CANDIDATE – PLEASE NOTE!

PRINT your name on the line below and return this booklet with your answer sheet. Failure to do so may result in disqualification.

TEST CODE **01207010**

FORM TP 2022049

MAY/JUNE 2022

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

BIOLOGY

Paper 01 – General Proficiency

1 hour 15 minutes

31 MAY 2022 (p.m.)

343

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This test consists of 60 items. You will have 1 hour and 15 minutes to answer them.

2. In addition to this test booklet, you should have an answer sheet.

3. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.

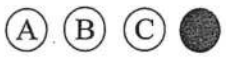
4. On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

   Sample Item

   Which of the following diseases is due to a dietary deficiency?

   (A) Malaria
   (B) Diabetes
   (C) Influenza
   (D) Anaemia

   Sample Answer

B000

   The best answer to this item is "Anaemia", so (D) has been shaded.

5. If you want to change your answer, erase it completely before you fill in your new choice.

6. When you are told to begin, turn the page and work as quickly and as carefully as you can. If you cannot answer an item, go on to the next one. You may return to that item later.

7. Figures are not necessarily drawn to scale.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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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

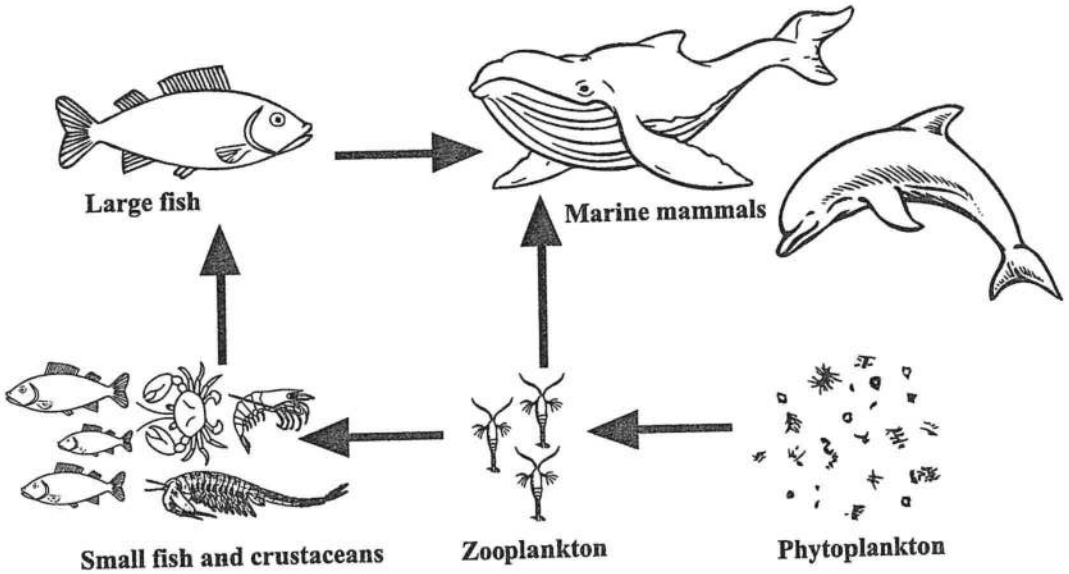
2. Which of the following sampling methods is MOST suitable for estimating the density of mushrooms in a garden?

(A) Quadrat
(B) Line transect
(C) Belt transect
(D) Mark/Release/Recapture

3. Which of the following correctly defines a niche and a habitat?

	Niche	Habitat
(A)	The role that an organism plays in the habitat in which it lives	The place where an organism lives
(B)	The place where an organism lives	The role that an organism plays in the habitat in which it lives
(C)	A community of living organisms which share the environment	The abiotic and biotic factors of the ecosystem
(D)	The biotic factors of the ecosystem where an organism lives	The abiotic factors of the ecosystem where an organism lives

Item 4 refers to the following food web.



4. Trophic level 1 is represented by

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

5. Which of the following organisms are MOST important in biodegradation?

(A) Bacteria
(B) Vultures
(C) Viruses
(D) Earthworms

6. Which of the following relationships may present harm to one of the organisms involved?

I. Commensalism
II. Parasitism
III. Predation

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

7. Approximately 10% of the energy stored in food is available to the next organism in a food chain because

(A) most of the energy is lost as heat during the process of respiration
(B) most of the energy is lost during the process of excretion
(C) there are fewer consumers than producers in a food chain
(D) many consumers compete for the same food source

8. Which of the following materials are considered to be non-biodegradable?

(A) Grass cuttings
(B) Sardine cans
(C) Newspapers
(D) Cloths

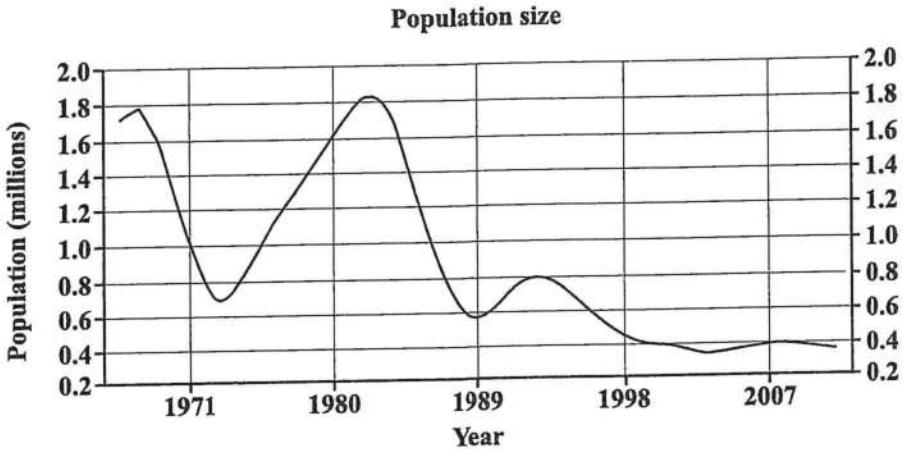
9. Human activities would have the LEAST immediate impact on

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

10. Replanting trees on a bare hillside is an example of

(A) restoration and preservation
(B) reafforestation and restoration
(C) conservation and afforestation
(D) preservation and conservation

Item **11** refers to the following graph of human population size over a period of time.

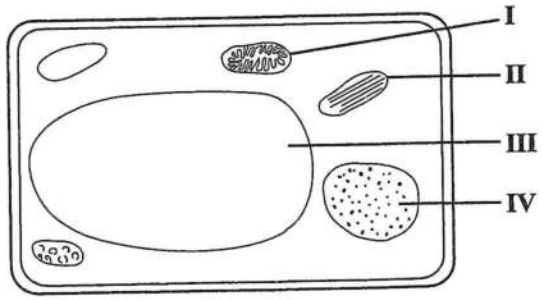


11. Which of the following factors MOST likely account for the change in population size from 1980 to 1989?

I. Increase in contraceptive use
II. Epidemic of a deadly disease
III. Decrease in fatal crimes

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

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



12. Which of the labelled structures is responsible for controlling cellular activities?

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

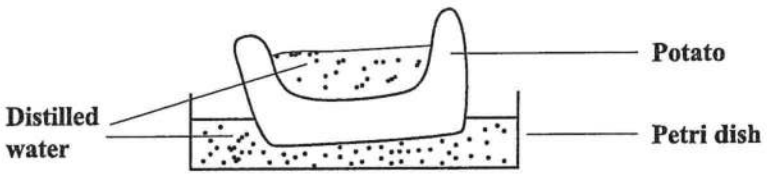
13. Which of the following comparisons of the cell wall and cell membrane is INCORRECT?

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

14. Which of the following organelles is **directly** involved in photosynthesis?

(A) Nucleus
(B) Cytoplasm
(C) Chloroplast
(D) Mitochondrion

Item **15** refers to the following apparatus.



15. What can be done to cause the level of solution in the petri dish to rise after 20 minutes?

(A) Add 5 g of salt to the distilled water in the potato only.
(B) Add 5 g of salt to the distilled water in the petri dish only.
(C) Add 5 g of salt to the distilled water in both the petri dish and the potato.
(D) Add 0 g of salt to the distilled water in both the petri dish and the potato.

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16. Autotrophic organisms derive their nutrition from

(A) water only
(B) complex organic substances only
(C) simple inorganic substances only
(D) both inorganic and organic substances

17. Which of the following features does NOT enhance a leaf's ability to absorb solar energy?

(A) Numerous chloroplasts in the palisade cells
(B) Presence of a vascular bundle
(C) Transparent cuticle
(D) Large surface area

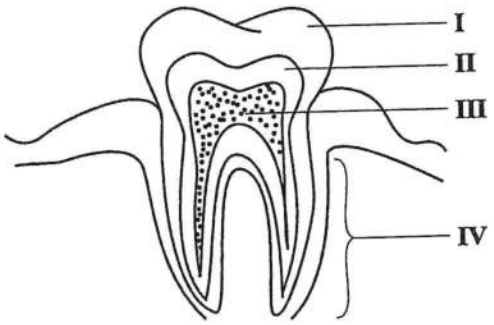
Item **18** refers to the following table which shows the results of food tests performed on three food samples, X, Y and Z.

Food Sample	Test and Observation
X	Violet colour with sodium hydroxide and copper sulphate
Y	Blue/black precipitate with iodine
Z	Orange precipitate when heated with Benedict's reagent after hydrolysis

18. The samples X, Y, and Z MOST likely contain

	X	Y	Z
(A)	non-reducing sugar	starch	protein
(B)	protein	reducing sugar	starch
(C)	starch	protein	reducing sugar
(D)	protein	starch	non-reducing sugar

Item **19** refers to the following longitudinal section of a tooth.

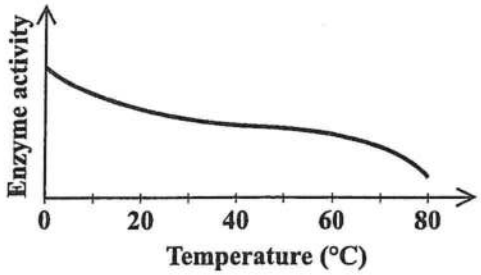


19. Which region of the tooth contains a large number of blood vessels and nerves?

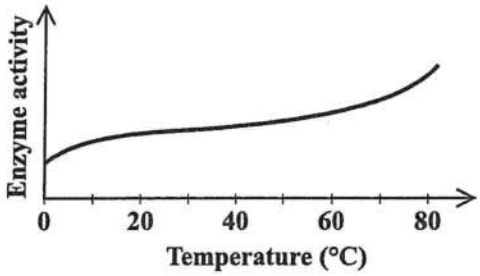
(A) I
(B) II
(C) III
(D) IV

20. Which of the following graphs shows the effect of temperature on an enzyme-controlled reaction?

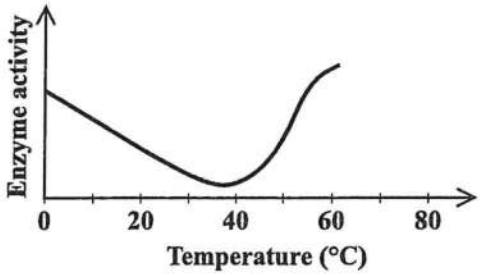
(A)



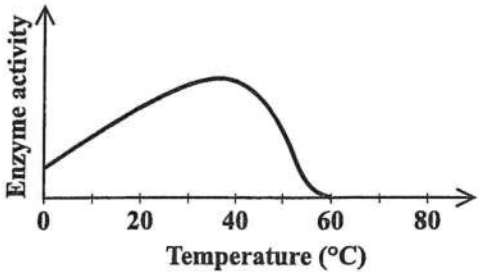
(B)



(C)



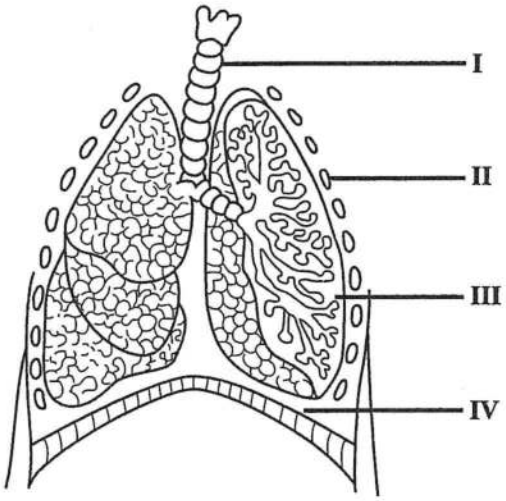
(D)



21. A 50-year old male is advised by his doctor to pay special attention to the amount of salt in his diet. He probably has a high chance of developing

(A) obesity
(B) diabetes
(C) hypertension
(D) sickle-cell anaemia

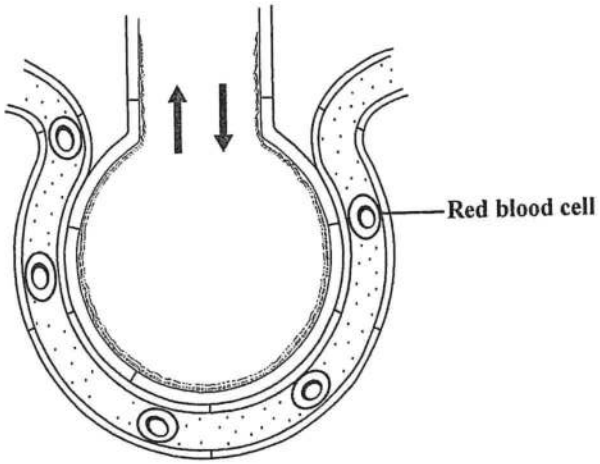
Item **22** refers to the following diagram of the respiratory system.



22. Which of the labelled parts represents the rib?

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

Item 23 refers to the following diagram of a respiratory structure.



23. The respiratory structure shown above is that of

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

24. Which of the following is an effect of nicotine found in cigarette smoke?

(A) Increased heart rate
(B) Increased beating of cilia
(C) Reduced oxygen transport by the blood
(D) Increased mucus production in the cells lining the respiratory passage

25. 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 explanation 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

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

I. Amino acids
II. Hormones
III. Sucrose

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

27. The essential vitamin and mineral ions required for blood clotting in humans are

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

28. Artificial immunity can BEST be described as immunity

(A) acquired from the body's natural defense against disease
(B) produced by deliberate exposure to a pathogen
(C) that has been passed on from mother to child in the uterus
(D) that has been passed on to a child from a mother's colostrum

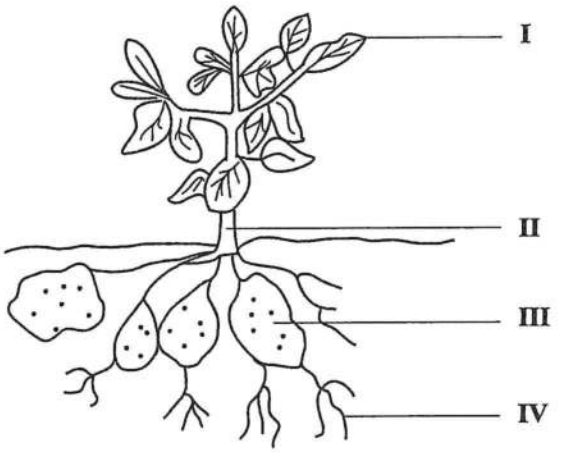
29. Under which conditions will the rate of transpiration in plants be HIGHEST?

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

30. In the transport of solutes in the phloem, the source is defined as any area of the plant where

(A) water is loaded into the phloem
(B) water is taken out of the phloem
(C) sucrose is loaded into the phloem
(D) sucrose is taken out of the phloem

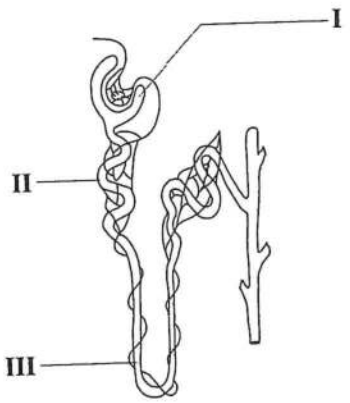
Item **31** refers to the following diagram of a potato plant.



31. Which part of the plant contains the MOST starch?

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

Item **32** refers to the following diagram of a mammalian kidney nephron.



32. Which of the following correctly identifies the functioning of EACH of the labelled parts, I, II and III?

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

33. 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

34. Locomotion is an evolutionary adaptation performed by animals. What advantages does this mechanism have over the type of movement that occurs in plants?

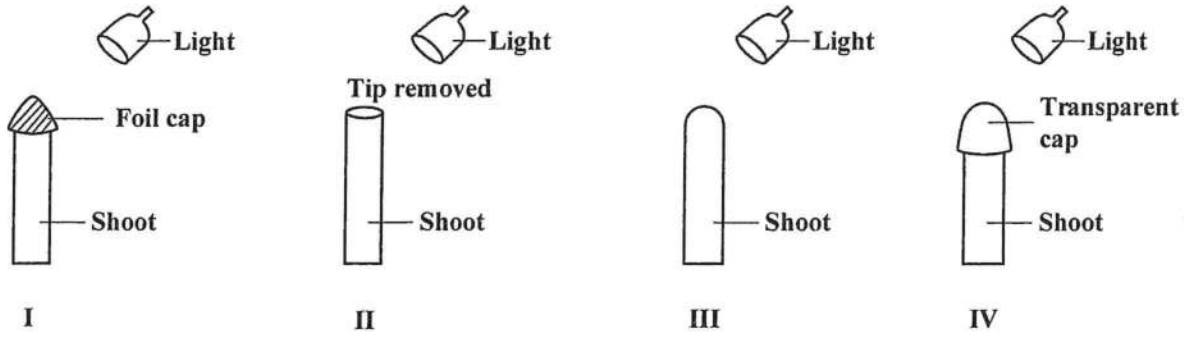
I. The ability to move to favourable conditions
II. Increases chances of predator attacks
III. The ability to find food

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

35. Which of the following 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 an organism away from light
(C)	A wave of excitement in an organism	Locomotion of an organism
(D)	A detectable change in an organism's environment	An organism's reactions to a stimulus

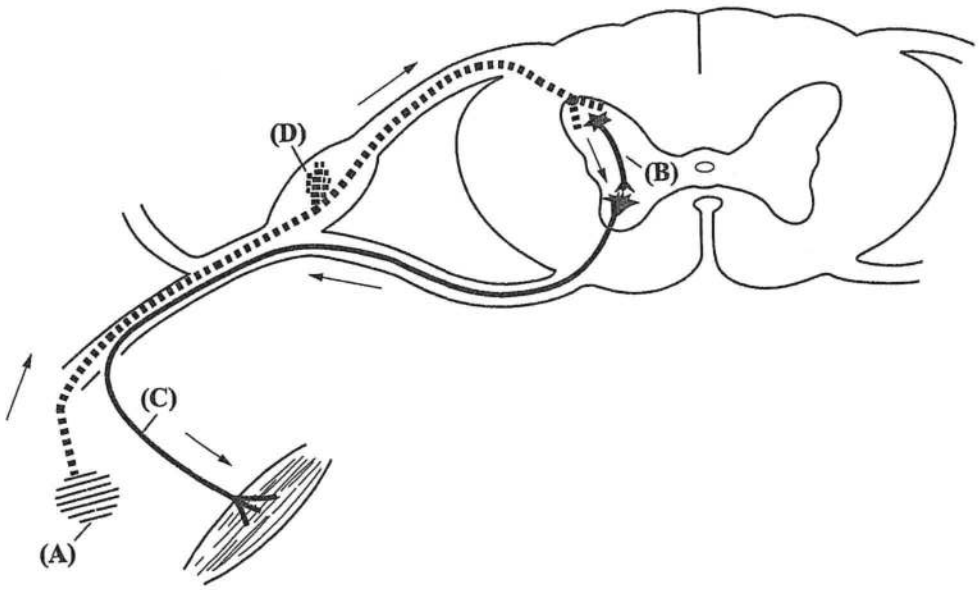
Item **36** refers to the following diagrams illustrating the steps involved in an experiment.



36. After a few days the TALLEST shoot would MOST likely be

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

Item **37** refers to the following diagram of a reflex arc.

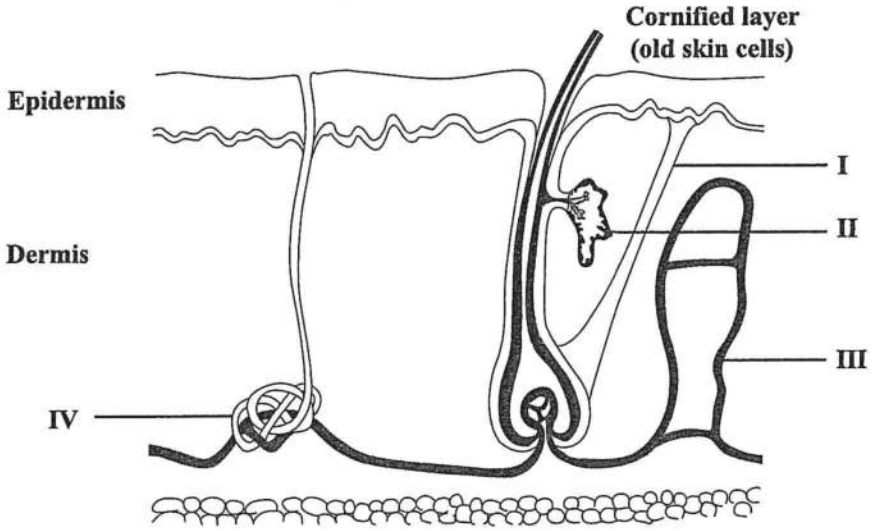


37. Which labelled structure relays the impulse to an effector?

38. 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

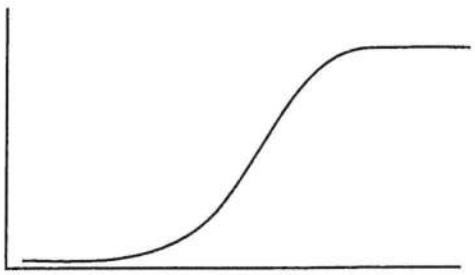
Item **39** refers to the following diagram of a section of human skin.



39. Which structure is NOT involved in temperature regulation?

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

Item **40** refers to the following graph which illustrates a measurement of growth in living organisms.



40. Which of the following labels would be INCORRECT on the *y*-axis?

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

41. The following statements describe the processes taking place within a seed during germination.

I. The embryo uses food to develop the radicle and plumule.
II. Enzymes break down proteins into amino acids.
III. Soluble products move into the embryo.

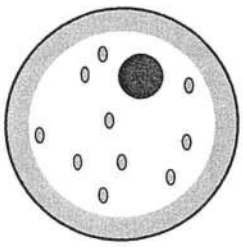
Which of the following sequences is the correct order of the processes?

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

42. The production of new organisms from one parent only is known as

(A) sexual reproduction
(B) asexual reproduction
(C) mitosis
(D) meiosis

Item **43** refers to the following diagrams of two specialized cells.





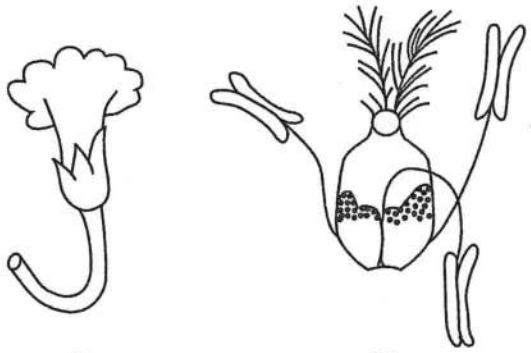
43. Which of the following structures is common to both cells?

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

44. Which of the following forms of birth control is MOST likely 100% effective?

(A) Condom
(B) Diaphragm
(C) Tubal ligation
(D) Birth control pill

Item **45** refers to the following diagrams of flowers from two different types of plants.



I II

45. Which of the following statements is true for the flowers?

(A) I is pollinated by a humming-bird; II is pollinated by the wind.
(B) Both are pollinated by a humming-bird.
(C) Petals are absent from both I–II.
(D) Both are wind pollinated.

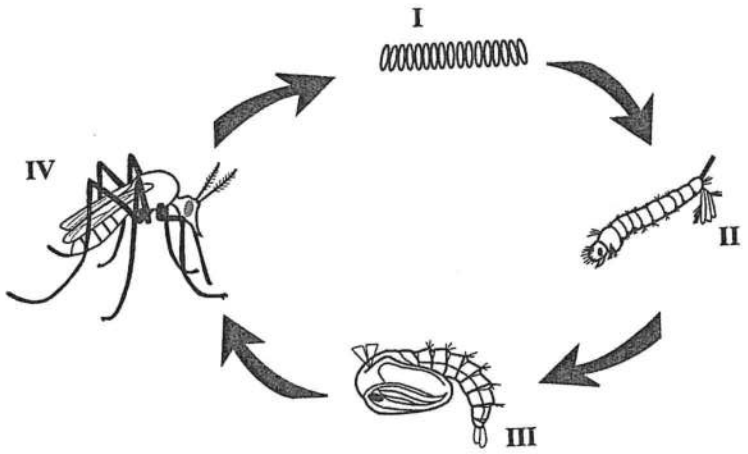
46. Which of the following is the correct sequence for seed formation after fertilization?

(A) Ovule → Zygote → Embryo → Seed
(B) Ovule → Embryo → Seed → Zygote
(C) Embryo → Ovule → Zygote → Seed
(D) Embryo → Zygote → Ovule → Seed

47. A vector is defined as an organism that

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

Item **48** refers to the following diagram which shows the life cycle of a an organism.



48. At which stage is this organism easily controlled by the use of aerosol insecticides?

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

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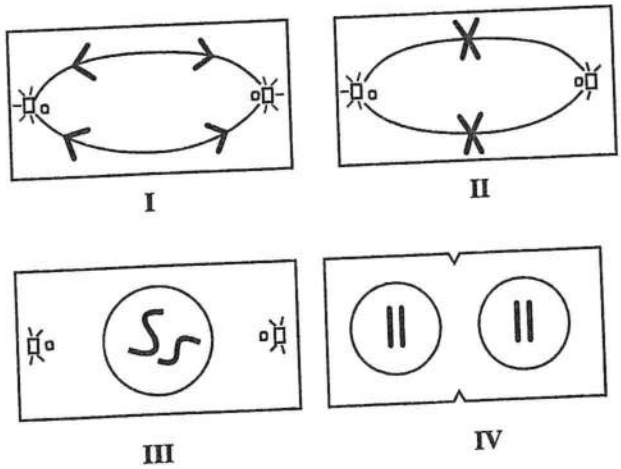
49. A 60-year-old man has been diagnosed with hypertension as well as diabetes. Which of the following treatments would be MOST effective for the diseases?

(A) Exercising and lowering the intake of salt and refined carbohydrates
(B) Spending more time watching television to relax
(C) Starting a rigorous exercise programme
(D) Taking insulin injections

50. Which of the following BEST describes a chromosome?

(A) Two forms of the same gene
(B) Structure made up of DNA wrapped around histones
(C) Nucleic acid that contains all genetic information
(D) Part of the DNA which carries genetic information to produce a protein

Item **51** refers to the following diagrams which show the stages of mitosis.



51. The correct order of the stages is

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

52. On a certain Caribbean island where sugar cane is grown, a fungus is accidentally introduced into the island and destroys the entire crop of sugar cane. Which of the following BEST explains why the entire crop was destroyed by the fungus?

(A) The plants were old and therefore more susceptible to the fungus.
(B) The plants were not of a hardy enough variety to withstand the fungus.
(C) The plants were planted too close together so the fungus spread easily.
(D) There was no genetic variation among the plants so none could survive the attack.

53. Which of the following is NOT a characteristic of meiosis?

(A) Maintenance of the diploid number
(B) Genetic recombination of alleles
(C) Crossing over of chromosomes
(D) Random assortment of genes

54. Which of the following terms refers to visible characteristics of living things?

(A) Gene
(B) Genotype
(C) Phenotype
(D) Chromosome

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

(A) both parents were homozygous recessive
(B) both parents were heterozygous 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 syndrome

57. Variation in a population is due to

I. mutation
II. crossing over
III. asexual reproduction

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

58. A species consists of members that

(A) occupy the same habitat
(B) reproduce by asexual means
(C) interbreed under natural conditions
(D) interbreed to produce infertile offspring

GO ON TO THE NEXT PAGE

59. Which of the following descriptions is true of 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)	Produces great biological diversity	Produces very different organisms from natural populations
(D)	Is a faster process	Is a slower process

60. Which of the following would be involved in the production of insulin by genetic engineering?

I. Transfer of the human insulin gene to a bacterium
II. A vector to transfer the insulin gene
III. Production of insulin by the bacterium

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

END OF TEST

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

DO NOT
WRITE ON
THIS PAGE

CANDIDATE'S RECEIPT

INSTRUCTIONS TO CANDIDATE:

1. **Fill in all the information requested clearly in capital letters.**

TEST CODE: | 0 | 1 | 2 | 0 | 7 | 0 | 1 | 0 |

SUBJECT: BIOLOGY – Paper 01

PROFICIENCY: GENERAL

REGISTRATION NUMBER: | | | | | | | | | | |

FULL NAME: _____
(BLOCK LETTERS)

Signature: _____

Date: _____

2. **Ensure that this slip is detached by the Supervisor or Invigilator and given to you when you hand in this booklet.**

3. **Keep it in a safe place until you have received your results.**

INSTRUCTION TO SUPERVISOR/INVIGILATOR:

Sign the declaration below, detach this slip and hand it to the candidate as his/her receipt for this booklet collected by you.

I hereby acknowledge receipt of the candidate's booklet for the examination stated above.

Signature: _____
Supervisor/Invigilator

Date: _____