

1. Which of the following features is used to classify a group of organisms as Class Insecta?

- (A) Size
- (B) Shape
- (C) Colour
- (D) Number of segments

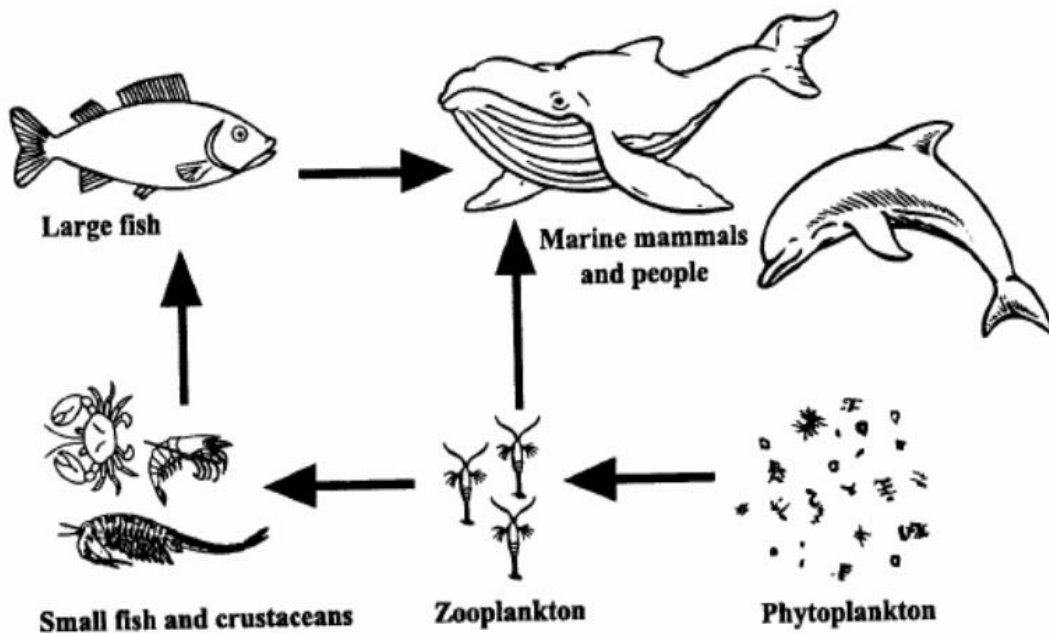
2. Eleanor collected 13 snails in a 25 cm × 25 cm quadrat. What is the density of the snail population in a 1 m² area?

- (A) 13
- (B) 52
- (C) 208
- (D) 832

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

Item 4 refers to the following diagram of a food web.



4. Trophic Level 1 is represented by

- (A) zooplankton
- (B) phytoplankton
- (C) small fish and crustaceans
- (D) marine mammals and people

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9. Which of the following is NOT an example of a renewable energy resource?

- (A) Oil
- (B) Wind
- (C) Solar
- (D) Biomass

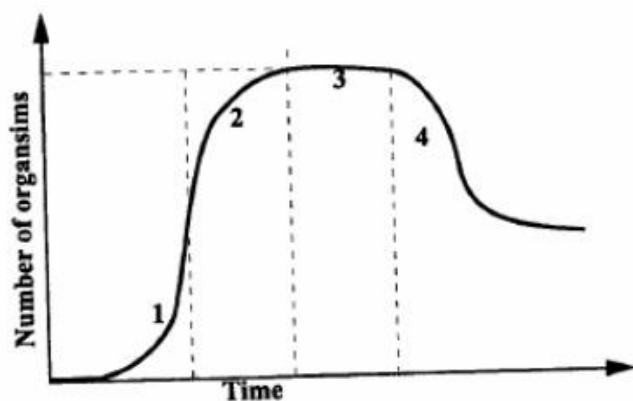
10. Which of the following practices does NOT help to conserve the environment?

- (A) Overgrazing
- (B) Crop rotation
- (C) Reforestation
- (D) Using natural fertilizers

11. Human activities would have the LEAST immediate impact on

- (A) coral bleaching
- (B) eutrophication
- (C) overpopulation
- (D) formation of fossil fuels

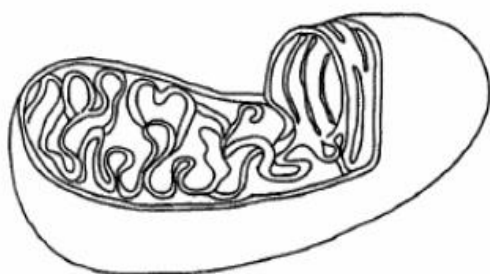
Item 14 refers to the following graph of population growth.



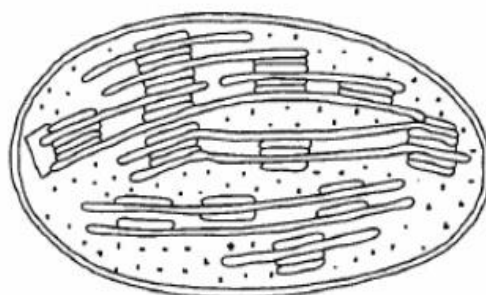
14. Phase 4 of the graph of population growth is MOST likely due to

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

Item 16 refers to the following diagrams.



I



II

16. Which of the following options MOST likely identifies the organelles, I and II above?

- (A) Nucleus and chloroplast
- (B) Mitochondrion and nucleus
- (C) Mitochondrion and chloroplast
- (D) Nucleus and mitochondrion

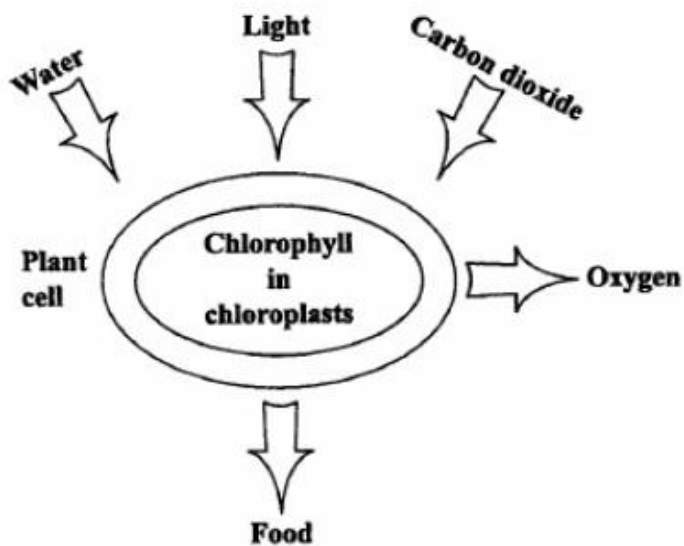
17. Which of the following organelles is correctly matched with its function?

	Organelle	Function
(A)	Ribosomes	Sites of protein synthesis
(B)	Mitochondrion	Air space in the cell
(C)	Nucleus	Controls movement of fats in the cell
(D)	Vacuole	Site of energy use

18. In a comparison between osmosis and diffusion, which of the following statements is NOT true?

- (A) Osmosis occurs only in living cells.
- (B) Both processes require energy to move particles across a concentration gradient.
- (C) Diffusion sometimes requires a partially permeable membrane.
- (D) With both processes, molecules move from a high concentration to an area of lower concentration.

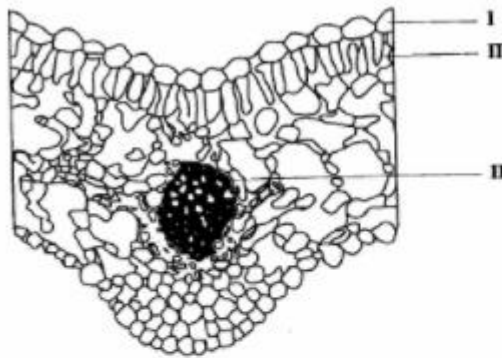
Item 19 refers to the following diagram which represents a metabolic process carried out in plants.



19. The food produced is

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

Item 20 refers to the following diagram showing the cross section of a dicotyledonous leaf.

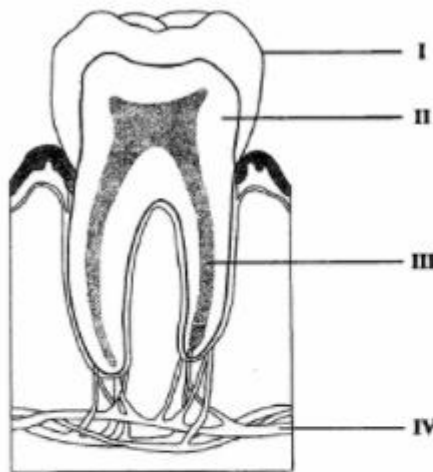


20. Which of the following statements about the labelled parts are true?

Region	Function
I	Allows maximum sunlight penetration through transparent cells
II	Allows for transpiration via spongy cells
III	Allows for gaseous exchange via spongy cells

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

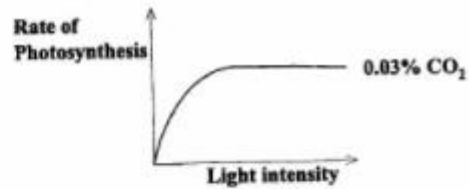
Item 22 refers to the following diagram of a tooth.



22. Which option correctly identifies the structures labelled I, II, III and IV?

	I	II	III	IV
(A)	Crown	Enamel	Dentine	Pulp
(B)	Enamel	Crown	Root	Nerve
(C)	Enamel	Dentine	Pulp	Capillaries
(D)	Dentine	Enamel	Nerve	Capillaries

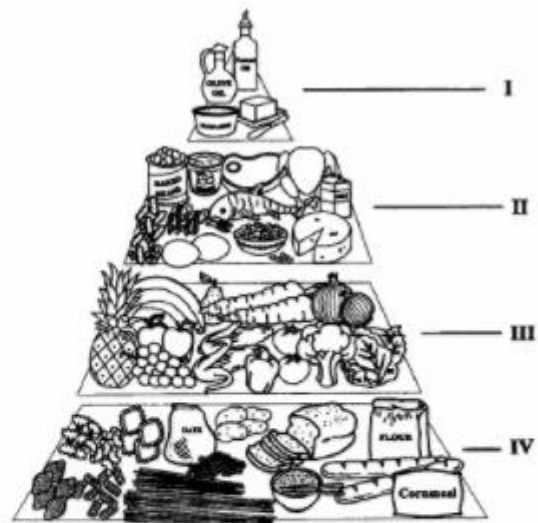
Item 21 refers to the following diagram.



21. Which of the following statements BEST accounts for the shape of the graph?

- (A) As photosynthesis rates increase, there is a decrease in carbon dioxide levels.
 (B) As light intensity increases, the rate of photosynthesis also increases, until a stationary phase exists, when denaturation of the enzymes occurs.
 (C) As light intensity increases, there is an increase in photosynthesis, until there is no further increase in the rate due to some other limiting factor.
 (D) As carbon dioxide levels gradually increase, there is a similar increase in the rate of photosynthesis, until a plateau phase exists where no further increase in carbon dioxide results in any further increase in photosynthesis.

Item 24 refers to the following diagram.



24. Which two food groups should a person suffering from hypertension and diabetes limit?

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

23. Which of the following conditions are optimum for the action of salivary amylase?

	Temperature (°C)	pH	Amount of Maltose Produced (µg)
(A)	20-30	1-2	12
(B)	30-40	7-8	73
(C)	30-40	9-10	64
(D)	40-50	7-8	32

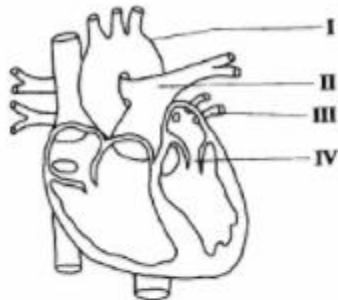
26. Which of the following options correctly matches the gaseous exchange structures with the organism?

	Human	Fish	Plant
(A)	Trachea	Mouth	Stems
(B)	Alveoli	Gill filaments	Large leaves
(C)	Alveoli	Gill rakers	Young leaves
(D)	Trachea	Gill bars	Spongy mesophyll

27. The role of respiration is BEST described as the

- (A) release of energy
- (B) absorption of oxygen
- (C) breakdown of carbohydrates
- (D) liberation of carbon dioxide

Item 29 refers to the following diagram of a human heart.



29. Which of the following options correctly identifies the structures labelled I, II, III and IV?

	I	II	III	IV
(A)	Aorta	Pulmonary artery	Pulmonary vein	Bicuspid or Mitral valve
(B)	Pulmonary artery	Posterior vena cava	Aorta	Bicuspid or Mitral valve
(C)	Aorta	Pulmonary vein	Pulmonary artery	Semi-lunar valve
(D)	Pulmonary vein	Pulmonary artery	Anterior vena cava	Tricuspid valve

25. Which of the following can be ingested to prevent osteomalacia or rickets?

- (A) Calcium
- (B) Vitamin A
- (C) Vitamin C
- (D) Magnesium

28. Which of the following BEST identify some of the transport substances in animals?

- I. Amino acids
- II. Hormones
- III. Sucrose
- IV. Respiratory gases

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

30. An *Amoeba* obtains all the oxygen it needs by diffusion via its cell membrane, while a human needs to have special respiratory surfaces for this purpose. The BEST reason for this difference is that

- (A) the *Amoeba* does not require much oxygen
- (B) oxygen cannot pass through the skin of a human
- (C) a human requires a larger volume of oxygen
- (D) a human's surface area to volume ratio is too small for diffusion to be effective

31. The essential vitamin and mineral salt required for blood clotting in humans are

- (A) A and Mg^{2+}
- (B) C and K^+
- (C) B and Na^+
- (D) K and Ca^{2+}

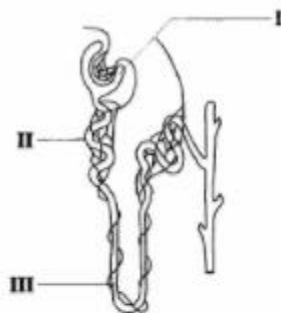
32. Under which conditions will the rate of transpiration in plants be HIGHEST?

- (A) Sunny and low wind speed
- (B) Sunny and high wind speed
- (C) Cloudy and low wind speed
- (D) Cloudy and high wind speed

33. Translocation of sucrose in plants occurs via specialized vessels which

- (A) are dead, narrow cells
- (B) are abundant in mitochondria
- (C) contain sieve pores in their end walls
- (D) are thin, hollow tubes of lignin

Item 36 refers to the following diagram of a mammalian kidney nephron.



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

	Roots	Fruits	Liver
(A)	Starch	Sucrose	Glycogen
(B)	Starch	Fructose	Glucose
(C)	Proteins	Glucose	Fats
(D)	Fats	Glucose	Glycogen

35. The BEST description of the role of excretion in living organisms is to

- (A) produce urine
- (B) produce faeces
- (C) get rid of toxic waste
- (D) get rid of excess water

36. Which option correctly identifies the functions of the parts labelled I, II and III?

	I	II	III
(A)	Ultrafiltration	Water conservation	Selective reabsorption
(B)	Ultrafiltration	Selective reabsorption	Under the influence of ADH
(C)	Water conservation	Under the influence of ADH	Urine production
(D)	Selective reabsorption	Ultrafiltration	Under the influence of ADH

37. Which of the following organs does the mammalian skeleton protect?

- (A) Stomach
- (B) Pancreas
- (C) Bladder
- (D) Duodenum

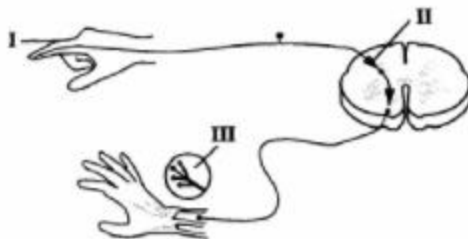
38. Which of the following correctly describes movement in plants?

- (A) Irreversible, whole or part movement
- (B) Reversible, whole or part movement
- (C) Irreversible, growth or part movement
- (D) Reversible, growth or part movement

39. Which of the following options BEST describes the terms 'stimulus' and 'response'?

	Stimulus	Response
(A)	A deliberate provocation of an organism	The movement of an organism
(B)	An organism's exposure to sunlight	The growth of the organism away from light
(C)	A wave of excitement in an organism	Locomotion of the organism
(D)	A detectable change in an organism's environment	An organism's reaction to a stimulus

Item 40 refers to the following diagram.

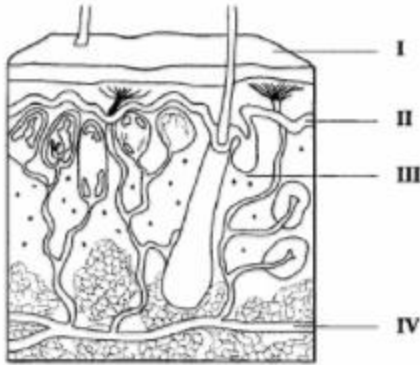


40. Which of the following options correctly identifies the structures labelled I, II and III above?

	I	II	III
(A)	Receptor	Relay nerve	Effector
(B)	Skin	Intermediate nerve	Muscle
(C)	Sensory nerve	Spinal nerve	Effector
(D)	Receptor	Spinal nerve	Effector

42. The function of the choroid layer in the eye is to
- (A) focus most light rays
 - (B) prevent internal reflection
 - (C) maintain the shape of the eyeball
 - (D) control the amount of light entering the eye

Item 41 refers to the following diagram of the skin.



41. The region which acts in a similar manner to SPF (Sun Protection Factor) creams is
- (A) I
 - (B) II
 - (C) III
 - (D) IV

Item 44 refers to the following activities involved in the menstrual cycle.

- I. Repair of the uterus lining
- II. Ovulation
- III. Shedding of the uterus lining
- IV. Development of the Graafian follicle

44. Which of the following is the correct sequence of activities?
- (A) I, II, III, IV
 - (B) II, I, III, IV
 - (C) IV, I, II, III
 - (D) IV, III, II, I

Item 43 refers to the following diagram which illustrates a measurement of growth in living organisms.



43. Which of the following is an INCORRECT label for the y-axis?

- (A) Length
- (B) Mass
- (C) Number of leaves
- (D) Units of time

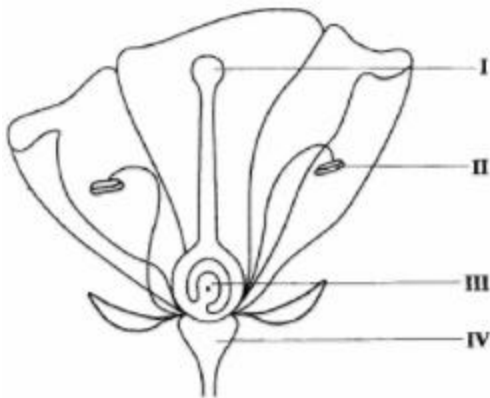
45. Contraception is used PRIMARILY to

- (A) limit the size of families
- (B) cause infertility in humans
- (C) prevent the spread of sexually transmitted infections
- (D) increase the world's population

46. Where does fertilization of the egg cell or ovum occur in flowering plants?

- (A) Stigma
- (B) Endosperm
- (C) Pollen grain
- (D) Embryo sac

Item 47 refers to the following diagram of a flower.



47. Which of the labelled parts is responsible for the production of male gametes?

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

48. A vector is defined as an organism that

- (A) bites humans
- (B) causes diseases
- (C) lives on other organisms
- (D) transmits disease organisms

49. Which of the following organisms transmits the yellow fever virus?

- (A) *Culex*
- (B) Tsetse
- (C) *Anopheles*
- (D) *Aedes aegypti*

50. Which of the following are used in the management of diabetes?

- I. Diet
- II. Exercise
- III. Meditation

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

51. Which of the following options correctly describes DNA, chromosome, gene and allele?

	DNA	Chromosome	Gene	Allele
(A)	Deoxyribonucleic acid	DNA + histamine	Unit that codes for a specific protein	An alternate form of a gene
(B)	Unit that codes for a specific protein	An alternate form of a gene	DNA + protein	Histone
(C)	Nucleic acid that has all genetic information	DNA + histone	The smallest unit of inheritance	An alternate form of a gene
(D)	Nucleic acid that has all genetic information	The smallest unit of inheritance	Unit that codes for a specific protein	DNA + protein

52. As a result of mitosis each daughter cell has
- (A) a variable number of chromosomes
 - (B) twice the number of chromosomes as the parent
 - (C) the same number of chromosomes as the parent
 - (D) half the number of chromosomes as the parent

54. Zane, the son of Tarzan and Jane, may have inherited the red-green colour-blindness gene from his parents. Neither Tarzan nor Jane is colour-blind. If N represents the allele for normal vision, and n represents the allele for colour-blindness, the genotypes of the parents would MOST likely be

	Tarzan	Jane
(A)	$X^N Y$	$X^N X^n$
(B)	$X^n Y$	$X^N X^n$
(C)	$X^n Y$	$X^n X^n$
(D)	$X^N Y$	$X^n X^n$

55. Variation in populations is due to

- I. mutation
- II. crossing over
- III. asexual reproduction
- IV. random segregation

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

56. Variation is important to populations because it ensures

- (A) diversity
- (B) conformity
- (C) adaptability
- (D) abnormality

53. Tarzan and Jane, both of whom are heterozygous for Blood Groups A and B respectively can have offspring that are likely to be

- (A) 100% AB
- (B) 50% A: 50% AB
- (C) 25% AB: 50% B: 25% O
- (D) 25% A: 25% B: 25% AB: 25% O

58. Which of the following is true about natural and artificial selection?

	Natural Selection	Artificial Selection
(A)	Occurs in domestic populations.	Occurs in natural populations.
(B)	Involves genetic modification.	Largely controlled by the environment.
(C)	Environment acts on the population which adapts.	Selective breeding for a particular trait.
(D)	Faster process.	Slower process.

59. Which of the following is an ecological implication of genetic engineering?

- (A) Loss of biodiversity
- (B) Humans 'playing God'
- (C) Higher prices for organic foods
- (D) Reduced incidence of allergic reactions

60. Which of the following describes the process of genetic engineering?

- (A) Tissue sample is treated to promote growth of cells.
- (B) Stem cells are grown and used to treat medical problems.
- (C) Chromosomes from an egg cell are replaced by the nucleus from a somatic cell.
- (D) A gene is inserted into a vector which is then used to transfer the gene to a host cell.