

1. Leguminous plants can contribute to soil fertility because they

- (A) remove toxic substances
- (B) contain nitrogen-fixing bacteria
- (C) add trace elements
- (D) maintain the moisture content

Item 2 refers to the following information.

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

Characteristics	X	Y
Hard exoskeleton	√	√
Antennae	√	√
Wings	0	√
Segmented body	√	√
3 pairs of legs	√	0

Key: Present √ Absent 0

2. 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 X is an insect.
- (C) X is an insect but Y is not.
- (D) Neither X nor Y is an insect.

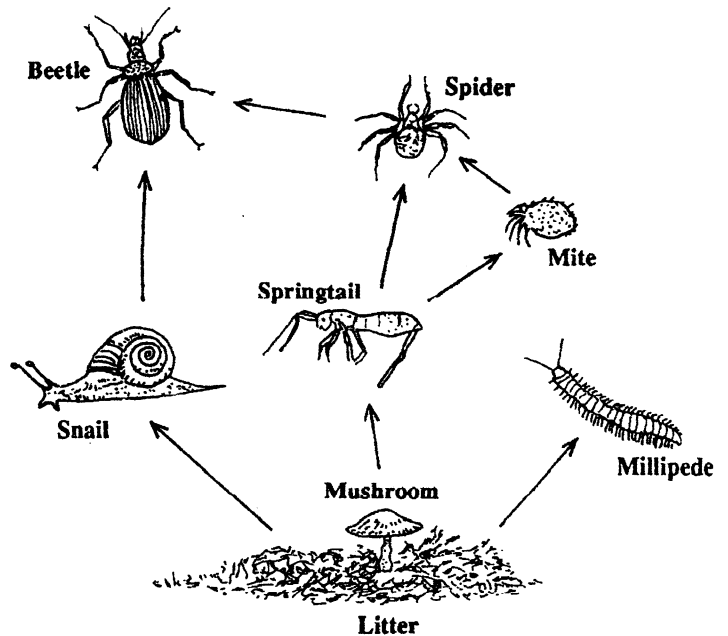
3. In an ecosystem, the organisms which make solar energy available to all other organisms are the

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

4. The bush pig, which has been observed to feed on a diet of plant roots as well as birds' eggs, is

- (A) a herbivore
- (B) a carnivore
- (C) an omnivore
- (D) a detritivore

Item 5 refers to the following diagram of a food web found in leaf litter.



5. The number of trophic levels illustrated in the food web is

- (A) 2
- (B) 3
- (C) 4
- (D) 7

6. 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

7. Which of the following cell structures are associated with energy transfer?

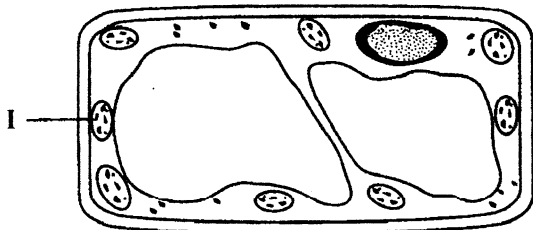
- I. Chloroplast
- II. Mitochondrion
- III. Nucleus
- IV. Cell membrane

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

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

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

Item 9 refers to the following diagram of a cell.



9. The structure labelled I is found in

- (A) animals
- (B) fungi
- (C) bacteria
- (D) green plants

10. Which of the following pairs of organisms possesses the requirements for making carbohydrates from inorganic materials?

- (A) Algae and flowering plants
- (B) Bacteria and fungi
- (C) Fungi and flowering plants
- (D) Viruses and algae

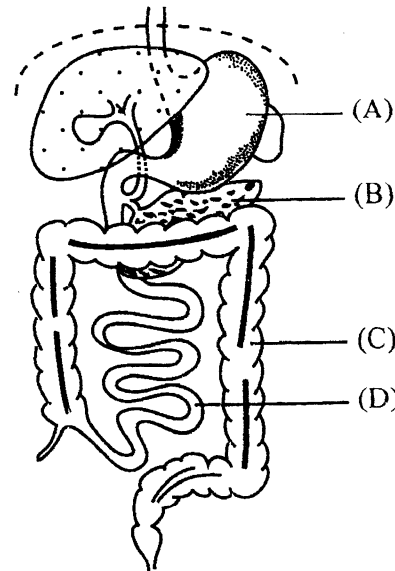
11. Sodium hydroxide and weak copper sulphate solution will produce a violet colour with molecules of

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

12. Which of the following is true of photosynthesis and respiration in green plants?

- (A) Photosynthesis occurs in the day while respiration occurs in the night.
- (B) Photosynthesis never occurs in the dark while respiration occurs only in the dark.
- (C) Photosynthesis occurs only in the light while respiration occurs both in the light and in the dark.
- (D) Photosynthesis occurs only in the sunlight and respiration takes over when photosynthesis ceases.

Items 13-14 refer to the following diagram of the human alimentary canal.



In answering items 13 and 14, match each item with one of the labelled parts above. Each part may be used once, more than once or not at all.

13. Secretes a substance to regulate sugar balance in the body

14. The site for absorption of digested food

15. The rate at which respiration is occurring in a mammal can be indicated by the rate of

- (A) sweat production
- (B) urine excretion
- (C) carbon dioxide elimination
- (D) oxygen elimination

16. The process which releases energy by breaking down organic compounds is

- (A) excretion
- (B) respiration
- (C) photosynthesis
- (D) deamination

Item 17 refers to the following characteristics.

- I. Thin-walled structures
- II. Excellent blood supply
- III. Always moist
- IV. Large surface area

17. These characteristics are true for a tissue MOST likely found in the

- (A) liver
- (B) lungs
- (C) mouth
- (D) skin

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

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

19. Which of the following sequences represents the route which a red blood cell must take to travel from the lung to the kidney?

- (A) Lung → pulmonary vein → heart → aorta → renal artery → kidney
- (B) Lung → aorta → hepatic artery → liver → renal artery → kidney
- (C) Lung → liver → hepatic portal vein → intestine → renal artery → kidney
- (D) Lung → pulmonary vein → hepatic artery → stomach → renal vein → kidney

20. Mineral salts are transported in plants mainly through the

- (A) sieve tubes
- (B) cambium
- (C) parenchyma
- (D) xylem vessels

21. 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

- (A) absorbs less water
- (B) absorbs more water
- (C) loses less water
- (D) loses more water

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) III and IV only
- (C) I and III only
- (D) I and IV only

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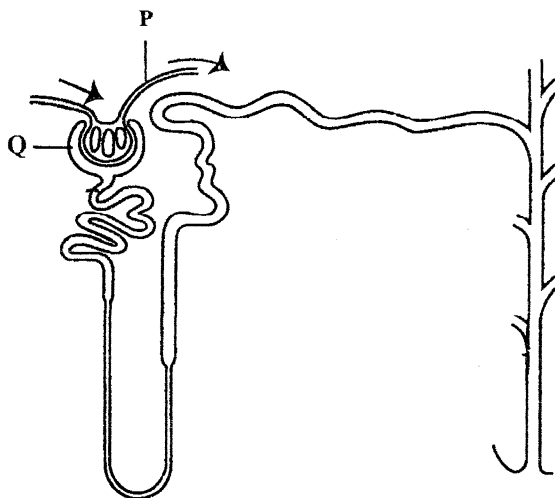
23. Which of the following does NOT represent a step in the formation of a blood clot?

- (A) Thromboplastin reacts with prothrombin.
- (B) Thrombin reacts with fibrinogen.
- (C) White blood cells engulf bacteria and digest them.
- (D) Blood cells and platelets become trapped in fibres.

24. Which of the following statements about excretory products in plants are correct?
Excretory products

- I. are stored in leaves and bark
 - II. are converted into insoluble crystals and tannins
 - III. are removed during transpiration
 - IV. result in the formation of storage organs
- (A) I and II only
 - (B) I and IV only
 - (C) II and III only
 - (D) II and IV only

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



25. The name of 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

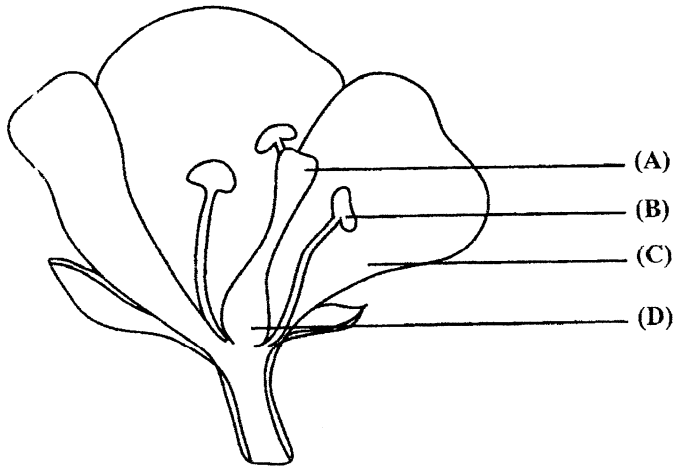
- (A) glucose
- (B) blood proteins
- (C) urea
- (D) blood plasma

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27. Which of the following is NOT a distinguishing feature of the nervous system?
- (A) Rapid response
 - (B) Localised reaction
 - (C) Long-lasting effect
 - (D) Temporary and reversible response
28. Which of the following statements would describe ligaments?
- I. They hold bones together.
 - II. They are tough and fibrous.
 - III. They reduce friction between bones.
- (A) I and II only
 - (B) I and III only
 - (C) II and III only
 - (D) I, II and III
29. Which of the following is NOT a component of joints?
- (A) Ligament
 - (B) Cartilage
 - (C) Tendon
 - (D) Synovial fluid
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
31. The presence of sugar in the urine often indicates a deficiency of
- (A) adrenalin
 - (B) insulin
 - (C) secretin
 - (D) thyroxin
32. A seedling illuminated from one side, bends towards the light source because the concentration of auxins becomes
- (A) greater on the side away from the light
 - (B) greater on the side towards the light
 - (C) the same on both sides
 - (D) greatest at the tip of the shoot
33. Which of the following parts of the eye functions as a receptor?
- (A) Iris
 - (B) Lens
 - (C) Retina
 - (D) Optic nerve
34. Which region of the brain is MOST likely to be used in solving a mathematical problem?
- (A) Cerebellum
 - (B) Cerebrum
 - (C) Medulla oblongata
 - (D) Hypothalamus
35. When someone sees appetizing food saliva is often produced. Which of the following is the correct sequence for this reflex action?
- (A) Receptor organ → spinal cord → brain
 - (B) Receptor organ → salivary gland → brain
 - (C) Receptor organ → brain → salivary gland
 - (D) Receptor organ → spinal cord → salivary gland
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

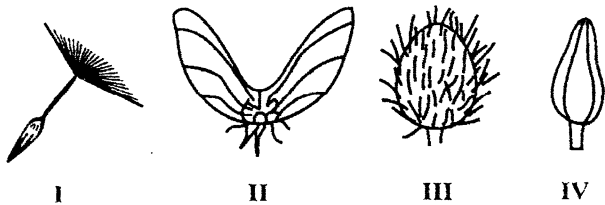
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Item 37 refers to the following diagram which illustrates the structure of a flower.



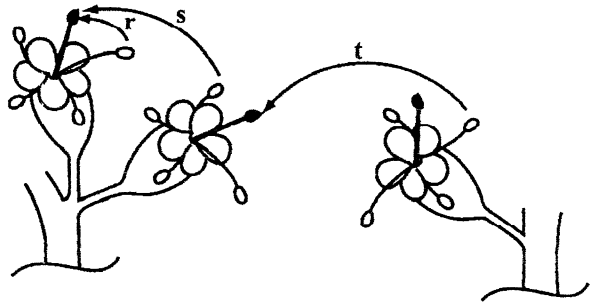
37. In which part of this flower is pollen produced?
38. Which of the following shows the route taken by a sperm cell when it leaves the testis?
- (A) Epididymis → sperm duct → urethra
 - (B) Sperm duct → urethra → epididymis
 - (C) Epididymis → urethra → sperm duct
 - (D) Urethra → sperm duct → epididymis
39. In the human female, fertilization of the ovum takes place in the
- (A) ovary
 - (B) oviduct
 - (C) uterus
 - (D) vagina

Item 40 refers to the following diagrams of certain fruits.



40. Which of these fruits is MOST likely to be dispersed by animals?
- (A) I
 - (B) II
 - (C) III
 - (D) IV

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

Items 42 - 43 refer to the following options.

- (A) Diploid
- (B) Recessive
- (C) Heterozygote
- (D) Clone

In answering items 42 - 43, match each of the items with one of the options above. Each option may be used once, more than once or not at all.

42. The descendants of a plant produced by asexual reproduction from a single organism
43. An allele not expressed in the zygote

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44. Between the ages of 3 and 5, boys and girls show a reduction in their growth rate because
- (A) they do not eat a lot of protein
 - (B) they are suffering from worms
 - (C) their body cells divide by reduction division
 - (D) the rate of division of the body cells is slower

Items 45 - 46 refer to the following information.

A cross between red and white flowered plants of the same species produces plants with pink flowers.

45. What would be the expected phenotypic ratio if two of the pink flowers are crossed?
- (A) 1 red : 1 white
 - (B) 1 red : 1 pink : 1 white
 - (C) 1 red : 3 pink : 1 white
 - (D) 1 red : 2 pink : 1 white
46. If one of the pink flowered plants is crossed with the red parent, what percentage of the offspring would be expected to have pink flowers?
- (A) 0
 - (B) 25
 - (C) 50
 - (D) 100
47. Which of the following processes could give rise to new plant varieties?

- I. Mutations
 - II. Mitosis
 - III. Breeding
- (A) I only
 - (B) II only
 - (C) I and III only
 - (D) II and III only

48. Which of the following statements BEST describes genetic engineering?
- (A) Changing the traits of one organism by incorporating genes from another organism
 - (B) Changing the traits of one organism by incorporating a few chromosomes from a different organism
 - (C) Changing the traits of one organism by crossing it with a closely related species
 - (D) Changing the traits of one organism by inducing mutation in its sex organs

49. Which of the following statements about asexual reproduction is true?
- (A) Asexual reproduction is carried out by humans.
 - (B) Asexual reproduction involves meiosis.
 - (C) The whole organism is produced by mitotic divisions.
 - (D) The organisms are produced under the same conditions.

50. Which of the following characteristics are examples of discontinuous variation in humans?
- I. Height
 - II. Tongue-rolling
 - III. Blood groups
 - IV. Foot length
- (A) I and II only
 - (B) II and III only
 - (C) I and IV only
 - (D) I, II, III and IV

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51. Through which of the following can natural immunity be obtained?

- I. Blood transfusion
- II. Breast milk
- III. The placenta
- IV. Vaccines

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

52. Humans can easily overcome the adverse effects of all of the following constraints on their population growth EXCEPT

- (A) natural disasters
- (B) short food supply
- (C) insufficient housing
- (D) natural predators

Items 53 - 54 refer to following types of diseases.

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

In answering items 53 - 54, 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. At which stage in the life history of the mosquito is control easiest?

- (A) Egg
- (B) Larva
- (C) Pupa
- (D) Imago

56. Which of the following methods can BEST be used to collect data about the distribution of organisms in a savannah or pasture?

- (A) Quadrat
- (B) Line transect
- (C) Collection
- (D) Sweep net

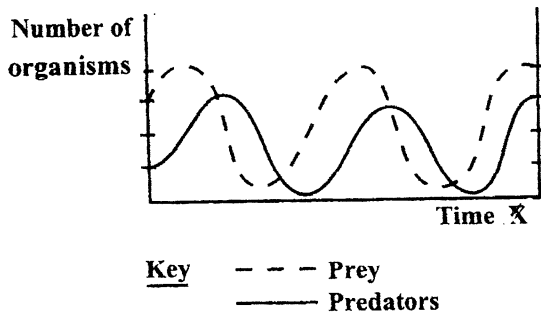
57. Which of the following factors contribute to increased population size?

- I. Ability to resist disease
- II. Inadequate water supplies
- III. Too much or too little light
- IV. Small number of predators

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

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Items 58-59 refer to the following graph.



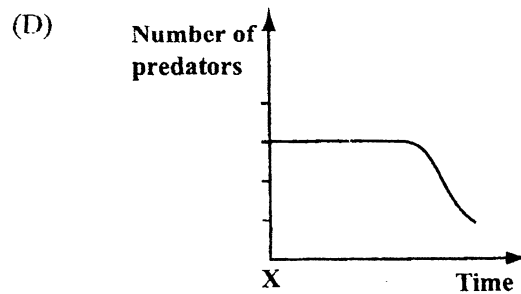
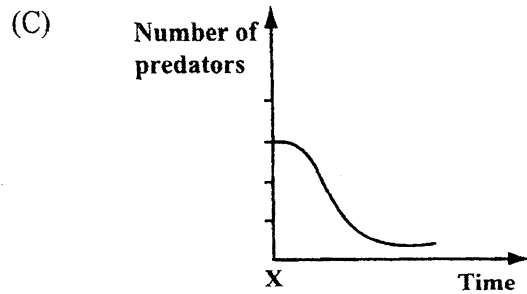
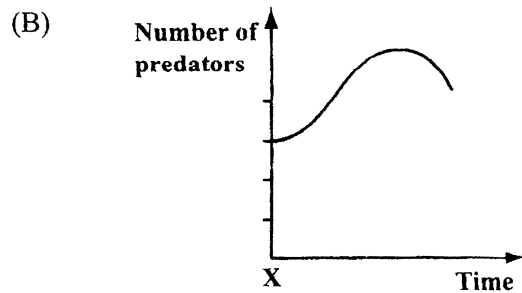
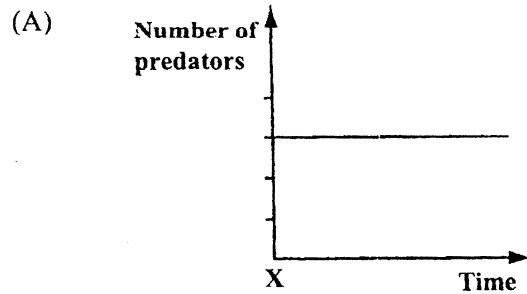
58. Which of the following inferences can be made from the graph?

- I. The maximum number of predators never exceeds the maximum number of prey.
- II. Predation has caused the loss of the entire prey population.
- III. The populations of predator and prey decrease simultaneously.

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

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59. Which of the following graphs represents what may happen if a large number of prey came to live in the habitat at time X?



60. Which of the following statements is true of inorganic fertilizers?

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