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.

FORM TP 2024053

TEST CODE **01207010**

MAY/JUNE 2024

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

BIOLOGY

Paper 01 – General Proficiency

1 hour 15 minutes

31 MAY 2024 (p.m.)

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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.

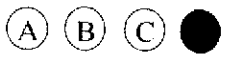
4. On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

   Sample Item

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

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

   Sample Answer

   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.

A004

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

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. Living organisms, such as plants, are affected by ABIOTIC factors which determine where they become established. Which of the following lists contains some of these determining factors?

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

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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 that share the environment	The abiotic and biotic factors of the ecosystem in which an organism lives
(D)	The biotic factors of the ecosystem where an organism lives	The abiotic factors of the ecosystem where an organism lives

A004

Items **4** and **5** refer to the following food chain which shows the feeding relationship in a freshwater lake.

Algae → larvae → eel → pike

4. Which organism in the food chain is the secondary consumer?

(A) Eel
(B) Pike
(C) Algae
(D) Larvae

5. Which of the following organisms in the food chain is the herbivore?

(A) Eel
(B) Pike
(C) Algae
(D) Larvae

6. A farmer notices pink mealy bugs in his garden. He is advised to introduce the ladybird beetle to control the mealy bugs. The type of relationship between the mealy bug and the ladybird beetle is described as

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

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

8. Animals that are at the end of a food chain and that feed on dead and decaying organisms are called

(A) prey
(B) omnivores
(C) carnivores
(D) decomposers

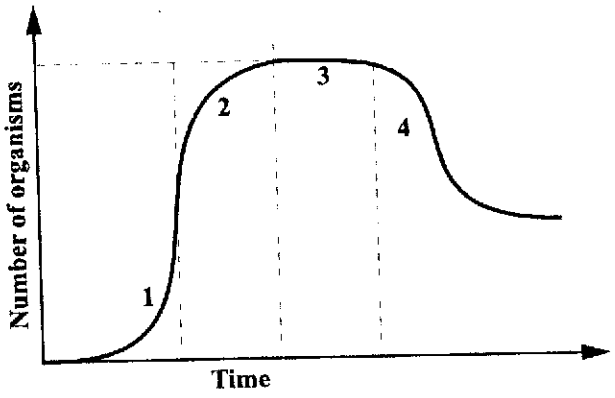
9. The GREATEST threat to the survival of coral reefs is

(A) increased levels of dissolved oxygen
(B) increased ocean temperatures
(C) decreased greenhouse gases
(D) decreased nitrogen levels

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 which illustrates population growth.



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

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

12. Which of the following structures is found ONLY in plant cells?

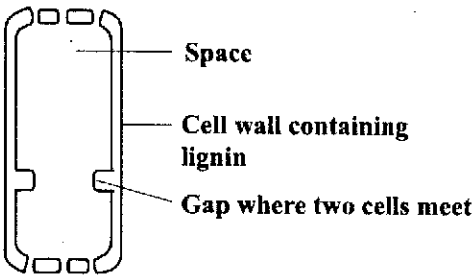
(A) Nucleus
(B) Chloroplast
(C) Mitochondria
(D) Cell membrane

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

A004

	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

Item **14** refers to the following diagram which shows a xylem vessel.



14. The **major** feature that is responsible for the rigid structure of the xylem vessel is the

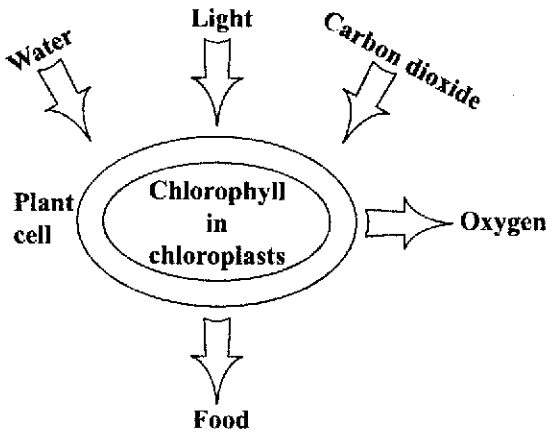
(A) lignin
(B) cell wall
(C) space in the cells
(D) gap where two cells meet

15. In which of the following biological processes is diffusion involved?

I. Food absorption
II. Urine formation
III. Gaseous exchange

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

Item **16** refers to the following diagram which represents a metabolic process carried out in plants.



16. The food produced is

(A) fat
(B) protein
(C) glucose
(D) amino acid

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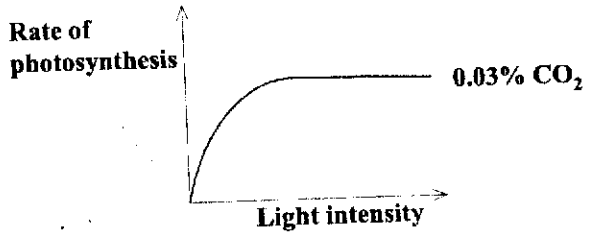
A004

Item 17 refers to the following graph showing rate of photosynthesis versus light intensity.



17. 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 there is no further increase in carbon dioxide and therefore no further increase in photosynthesis.

18. Which of the following minerals is important for the formation of chlorophyll?

(A) Iron
(B) Zinc
(C) Potassium
(D) Magnesium

19. An enzyme is BEST defined as a molecule which

(A) increases the rate of a chemical reaction

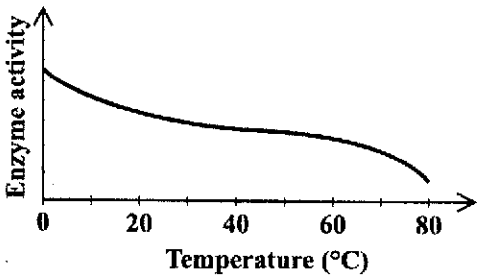
(B) decreases the rate of a chemical reaction

(C) increases the rate of a chemical reaction but remains unchanged at the end of the reaction

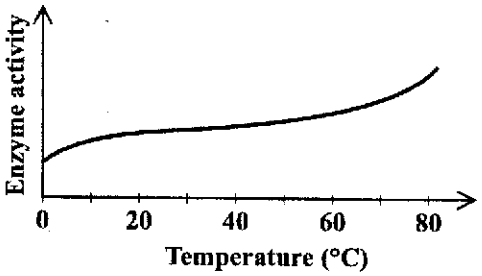
(D) decreases the rate of a chemical reaction but remains unchanged at the end of the reaction

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

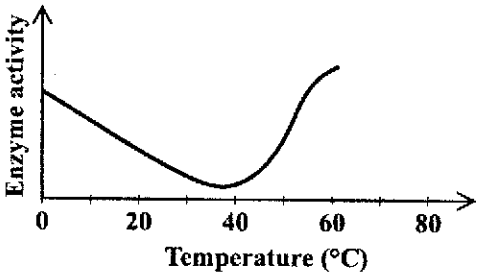
(A)



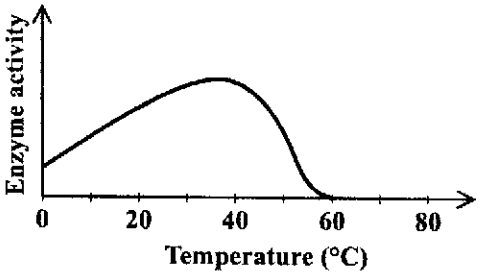
(B)



(C)



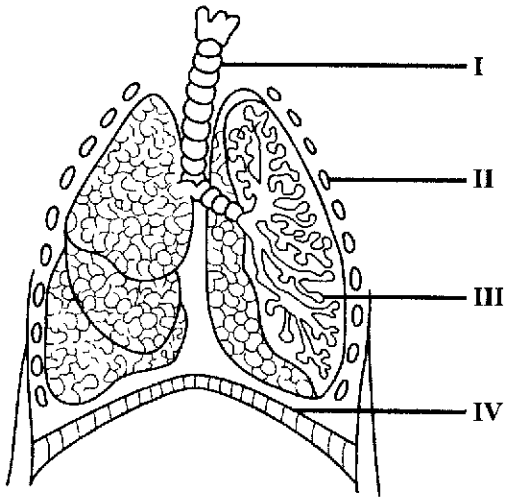
(D)



21. A 50-year-old male is advised by his doctor to reduce the amount of salt he consumes in his diet. If he ignores his doctor's advice, he 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 equation which shows the oxidation of glucose in cells.

$$C_6H_{12}O_6 + O_2 \longrightarrow CO_2 + H_2O$$

Release of energy

23. The energy released from the process above 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 is NOT 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 mucous 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) a human requires a larger volume of oxygen
(C) oxygen cannot pass through the skin of a human
(D) a human's surface area to volume ratio is too small for diffusion to be effective

26. In heart bypass surgery, using an artery to bypass the blockage is advantageous over using a vein because

(A) arteries carry blood away from the heart
(B) veins allow blood to flow in one direction
(C) arteries have thicker, more muscular walls than veins
(D) veins carry only deoxygenated blood

27. The events listed below are involved in the clotting of blood.

I. Fibrinogen is converted to fibrin.
II. Blood cells are trapped.
III. Platelets are activated.
IV. Blood vessels are damaged.

Which of the following is the correct sequence of events in the clotting of blood?

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

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

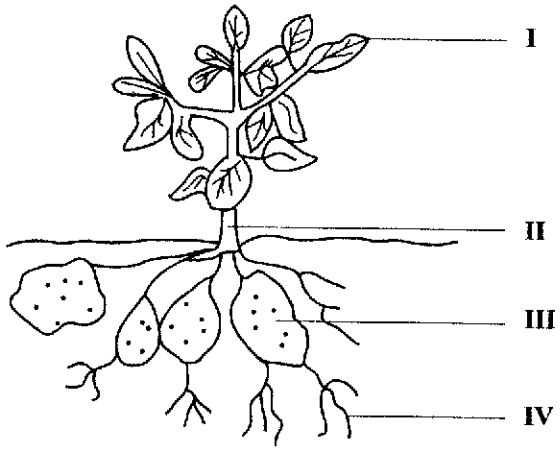
29. Under which conditions will the rate of transpiration in plants be HIGHEST?

(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

32. Which of the following is NOT a form of excretion in plants?

(A) Carbon dioxide diffusing in, through the stomata
(B) Substances being stored in the bark of a tree
(C) Water vapour diffusing out, through the epidermis
(D) Calcium oxalate crystals being stored in leaves during leaf fall

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

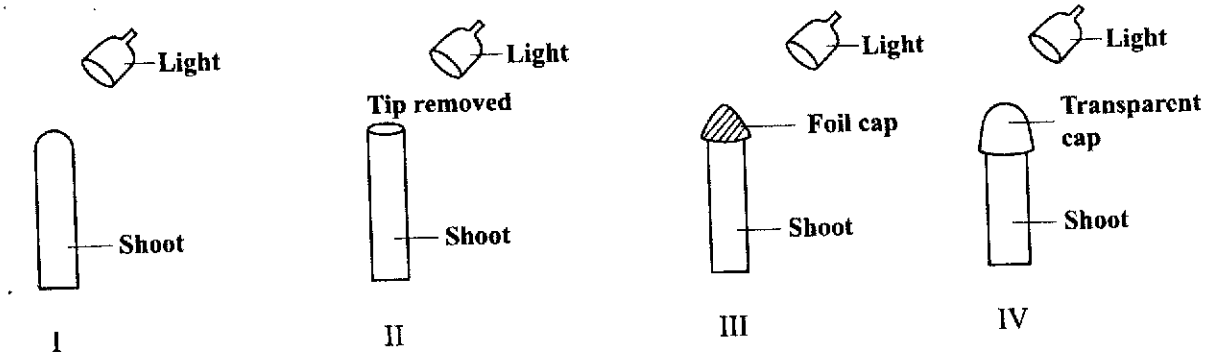
34. Locomotion is an evolutionary adaptation performed by animals. What advantages does this mechanism have over the type of movement that occurs in plants?

I. The ability to move to favourable conditions
II. The increased chance 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

GO ON TO THE NEXT PAGE

Item 35 refers to the following diagrams illustrating the effects of light on a shoot under different conditions.



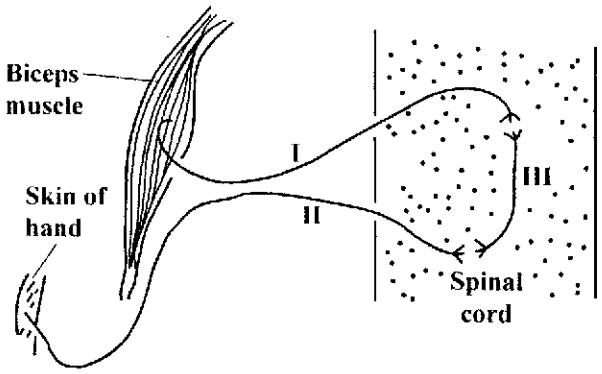
35. After a few days, the TALLEST shoot would MOST likely be

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

36. The role of an effector is to

(A) detect a stimulus
(B) respond to a stimulus
(C) relay a nerve impulse
(D) create a nerve impulse

Item 37 refers to the following diagram of a spinal reflex.



37. Which of the following options gives the correct names for the numbered structures?

	I	II	III
(A)	sensory neurone	motor neurone	relay neurone
(B)	sensory neurone	relay neurone	motor neurone
(C)	motor neurone	sensory neurone	relay neurone
(D)	motor neurone	relay neurone	sensory neurone

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38. Which of the following are functions of the contribute to in the brain?

I. Maintains posture
II. Maintains balance
III. Regulates temperature

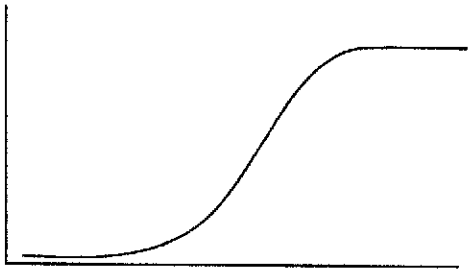
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

A004

39. Which of the following factors does NOT contribute to the development of glaucoma in the eye?

(A) Age
(B) Stroke
(C) Heredity
(D) Vitamin A deficiency

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) Time
(C) Length
(D) Number of leaves

Item **41** refers to the following activities involved in the menstrual cycle.

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

41. Which of the following sequences represent the order of activities in the menstrual cycle?

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

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

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

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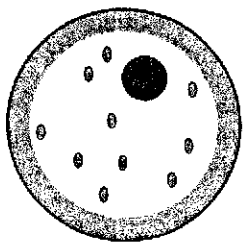
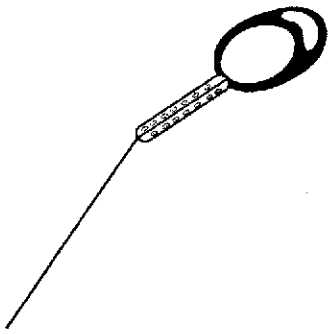
Item **43** refers to the following diagrams of two specialized cells.





A004

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

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

44. Which row in the following table CORRECTLY states the cause, treatment, control and prevention of the disease AIDS?

	Causative Agent	Treatment	Control	Prevention
(A)	Bacterium	Antibiotics	Monogamy	Abstinence
(B)	RNA virus	Antiretrovirals, for example, AZT	Monogamy	Abstinence
(C)	DNA virus	Antigens	Vaccination	Public education
(D)	Bacterium	Penicillin	Vaccination	Abstinence

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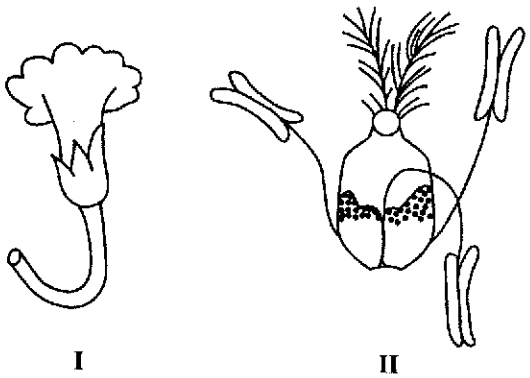
Item **45** refers to the following diagrams of flowers from two different types of plants.



I II

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

(A) I is pollinated by a hummingbird; II is pollinated by the wind.
(B) Both are pollinated by a hummingbirds.
(C) Petals are absent from both I and II.
(D) Both are wind pollinated.

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

(A) Ovule → embryo → seed → zygote
(B) Ovule → zygote → embryo → seed
(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

48. Which of the following forms of birth control is MOST likely to be 100% effective?

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

A004

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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

51. Which of the following are examples of asexual reproduction?

I. Budding
II. Binary fission
III. Vegetative propagation

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

52. On a certain Caribbean island where sugar cane is grown, a fungus is accidentally introduced into the island and destroys the entire sugar cane crop. 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 statements about meiosis is NOT true?

(A) It allows for genetic variation.
(B) It results in the production of gametes.
(C) It doubles the number of chromosomes in gametes.
(D) It causes haploid cells to form from diploid cells.

54. If a diploid organism has two different alleles for the same gene, it is described as being

(A) heterozygous
(B) homozygous
(C) dominant
(D) recessive

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

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56. Two goats, heterozygous for fast growth rate, are crossed. What percentage of the **entire** F1 population would be expected to possess homozygous alleles?

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

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. As a result of mitosis each daughter cell has

(A) a variable number of chromosomes
(B) twice the number of chromosomes as the parent cell
(C) the same number of chromosomes as the parent cell
(D) half the number of chromosomes as the parent cell

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59. Which of the following descriptions is true of natural and artificial selection?

A004

	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

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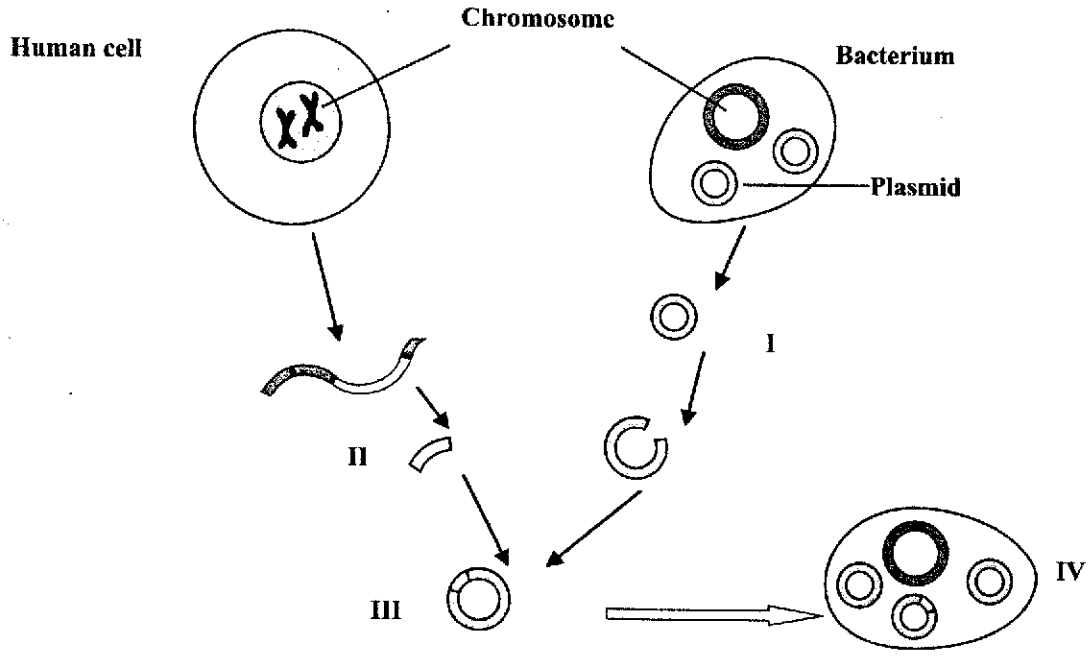
Item **60** refers to the following diagram which shows Stages I, II, III and IV in the production of insulin by genetic engineering.



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60. In which of the stages above can insulin be produced by the bacterium?

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

A004

END OF TEST

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