B) Absorption
- (C) Inhalation
- (D) Osmosis

20. Large organisms CANNOT depend solely on diffusion for the uptake and transport of gases. This is because as organisms get larger the

- (A) surface area to volume ratio increases
- (B) surface area to volume ratio decreases
- (C) surface area and the volume both increase
- (D) surface area and the volume both decrease

21. As part of the sequence of the heartbeat, the ventricular muscle contracts, the atrio-ventricular valves close, and the arterial valves open. This allows blood to flow from

- (A) ventricles to the arteries
- (B) ventricles to the veins
- (C) veins to the atria
- (D) atria to the ventricles

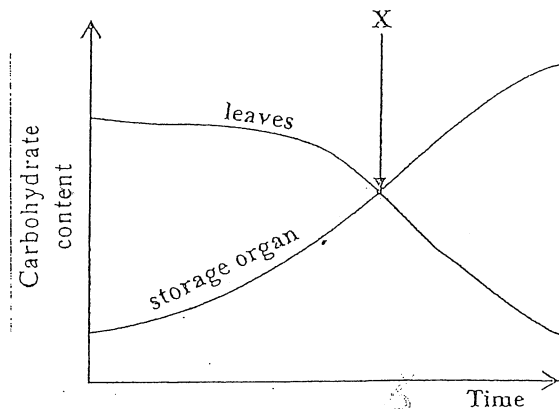
22. The structure of the red blood cell allows it to

- I. squeeze through tiny blood vessels
 - II. release large quantities of oxygen
 - III. absorb carbon dioxide
 - IV. absorb large quantities of oxygen
- (A) I and II only
 - (B) I and III only
 - (C) I and IV only
 - (D) III and IV only

23. A greenhouse plant which is usually kept at a temperature of 25 °C is subjected to a temperature of 30 °C for 24 hours. The MOST likely effect of this change is that the plant will

- (A) lose more water and wilt
- (B) absorb more water and open the stomata
- (C) absorb less water and close the stomata
- (D) lose less water and become turgid

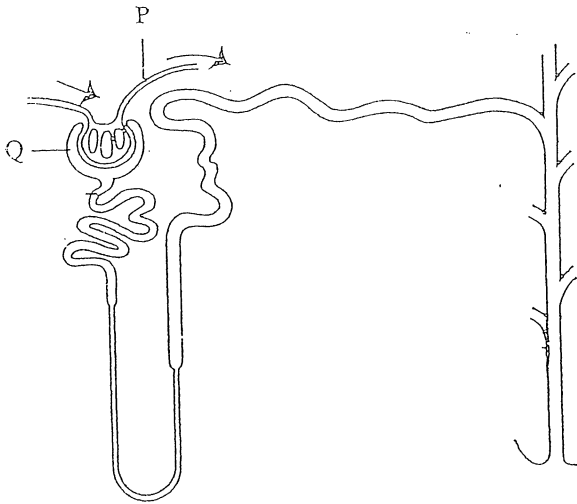
Item 24 refers to the following graph which shows the relative amounts of carbohydrate in the leaves and storage organ of a plant towards the end of its growing season.



24. The point X represents the period when the

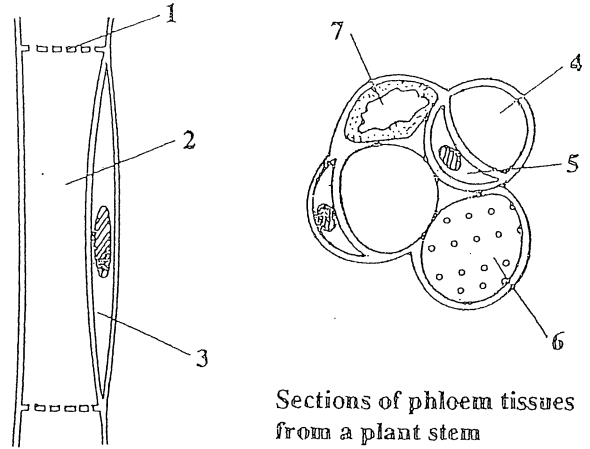
- (A) plant has its highest carbohydrate content
- (B) plant dies for regeneration in the next growing season
- (C) carbohydrate content of the leaves and storage organ are equal
- (D) carbohydrate content of the leaves is higher than that of the storage organ

Items 25 - 26 refer to the simplified drawing of a renal tubule (nephron) below.



25. The process which occurs in Q is
- (A) secretion
 - (B) reabsorption
 - (C) osmosis
 - (D) filtration
26. One component present in the fluid in P but NOT in the fluid in Q is
- (A) urea
 - (B) glucose
 - (C) blood proteins
 - (D) blood plasma

Items 27 - 28 refer to the following diagrams of sections of phloem tissues from a plant stem.

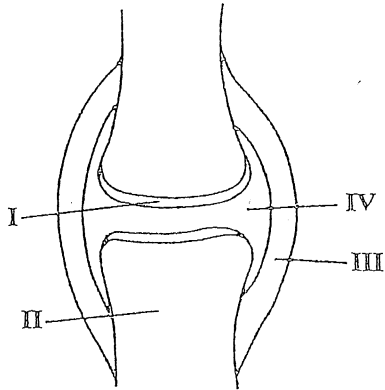


27. Manufactured food is transported in
- (A) 1 and 5
 - (B) 2 and 4
 - (C) 3 and 5
 - (D) 3 and 6
28. Companion cells are represented by
- (A) 1 and 7
 - (B) 2 and 5
 - (C) 2 and 6
 - (D) 3 and 5
29. Which of the following BEST describes excretion?
- (A) Getting rid of undigested food from the gut
 - (B) Loss of water from the contractile vacuole
 - (C) Getting rid of waste products of metabolism
 - (D) Loss of water, as a vapour, through the stomata

30. The MOST important of the minerals stored by bones in the body are

- (A) calcium and phosphorus
- (B) calcium and potassium
- (C) phosphorus and sodium
- (D) sodium and potassium

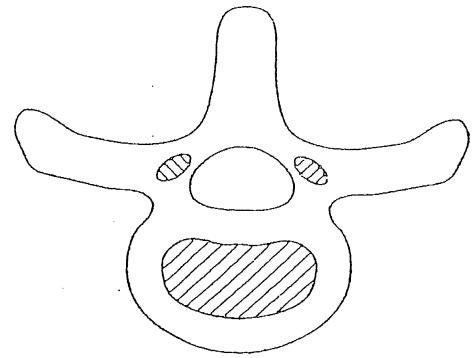
Item 31 refers to the following diagram of a section through a joint.



31. Which of the following components reduce friction?

- (A) I and II
- (B) I and IV
- (C) II and III
- (D) II and IV

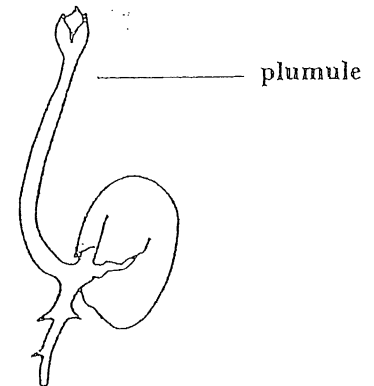
Item 32 refers to the following diagram which shows the plan of a typical vertebra.



32. Which of the following vertebrae is modified to the greatest extent from the plan shown in the diagram above?

- (A) Atlas
- (B) Cervical
- (C) Lumbar
- (D) Thoracic

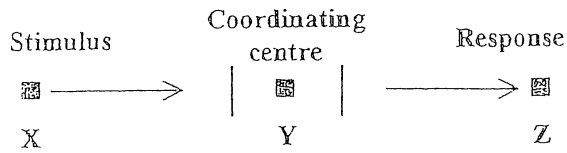
Item 33 refers to the following diagram which represents a seedling that has been growing in the dark.



33. The plumule of the seedling is showing a

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

Item 34 refers to the following diagram which shows a coordinated response to a stimulus in humans.



34. The role of Y in the illustration above is to

- (A) stimulate receptors
- (B) cause reflex actions
- (C) react to stimuli
- (D) interpret changes in surroundings

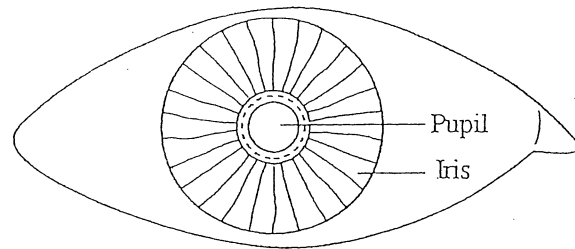
35. For a student to recall his biology notes, action takes place in

- (A) a reflex arc
- (B) the cerebrum
- (C) the cerebellum
- (D) the medulla oblongata

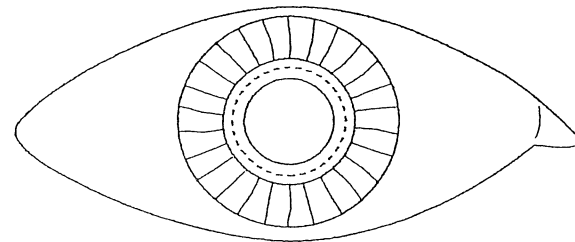
36. Carbohydrate stored in the muscles of a marathon runner is converted to available glucose during a race. This conversion is controlled by the hormone

- (A) adrenalin
- (B) insulin
- (C) thyroxin
- (D) testosterone

Item 37 refers to the following diagrams (I and II) representing the iris in bright and dim light respectively.



I



II

37. What causes the appearance in I and II to be different?

- (A) In bright and dim light the circular and radial muscles both contract.
- (B) In bright and dim light both circular and radial muscles relax.
- (C) In dim light the circular muscles relax and radial muscles contract, and in bright light radial muscles relax and circular muscles contract.
- (D) In bright light circular muscles relax and radial muscles contract, and in dim light radial muscles relax and circular muscles contract.

38. The following reactions all take place in the skin.

- I. Blood vessels dilate and constrict.
- II. Glands produce sweat.
- III. Hair erector muscles contract.

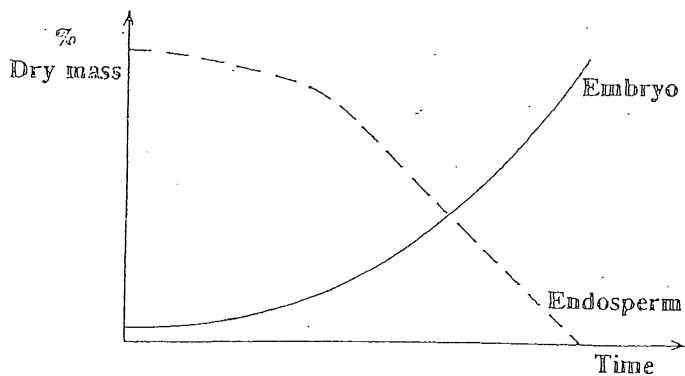
These functions relate to the skin's role as an organ for

- (A) mechanical protection only
- (B) body temperature control only
- (C) both body temperature control and sensitivity to the surroundings
- (D) mechanical protection, body temperature control and sensitivity to the surroundings

39. Secretions from your adrenal glands help you to function more effectively when

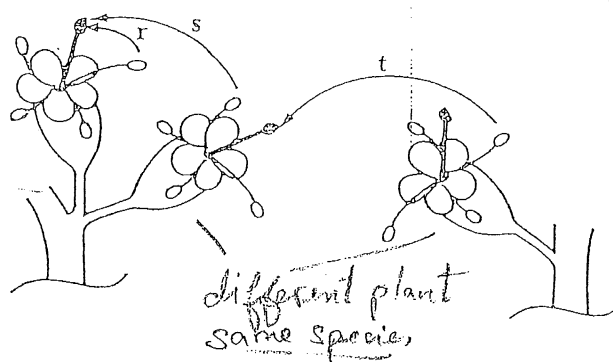
- (A) doing an examination
- (B) eating a meal
- (C) listening to music
- (D) going to bed

Item 40 refers to the following graph which shows changes in dry mass of embryo and endosperm during germination.



40. From the graph, it is true to say that
- (A) the embryo begins to grow as the endosperm increases in mass
 - (B) the embryo and the endosperm decrease in mass at the same rate
 - (C) the embryo and the endosperm increase in mass at the same rate
 - (D) as the embryo grows, the food reserves are gradually depleted

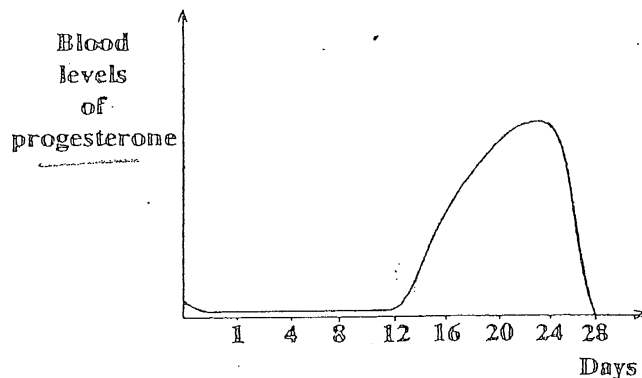
Item 41 refers to the following diagram which illustrates pollination.



41. Pollination involves the transfer of pollen from anther to stigma. Which of the arrows in the diagram above may be illustrating the movement of pollen in cross-pollination?

- (A) s only
- (B) t only
- (C) r and s
- (D) s and t

Item 42 refers to the graph below which shows blood levels of progesterone during the menstrual cycle of a human female.



42. With which process does the HIGHEST point of the curve correspond?

- (A) Shedding of the lining of the uterus
- (B) Production of a mature egg cell from the ovary
- (C) Maximum production of the hormone by the placenta
- (D) Maximum production of the hormone by the corpus luteum

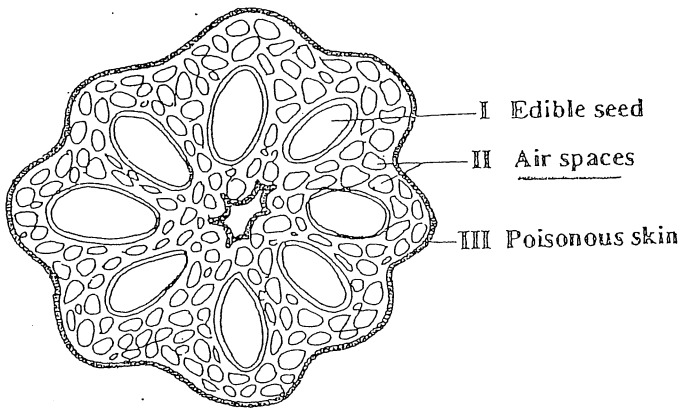
43. Oral contraceptives prevent pregnancy by

- (A) killing sperm
- (B) killing released eggs
- (C) preventing ovulation
- (D) preventing implantation

44. During pregnancy, the developing foetus receives protection against infections, a perfectly balanced diet, warmth and oxygen from its mother. Which of the following can a mother no longer provide for her newborn infant?

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

Items 45-46 refer to the following diagram of the cross-section of a fruit of an unknown plant found on the shore of a swamp.



45. Which of the following is the MOST likely means of dispersed of this fruit?

- (A) Wind
- (B) Water
- (C) Animal
- (D) Mechanical

46. Which of the following would BEST suggest what the agent of dispersal might be?

- (A) I only
- (B) II only
- (C) III only
- (D) II and III only

47. Which of the following describes the chromosomes present in the ordinary cells of a human female?

- (A) 22 + X
- (B) 22 + XX
- (C) 22 pairs + X
- (D) 22 pairs + XX

48. Genetic engineering is BEST described as changing the traits of one organism by

- (A) incorporating genes from another organism
- (B) incorporating a few chromosomes from a different organism
- (C) crossing it with a closely related species
- (D) inducing mutation in its sex organs

Items 49-50 refer to the following diagrams.

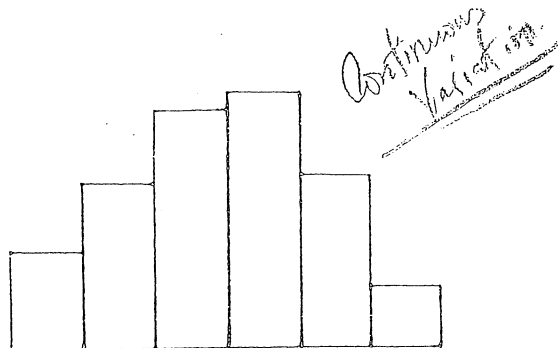


Figure X

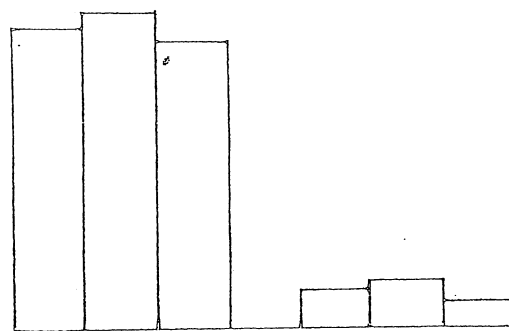


Figure Y

49. Figure X can be used to show

- (A) the number of shrubs in a field
- (B) stages in the life history of an insect
- (C) the heights of students in a school
- (D) variation in skin colour among albinos

50.

Figures X and Y can both be used to show different kinds of

- (A) variation
- (B) selection
- (C) inheritance
- (D) reproduction

Item 51 refers to the following information.

Some fowls (called Erminette) have black and white feathers evenly distributed over the body. A breeder crosses two of these fowls and finds that there are pure white, pure black and Erminette among the offspring.

51. What would you expect the ratio of black:white:Erminette to be?

- (A) 1 : 1 : 1
- (B) 1 : 1 : 2
- (C) 1 : 2 : 1
- (D) 3 : 1 : 1

52. Which of the following is NOT one of the body's natural ways of defending itself against infection?

- (A) Clotting
- (B) Vaccination
- (C) Action of phagocytes
- (D) Production of antibodies

Items 53-54 refer to the following types of diseases.

- (A) Pathogenic
- (B) Deficiency
- (C) Hereditary
- (D) Physiological

Match each item with one of the options above. Each option may be used once, more than once, or not at all.

53.

The type of disease to which sickle-cell anaemia belongs

54.

A disease that can be prevented with immunization

55. Abuse of prescription drugs is considered a disease because

- (A) it is costly to families
- (B) it reduces human productivity
- (C) many people are involved in it
- (D) it affects the functioning of the body

56. Which of the following statements is true of inorganic fertilisers?

- (A) They help to hold water in soils.
- (B) They do not affect soil pH.
- (C) They make nutrients available more quickly.
- (D) They improve the crumb structure of soil.

Items 57-58 refer to the following information.

A test was done to determine the water content of 4 different soils – clay, sand, a clayey loam and a sandy loam. The mass of 10 cm³ of each soil was determined before and after heating until completely dry. The results were as follows.

	(A)	(B)	(C)	(D)
Initial mass	17	15	13	15
Final mass	16	13	8	11

* 57. Which soils would be BEST for use as a facial astringent intended to shrink as it dries out, pulling the skin tight?

* 58. Which soil would be MOST suitable for use in an underground filter?

Items 59-60 refer to the following table.

Species	Number 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

59. The area in which the quadrat on the third 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 walkway

60. Which of the following is MOST likely true about Species P?

- (A) It is the commonest plant in the area.
- (B) It is taller than the other plants close to it.
- (C) It covers most of the area in which the quadrat fell on the 10th throw.
- (D) It covers about half the area in which the quadrat fell on the 4th throw.