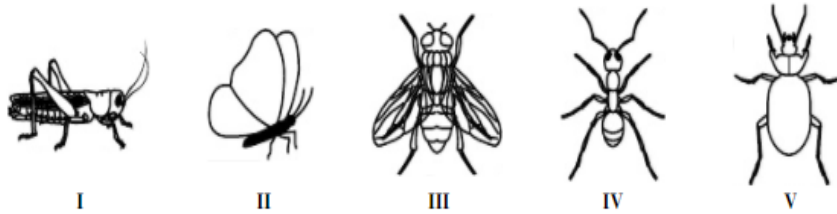


Items 1–2 refer to the following diagrams labelled I, II, III, IV and V found in a school garden.



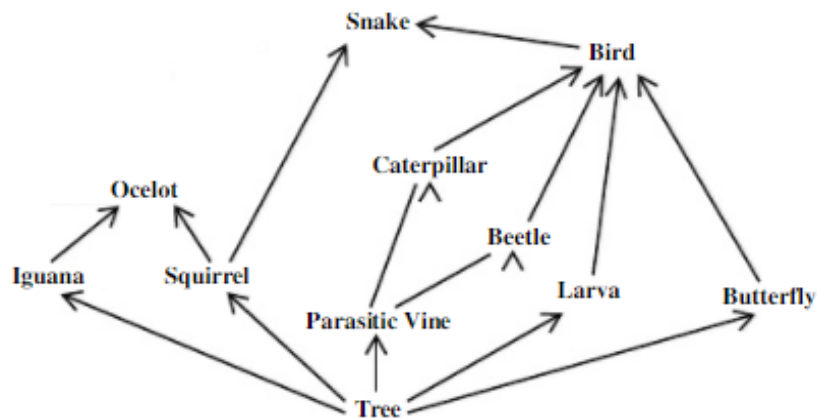
1. Which of the following characteristics could be used to classify these organisms into two groups?

- (A) Number of wings
- (B) Segmented body
- (C) Number of legs
- (D) Antennae

2. The distribution of the organism labelled I could be studied using

- (A) quadrats
- (B) sieves
- (C) line transects
- (D) nets

Item 3 refers to the following food web from a tropical forest.



3. The list of herbivores in the food web includes

- (A) iguana, parasitic vine, larva, butterfly
- (B) iguana, beetle, larva, butterfly
- (C) iguana, caterpillar, larva, bird
- (D) iguana, squirrel, snake, bird

Item 4 refers to following relationships between some organisms.

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

4. Which of the following correctly identifies these relationships?

	I	II	III
(A)	Commensalism	Predator/prey	Mutualism
(B)	Commensalism	Predator/prey	Parasitism
(C)	Predator/prey	Commensalism	Mutualism
(D)	Predator/prey	Mutualism	Parasitism

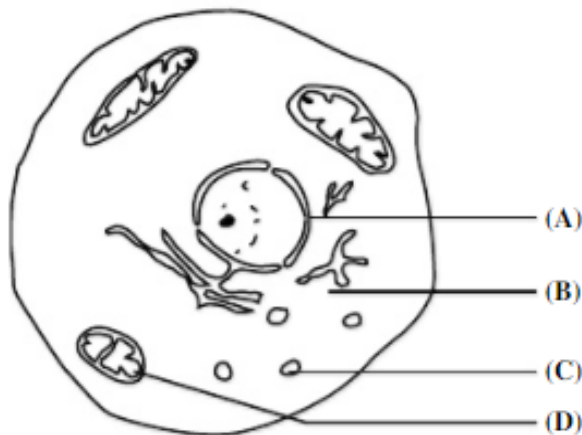
5. Which of the following statements about a food chain is true?

- (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 heat to light to chemical.
- (D) The sun traps light energy at the start of the food chain.

6. For which of the following would plants NOT compete?

- (A) Space
- (B) Light
- (C) Food
- (D) Water

Items 7–8 refer to the following diagram which represents an animal cell seen under an electron microscope. Some cell structures are labelled (A), (B), (C) and (D).



In answering items 7–8, each option may be used once, more than once or not at all.

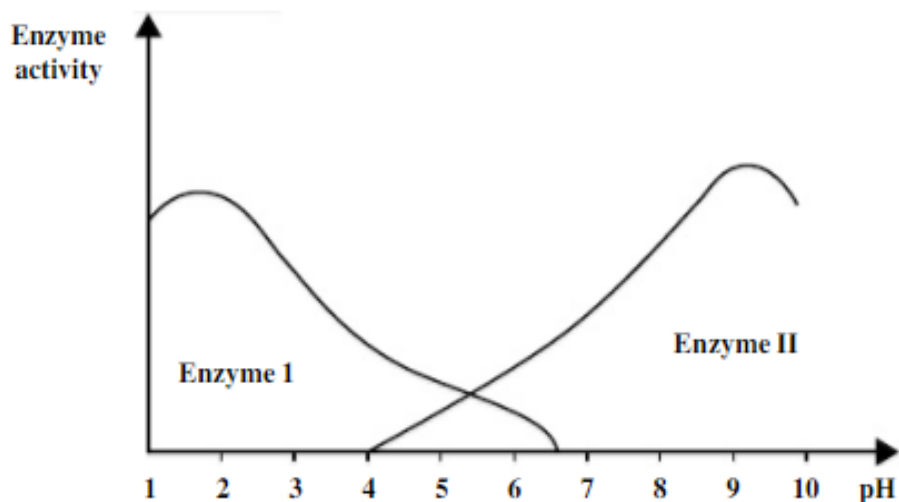
Which of the structures

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

9. Which of the following pairs of phrases does NOT distinguish between plant and animal cells?

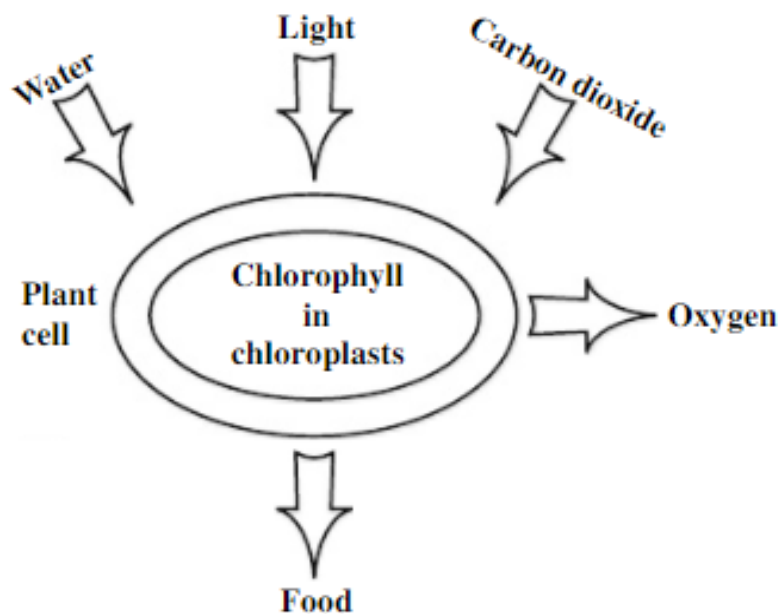
	Plant Cells	Animal Cells
(A)	Have chloroplasts	Do not have chloroplasts
(B)	Contain large vacuoles	Have few vacuoles
(C)	Have no cell membranes	Have cell membranes
(D)	Contain cellulose cell walls	Do not have cellulose cell walls

Items 10–11 refer to the following graph which shows the activity of two enzymes in the human digestive system.



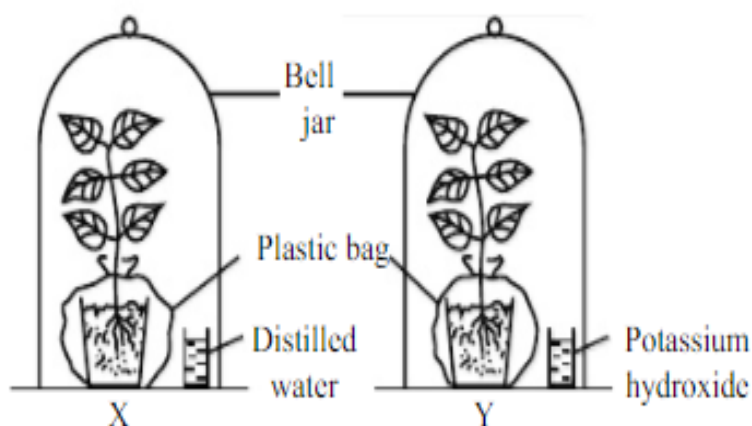
10. Enzyme I will function BEST in the
- (A) mouth
 - (B) stomach
 - (C) small intestine
 - (D) large intestine
11. Which of the following is MOST likely Enzyme II?
- (A) Pepsin
 - (B) Renin
 - (C) Trypsin
 - (D) Amylase

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



12. The oxygen shown in the diagram comes from the
- (A) atmosphere
 - (B) chlorophyll
 - (C) carbon dioxide
 - (D) water
13. To which of the following groups does the food produced belong?
- (A) Sugars
 - (B) Proteins
 - (C) Starches
 - (D) Fats

Items 14–15 refer to the following diagrams, X and Y, which illustrate an experiment on a metabolic process taking place in light.



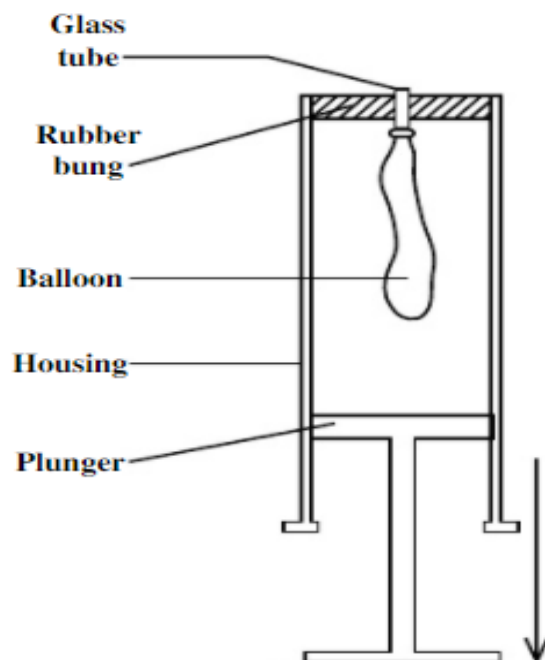
14. The aim of the experiment is to investigate
- (A) the effect of potassium hydroxide on the growth of plants
 - (B) the effect of water on the growth of plants
 - (C) if carbon dioxide is necessary for photosynthesis
 - (D) if oxygen is necessary for photosynthesis
15. Before the experiment is set up, the plants are placed in a dark cupboard for about twenty-four hours. This step is 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 is removed from the leaves
 - (D) stop further reduction of carbon dioxide to carbohydrate

16. Which of the following is important in a diet to develop strong bones and teeth?
- (A) Iron
 - (B) Vitamin C
 - (C) Vitamin D
 - (D) Calcium
17. Which of the following organs involved in digestion produces NO digestive enzymes?
- (A) Stomach
 - (B) Pancreas
 - (C) Liver
 - (D) Ileum
18. The products of aerobic respiration are
- (A) carbon dioxide and water
 - (B) carbon dioxide and lactic acid
 - (C) carbon dioxide and alcohol
 - (D) carbon dioxide only

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

- A. glucose
- B. glycogen
- C. lactic acid
- D. Citric acid

Items 20–22 refer to the following diagrams of a model showing how breathing takes place.



20. The part of the model which represents the diaphragm is the
- (A) rubber bung
 - (B) plunger
 - (C) balloon
 - (D) housing
21. Which of the following would MOST likely occur when the plunger is moved in the direction of the arrow shown in the diagram above?
- (A) The balloon will expand.
 - (B) A vacuum will be created.
 - (C) The volume of the apparatus would decrease.
 - (D) The pressure within the housing will increase.
22. When the plunger is moved, the balloon functions like the
- (A) alveolus
 - (B) bronchus
 - (C) diaphragm
 - (D) trachea

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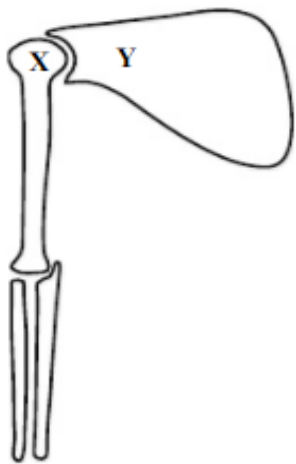
-
23. The following are descriptions of blood vessels.
- I. Thin wall, large lumen, takes blood away from organs and tissues
 - II. Thin-walled vessel adapted for diffusion; close to cells
 - III. Thick wall, small lumen, takes blood to organs and tissues

Which of the following 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

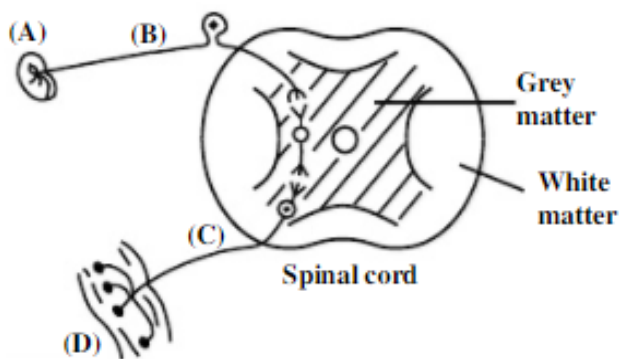
24. The function of valves in veins is to
- (A) lower the pressure of blood
 - (B) increase the pressure of blood
 - (C) prevent the back flow of blood
 - (D) push blood forward
25. When a person receives a vaccine, his/her immune system is stimulated to produce
- (A) antigens
 - (B) antibiotics
 - (C) antibodies
 - (D) antitoxins

Item 31 refers to the following diagram which shows the skeleton of a human arm.



31. During performance of vigorous exercise, Bone X slips out of the socket in Bone Y. Besides experiencing pain, the individual would MOST likely be UNABLE to
- (A) flex the arm
 - (B) straighten the arm
 - (C) swing the arm
 - (D) pick up a pencil
32. Which part of the body do drugs affect MOST?
- (A) Stomach
 - (B) Brain
 - (C) Blood vessels
 - (D) Lungs

Item 33 refers to the following diagram of a reflex arc, with parts labelled (A), (B), (C) and (D).



33. Which part of the reflex arc takes messages to the central nervous system?

34. Which of the following sequences is the correct pathway of a reflex action?
- (A) Receptor → Stimulus → Effector → Response
 - (B) Stimulus → Receptor → Effector → Response
 - (C) Effector → Stimulus → Receptor → Response
 - (D) Response → Stimulus → Effector → Receptor
35. The central nervous system consists of
- (A) the brain and the spinal cord
 - (B) the cerebrum, cerebellum and hypothalamus
 - (C) sensory, motor and relay neurones
 - (D) sight, smell, taste, hearing, touch
36. Which of the following is NOT true about drugs?
- (A) They are addictive.
 - (B) All are legally available to citizens.
 - (C) They alter normal bodily functions.
 - (D) They may cause liver damage and heart disease.
37. Which of the following structures are involved in the regulation of body temperature in humans?
- (A) Arterioles, sweat glands, hair erector muscles
 - (B) Epidermis, dermis, hypodermis
 - (C) Sebaceous gland, hair follicle, pain receptor
 - (D) Adipose tissue, sweat pores and hair
38. During the menstrual cycle, the egg is MOST likely to be released on Day
- (A) 5
 - (B) 11
 - (C) 14
 - (D) 28
39. When one side of the stem of a plant is illuminated the plant grows
- (A) thin and spindly
 - (B) away from the light
 - (C) towards the light
 - (D) and becomes etiolated
40. Which of the following is associated with germination?
- (A) Increased water content
 - (B) Increased food store
 - (C) Decreased metabolic activity
 - (D) Decreased water content

41. Which of the following is NOT used to measure growth in plants?
- (A) Total volume of all the organs
 - (B) Total number of leaves on the plant
 - (C) Changes in the fresh mass of all the organs
 - (D) Changes in the dry mass of all the organs
42. A seed develops from the
- (A) ovary
 - (B) embryo
 - (C) ovule
 - (D) pollen grain
43. Which of the following is a requirement for sexual reproduction?
- (A) Mitosis
 - (B) An aquatic habitat
 - (C) Optimal environmental conditions
 - (D) Production of gametes
44. Asexual reproduction gives rise to genetically identical offspring because
- (A) a single cell divides by meiosis
 - (B) only half the chromosomes are involved
 - (C) all the chromosomes are from one parent
 - (D) all cell divisions are by mitosis
45. After leaving the vas deferens, spermatozoa enter the
- (A) testes
 - (B) epididymis
 - (C) urethra
 - (D) ureter
46. Fertilization of the ovum takes place in the
- (A) vagina
 - (B) uterus
 - (C) oviduct
 - (D) ovary
47. Which of the following is considered a male hormone?
- (A) Oestrogen
 - (B) Progesterone
 - (C) Testosterone
 - (D) Follicle-stimulating hormone

48. Which of the following means of birth control is MOST effective in preventing sexually transmitted infections?
- (A) A condom
 - (B) The pill
 - (C) A diaphragm
 - (D) A spermicide
49. Animals assist with
- (A) pollination and seed dispersal
 - (B) pollination only
 - (C) seed dispersal only
 - (D) asexual reproduction in plants
50. The observable physical/biochemical characteristics or traits of an organism are referred to as its
- (A) genotype
 - (B) monotype
 - (C) phenotype
 - (D) prototype
51. Which of the following is an example of a discontinuous trait?
- (A) Foot size
 - (B) Height
 - (C) Intelligence
 - (D) Presence or absence of horns
52. Genetic variation is important because it
- (A) provides a basis for natural selection
 - (B) allows for survival against disease
 - (C) provides antibiotic resistance
 - (D) forms the basis for vaccines
53. Which of the following isolation mechanisms could lead to speciation (splitting into two different species)?
- I. Geographical
 - II. Behavioral
 - III. Ecological
- (A) I only
 - (B) II only
 - (C) II and III only
 - (D) I, II and III

54. Which of the following terms BEST describes two or more forms of the same gene?

- (A) Alleles
- (B) Diploid
- (C) Chromatids
- (D) Chromosomes

55. Which of the following processes does NOT form part of meiosis?

- (A) Recombination
- (B) Segregation
- (C) Independent assortment
- (D) Dependent assortment

56. Which of the following describes the sex chromosomes in humans?

	Females	Males
(A)	XX	XXX
(B)	XO	XY
(C)	XX	XY
(D)	XX	Y

57. Which of the following BEST describes the process of evolution?

- (A) Development of characteristics in response to need
- (B) Change of populations through time
- (C) Development of populations due to natural selection
- (D) Change from simple to complex organisms

58. Biological evolution is BEST defined as the

- (A) changes in species towards greater complexity over time
- (B) changes in gene frequencies in a population over time
- (C) ability of individuals to survive and produce offspring
- (D) ability of individuals to respond to natural selection

59. Which of the following provide supporting evidence for biological evolution?

- I. Fossil record
- II. DNA/genetic material
- III. Vestigial traits (appendix, wisdom teeth)

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

60. Which of the following is the first step in the production of insulin using recombinant DNA?

- (A) Plasmid removed from *E. coli*.
- (B) DNA coding for human insulin inserted in the plasmid.
- (C) Plasmid closed by a special enzyme.
- (D) Plasmid opened by a special enzyme.

QUESTION NUMBER	KEY	SYLLABUS OBJECTIVE
1	A	A1.1
2	D	A2.1
3	B	A3.3
4	B	A3.7
5	A	A4.1
6	C	A7.1
7	D	B1.3
8	B	B1.3
9	C	B1.4
10	B	B2.8
11	C	B2.9
12	D	B2.2
13	A	B2.2
14	C	B2.4
15	C	B2.4
16	D	B2.11
17	C	B2.7
18	A	B3.1
19	C	B3.2
20	B	B3.3
21	A	B3.3
22	A	B3.3
23	B	B4.3
24	C	B4.3
25	C	B4.6
26	D	B4.9
27	B	B5.4
28	C	B5.4
29	B	B5.4
30	A	B6.1

QUESTION NUMBER	KEY	SYLLABUS OBJECTIVE
31	C	B6.4
32	B	B7.8
33	B	B7.6
34	B	B7.6
35	A	B7.5
36	B	B7.8
37	A	B7.11
38	C	B9.3
39	C	B7.2
40	A	B8.3
41	A	B8.1
42	C	B8.2
43	D	C9.1
44	D	C9.1
45	C	B9.2
46	C	B9.2
47	C	B9.2, 9.3
48	A	B9.5
49	A	B9.9
50	C	C4.7
51	D	C2.2
52	A	C2.1
53	D	C1.2
54	A	C3.1
55	D	C4.4
56	C	C4.10
57	B	C5.1
58	B	C5.4
59	D	C6.1
60	A	C7.1