1. Which of the following characteristics is used to distinguish insects from other Arthropods?

(A) Number of legs
(B) Hairiness
(C) Colour
(D) Shape

2. Living organisms, such as plants, are affected by **abiotic** factors which determine where they become established.

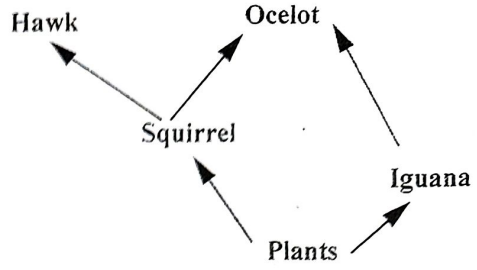
Which of the following options describes some of these determining factors?

(A) Parasitism, commensalism, mutualism
(B) Sediment size, shape and colour
(C) Sunlight availability, soil pH, minerals
(D) Deforestation, slash and burn, shifting cultivation

3. A 50 g sample of fresh soil is repeatedly heated at 110 °C and cooled in a desiccator. The final constant weight of the soil is 35 g. The soil component eliminated by this procedure is MOST likely

(A) air
(B) water
(C) humus
(D) mineral

Item 4 refers to the following food web.



4. How many complete food chains can be formed from the food web shown above?

(A) 1
(B) 2
(C) 3
(D) 4

5. Infestations of mealy bugs can cause severe damage to Hibiscus plants and very often ladybird beetles are introduced to reduce the mealy bug population.

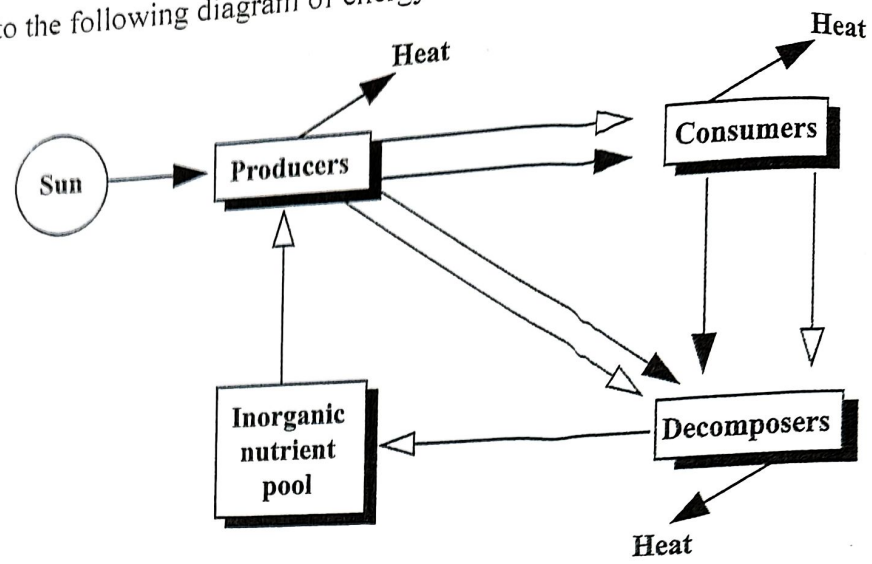
The relationship between the mealy bugs and ladybird beetles can be described as

(A) parasitism
(B) mutualism
(C) prey/predator
(D) commensalism

6. Bacteria play an important role in the cycling of nitrogen. Which of the following organisms is NOT a part of this cycle?

(A) Rhizobium
(B) Nitrobacter
(C) Nitrosomonas
(D) Streptococcus

Item 7 refers to the following diagram of energy transfer from the sun.



7. Energy flow through ecosystems is not 100% efficient. This is so because energy is

(A) lost during respiration and excretion
(B) recycled from plants to the atmosphere
(C) circular, moving in and out of organisms
(D) linear, moving from one organism to the next

---

8. Which of the following practices can be used in the conservation or restoration of an ecosystem?

I. Restricted hunting seasons
II. Quarrying to remove limestone
III Planting of mangrove along the shoreline

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

9. Which of the following are effects of pollutants on coral reefs in the Caribbean?

I. Increase in macroalgal and seagrass growth
II. Less reef fish
III. More branching corals

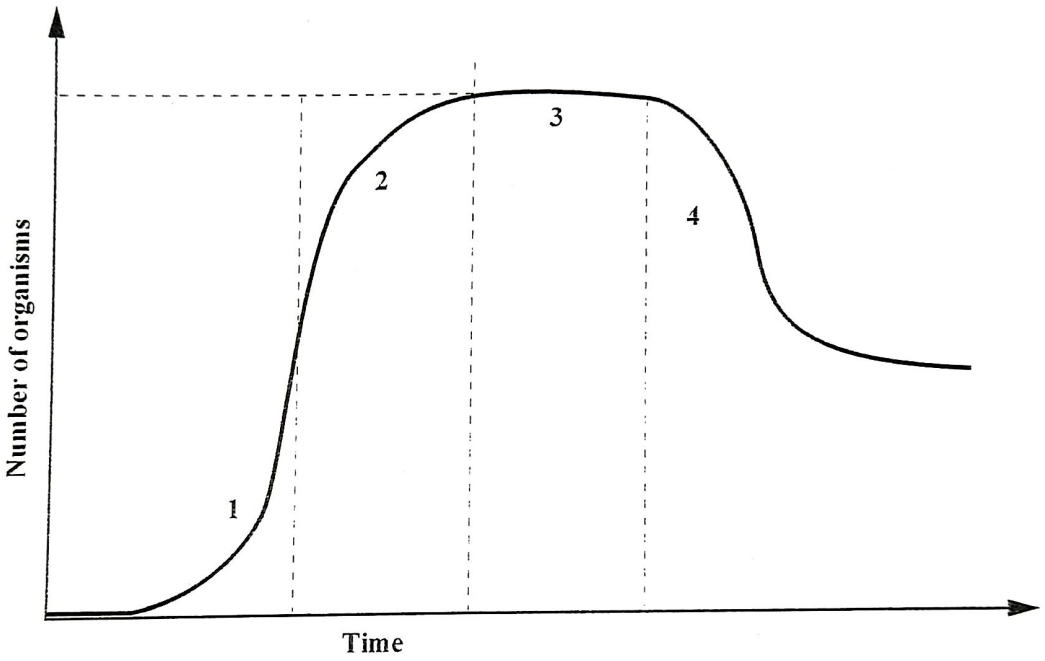
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

10. Which of the following are true about the effect of carbon monoxide from exhausts?

I. Binds reversibly with haemoglobin
II. Binds more easily with haemoglobin
III. Prevents oxygen transport by haemoglobin

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

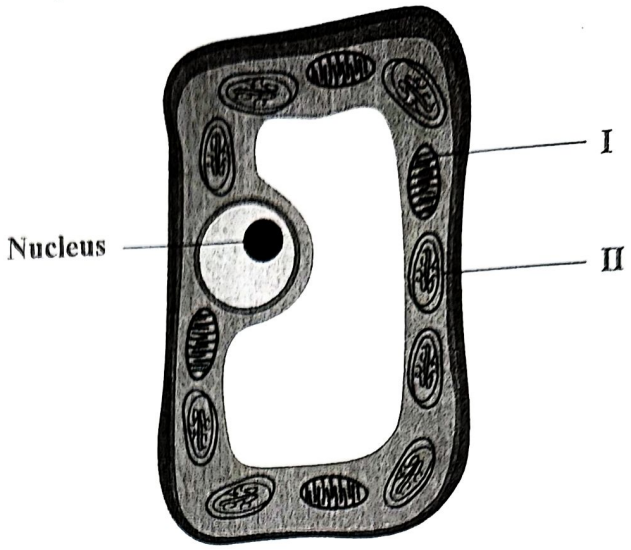
Item 11 refers to the following graph of population growth.



11. Phase 4 of the graph is MOST likely due to

(A) competition from invasive species
(B) adequate food and space
(C) a high natural birth rate
(D) disease resistance

Item **12** refers to the following diagram of a plant cell.



12. Which organelles are correctly matched to their function?

	I	II
(A)	Releases energy during respiration	Controls the activity of the cell
(B)	Traps solar energy	Controls the activity of the cell
(C)	Traps solar energy	Releases energy during respiration
(D)	Stores nutrients	Releases energy during respiration

13. Which of the following comparisons of the cell wall and the cell membrane is INCORRECT?

	Cell Wall	**Cell Membrane**
(A)	Found in plant cells only	Found in both plant and animal cells
(B)	Freely permeable	Differentially permeable
(C)	Contains cellulose	Does not contain cellulose
(D)	Found in both plant and animal cells	Found in animal cells only

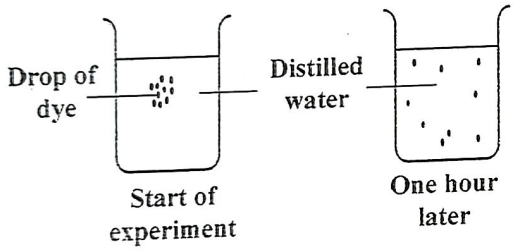
14. In multicellular organisms, cells become different from one another in order to carry out particular functions. This is called

(A) selection
(B) evolution
(C) adaptation
(D) specialization

15. Which of the following statements BEST describes diffusion?

(A) Energy is required.
(B) A cell membrane is required.
(C) A concentration gradient is necessary.
(D) It involves movement of water only.

Item 16 refers to the following diagrams which illustrate the result of an experiment.



16. The process demonstrated in the diagrams above is responsible for

(A) water entering root cells
(B) minerals entering root cells
(C) starch entering phloem cells
(D) carbon dioxide entering leaf cells

17. After absorption by the ileum, excess glucose is immediately converted to

(A) fat in the liver and muscles
(B) energy during cellular respiration
(C) glycogen by the liver and muscles
(D) fat by the liver and stored under the skin

18. Anaemia may be caused by a lack of

(A) iron and vitamin B
(B) iodine and vitamin C
(C) calcium and vitamin D
(D) phosphorous and vitamin A

19. Which of the following organisms are autotrophs?

(A) Cows
(B) Moulds
(C) Humans
(D) Seaweeds

20. When starch is chemically digested in the mouth, the enzyme and product are

	Enzyme	Product
(A)	salivary amylase	maltose
(B)	pancreatic amylase	maltose
(C)	pancreatic amylase	glucose
(D)	salivary amylase	sucrose

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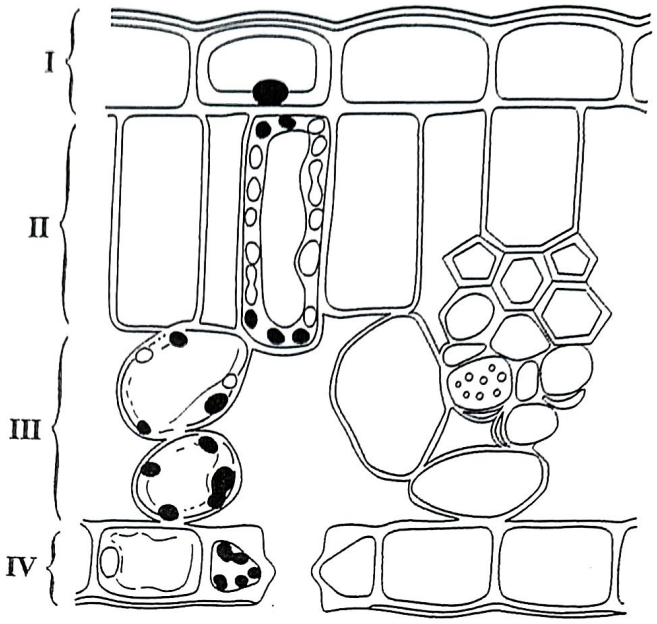
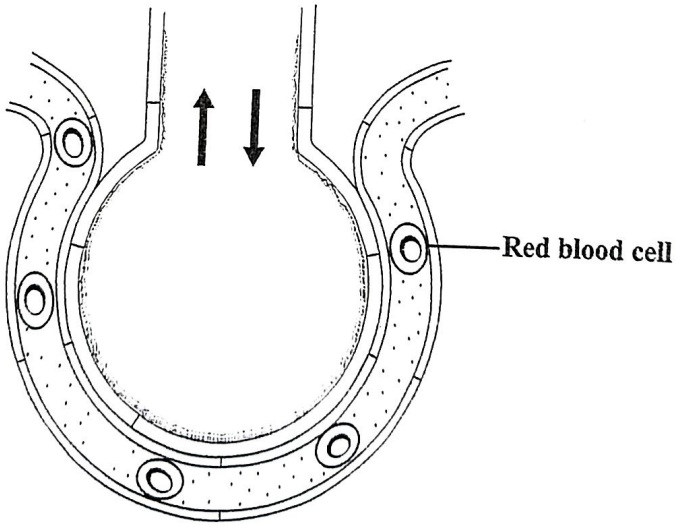
Item **21** refers to the following diagram which shows the cross section of the leaf of a flowering plant.



21. Photosynthesis occurs MAINLY in the area labelled

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

Item **22** refers to the following diagram of a respiratory structure.



22. The respiratory structure shown above is

(A) an alveolus
(B) a trachea
(C) a bronchiole
(D) a gill filament

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Item 23 refers to the following equation which shows the oxidation of glucose in cells.

$$C_6H_{12}O_6 + O_2 \xrightarrow[\text{Release of energy}]{} CO_2 + H_2O$$

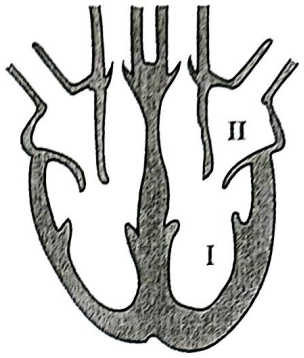
23. The energy released during the process is

(A) converted to ADP
(B) converted to ATP
(C) stored in a high energy bond in ADP
(D) stored in a high energy bond in ATP

24. Which of the following chemicals paralyses cilia on the membranes and results in mucus accumulation in the lungs.

(A) Tar
(B) Arsenic
(C) Nicotine
(D) Carbon monoxide

Item 25 refers to the following diagram of a mammalian heart.



25. In a patient with a certain defective heart condition, it was found that blood flowed from Section I to Section II of the diagram above. This was MOST likely due to a malfunction of the

(A) left atrium
(B) left ventricle
(C) bicuspid valve
(D) semi-lunar valve

26. Which of the following is NOT a type of substance transported by the circulatory system of an animal?

(A) Solid undigested food
(B) Metabolic waste
(C) Respiratory gas
(D) Digested food

27. The blood of a person suffering from a pathogenic disease differs from that of a healthy person by having a larger number of

(A) platelets
(B) red blood cells
(C) sugar molecules
(D) white blood cells

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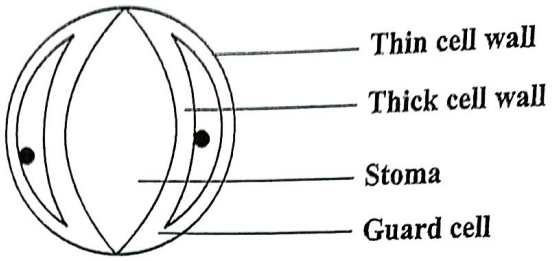
Item 28 refers to the following diagram which shows an open stoma of a leaf.



28. Which of the following changes occur when the plant is conserving water on a hot day?

	Guard Cells	Thin Cell Walls	Stoma
(A)	Turgid	Do not stretch	Closes
(B)	Turgid	Stretch	Opens
(C)	Flaccid	Stretch	Opens
(D)	Flaccid	Do not stretch	Closes

29. Which of the following options correctly matches the storage organs to their stored nutrients?

	Root	Fruit	Liver
(A)	Protein	Glucose	Fat
(B)	Fat	Glucose	Glycogen
(C)	Starch	Surcose	Glycogen
(D)	Carbo-hydrate	Sucrose	Glucose

30. A person whose kidneys have failed must undergo a process by which excretory materials are removed from the blood regularly. This is because excretory materials

(A) raise blood pressure
(B) make the blood dilute
(C) are not gotten rid of by any other means
(D) would otherwise accumulate and poison the person

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31. A student eats a highly salted snack and does not drink water. Which of the following describes and explains the urine MOST likely produced after a few hours?

	Type of Urine	ADH	Water Absorption by Kidney
(A)	Dilute	Released	Absorbed
(B)	Concentrated	Released	Absorbed
(C)	Dilute	Not released	Not absorbed
(D)	Concentrated	Not released	Not absorbed

32. Dyes in heartwood and tannins in the bark of trees are MOST likely products of

(A) photosynthesis
(B) respiration
(C) excretion
(D) auxins

33. Which of the following statements about the skeletal system are correct

I. It gives the body its shape.
II. It is made up of hard non-living tissues.
III. It protects delicate organs such as the heart and lungs.

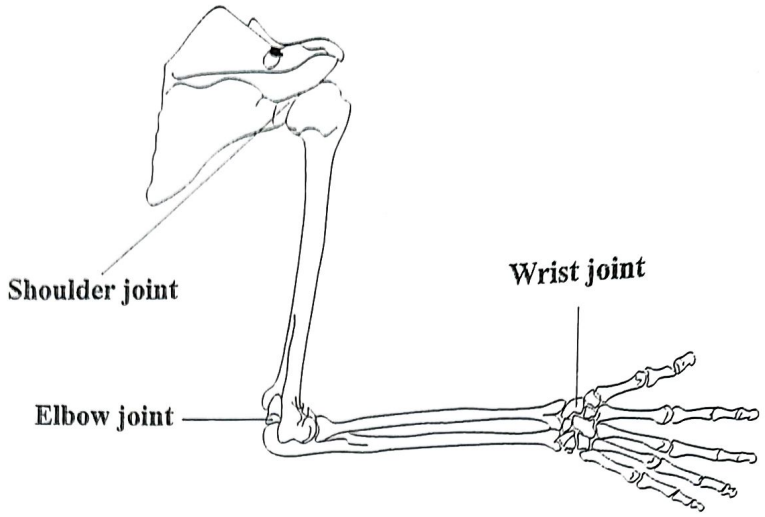
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

34. Locomotion is important to animals for

I. avoiding predators
II. acquiring food and shelter
III. assimilating digested food

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

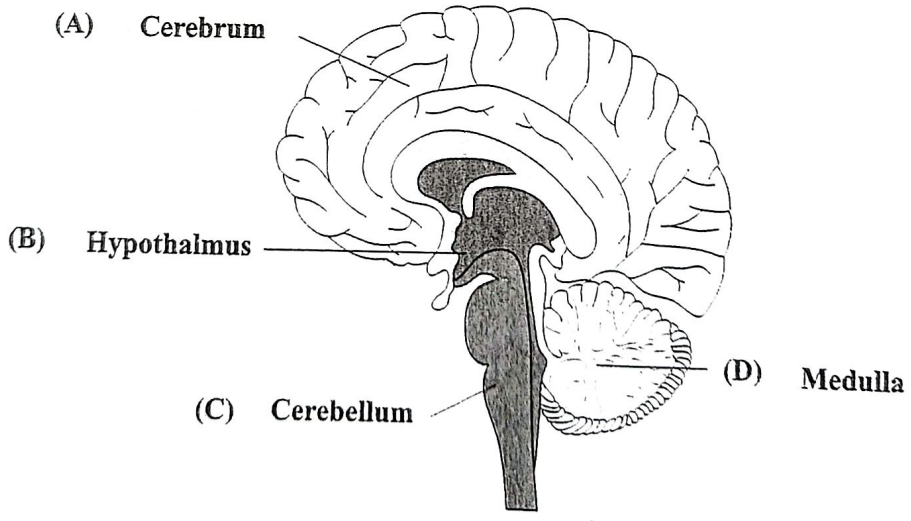
Item 35 refers to the following diagram of the arm and shoulder blade.



35. Movement in the shoulder, elbow and wrist joints is correctly described as movement in

	Shoulder Joint	Elbow Joint	Wrist Joint
(A)	three planes	one plane	one plane
(B)	three planes	one plane	three planes
(C)	one plane	three planes	one plane
(D)	one plane	three planes	three planes

36. Sashrin's speech is slurred because he drank too much alcohol. Which of the labelled regions of the brain is affected by the alcohol?



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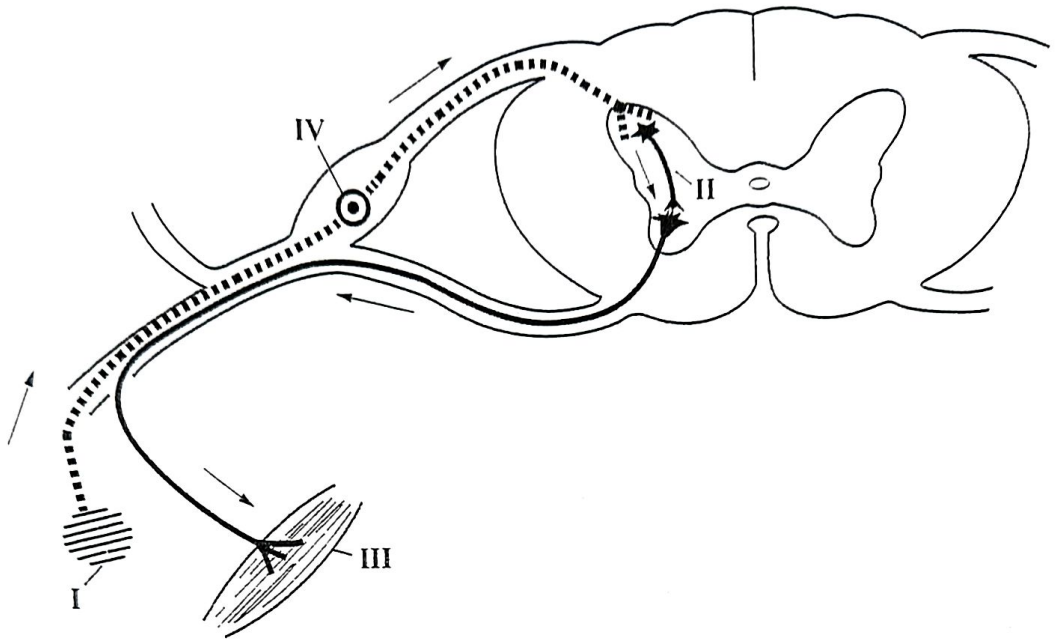
Item 37 refers to the following diagram which shows a reflex action.



37. Which labelled structure is the effector?

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

Item 38 refers to the following actions.

I. Bending of shoots towards light
II. Rolling up of a millipede when touched
III. Withdrawal of an earthworm into its burrow when touched

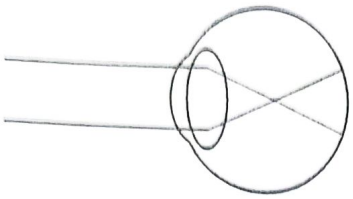
38. All of the actions are examples of

(A) stimuli
(B) responses
(C) locomotion
(D) growth movements

39. A girl smells a hamburger and salivates. Which of the following is the effector which brings about her response?

(A) Smell of food
(B) Salivary glands
(C) Cells in the nose
(D) Secretion of saliva

Item 40 refers to the following diagram of an eye which shows nearsightedness.



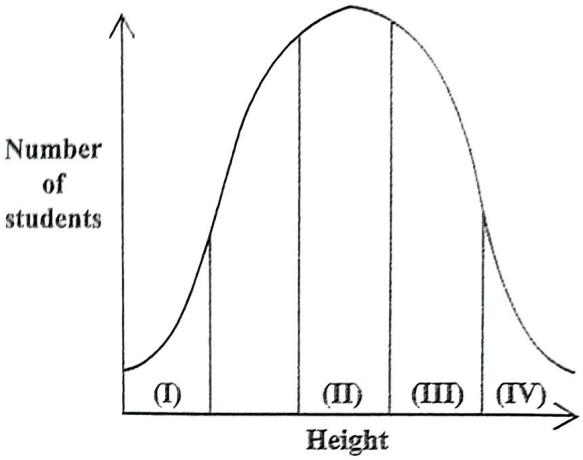
40. Which of the following shows how the defect can be corrected?

	Lens	Bending of Light Rays Before Entering the Eye
(A)	Diverging	Outwards
(B)	Diverging	Inwards
(C)	Converging	Outwards
(D)	Converging	Inwards

41. In the cotyledon of a red bean, which factor is NOT a requirement for the breakdown of stored food during germination?

(A) Enzyme
(B) Warmth
(C) Oxygen
(D) Light

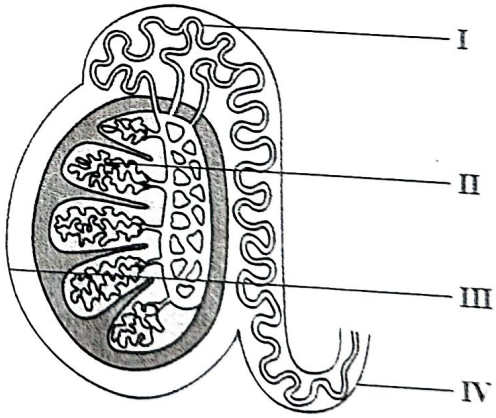
Item 42 is based on the following graph which shows the height of some students in a class.



42. Which labelled portion of the graph represents the unusually SHORT students?

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

Item 43 refers to the following diagram which shows a section through the testis.



43. The part labelled I is the

(A) epididymis
(B) vas deferens
(C) prostate gland
(D) seminiferous tubules

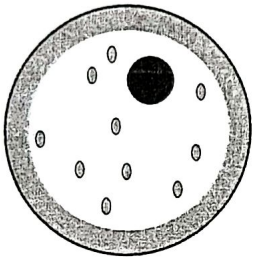
44. Pollen grains which are small, light, odourless and smooth are MOST likely transferred by

(A) water
(B) birds
(C) wind
(D) insects

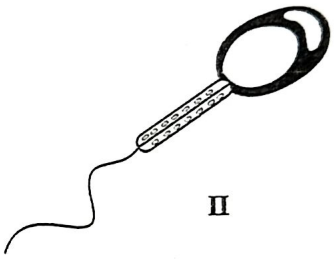
45. When an okra fruit becomes dry, it splits open along several lines of weakness in its structure. This adaptation is suited for

(A) attracting insects
(B) scattering the seeds
(C) germinating the seeds
(D) making food available to the animals

Item 46 refers to the following diagrams of specialized cells.



I



II

46. Which of the following structures is common to both cells?

(A) Cilium
(B) Nucleus
(C) Acrosome
(D) Mitochondrion

47. Which of the following is the correct sequence for seed formation after fertilization?

(A) Ovule ⟶ zygote ⟶ embryo ⟶ seed
(B) Ovule ⟶ embryo ⟶ seed ⟶ zygote
(C) Embryo ⟶ ovule ⟶ zygote ⟶ seed
(D) Embryo ⟶ zygote ⟶ ovule ⟶ seed

48. One method of controlling the population of mosquitoes is by getting rid of all stagnant water.

Which stages of the life cycle does this method control?

(A) Larva, pupa, adult
(B) Egg, larva, pupa
(C) Egg, larva, adult
(D) Egg, pupa, adult

49. A farmer's crop is infected by a disease-causing organism and he is unable to harvest most of the crop. Which of the following is an **environmental** implication as a result of this?

(A) Loss of crop
(B) Loss of productivity
(C) Loss of income and profit
(D) Risk of spread of the disease to nearby farmers' crops

50. Which of the following are consequences of plant or human disease?

I. Loss of productivity
II. Decrease in food prices
III. Larger part of national budget used to buy medications

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

51. Two alleles of a gene are situated at

(A) the same locus on a homologous pair of chromosomes
(B) different loci on a homologous pair of chromosomes
(C) the same locus on a different homologous pair of chromosomes
(D) different loci on a different homologous pair of chromosomes

52. The gene for coat colour in cattle shows incomplete dominance. A purebred cow with red coat mates with a purebred bull with white coat. All of the offspring have roan coats. Which of the following would represent the genotype of the offspring?

(A) RR
(B) RW
(C) RO
(D) WW

53. Which of the following about meiosis is NOT true?

(A) Mixing of genes occurs.
(B) Produces four daughter cells.
(C) Occurs only in the sex organs.
(D) Chromosome number is maintained.

54. Which of the following features of cell division refers to mitosis?

(A) It is essential for variety within a species.
(B) It results in the haploid number of chromosomes.
(C) It takes place in reproductive structures.
(D) The amount of genetic material in the cells remains the same.

55. Albinism is caused by a single recessive allele. Two normal parents can have an albino child. This is because

(A) both parents were heterozygous for the gene
(B) both parents were homozygous recessive for the gene
(C) one parent was homozygous dominant for the trait and the other heterozygous
(D) one parent was homozygous dominant for the trait and the other homozygous recessive

56. One example of a sex-linked disease is

(A) cancer
(B) hypertension
(C) colour blindness
(D) Down's syndrome

57. Two goats, heterozygous for fast growth rate, are crossbred. The percentage of the F1 population most likely to possess homozygous alleles is

(A) 25
(B) 75
(C) 50
(D) 100

58. Which of the following describes a group of closely related organisms that are able to interbreed and produce fertile offspring?

(A) Niche
(B) Species
(C) Population
(D) Community

59. Natural selection may be described as a

(A) process by which a community retains those genes which makes it adapted for its habitat
(B) technique by which a pioneer species retains those genes which makes it adapted for its habitat
(C) process by which an organism retains those genes which makes it adapted for its environment
(D) technique by which a selected organism retains those genes which makes it adapted for its habitat

60. Which of the following does NOT apply to genetic engineering?

(A) Treating genetic diseases
(B) Producing higher yielding crops
(C) Determining the parentage of a child
(D) Producing hormones and proteins

END OF TEST

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