

↑ AFFIX SEAL HERE ↑

TEST CODE **01207010**

**FORM TP 2006047**

MAY/JUNE **2005**

**CARIBBEAN EXAMINATIONS COUNCIL**

**SECONDARY EDUCATION CERTIFICATE  
EXAMINATION**

**BIOLOGY**

**LIBRARY OF**

**Paper 01 – General Proficiency**

*75 minutes*

**June 2005**

**READ THE FOLLOWING DIRECTIONS CAREFULLY**

1. In addition to this test booklet, you should have an answer sheet.
2. 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.
3. 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) Anaemia
- (B) Diabetes
- (C) Influenza
- (D) Malaria

Sample Answer



The best answer to this item is "Anaemia", so answer space (A) has been blackened.

4. If you want to change your answer, be sure to erase your old answer completely and fill in your new choice.
5. 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, omit it and go on to the next one. You can return to the omitted item later. Your score will be the total number of correct answers.
6. Figures are not necessarily drawn to scale.
7. This test consists of 60 items. You will have 75 minutes to answer them.
8. Do not be concerned that the answer sheet provides spaces for more answers than there are items in this test.

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

Item 1 refers to the following animals which were classified using the visible characteristics listed below.

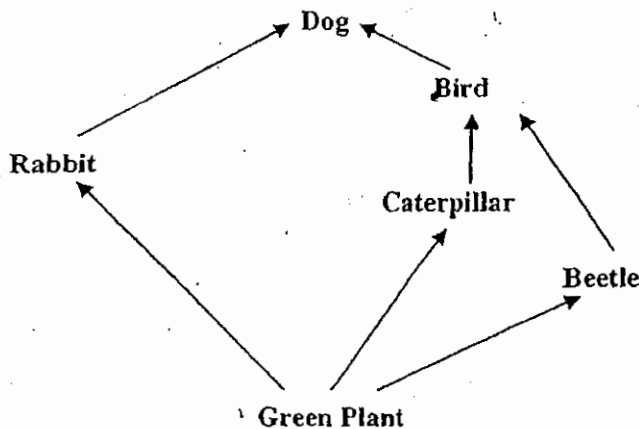


- I. Shape
- II. Number of wings
- III. Number of antennae

1. What other visible characteristic could be used for classification purposes?

- (A) Size
- (B) Weight
- (C) Tail
- (D) Fur

Item 2 refers to the following food web which was observed in a small terrestrial habitat.



2. The carnivores in the food web are the

- (A) bird and caterpillar
- (B) dog and rabbit
- (C) beetle and caterpillar
- (D) bird and dog

3. When does respiration occur in plants?

- (A) All the time
- (B) Only at night
- (C) When photosynthesis stops
- (D) Only while photosynthesis is taking place

4. Which of the following is NOT indicated by the direction of the arrows in a food chain?

- (A) The direction of the flow of energy
- (B) The amount of food each animal eats
- (C) That plants start every food chain
- (D) The animals that are predators

5. Which of the following situations BEST exemplifies an ecological community?

- (A) A colony of termites
- (B) A flock of migrating birds
- (C) Flies on a piece of rotting meat
- (D) The organisms in a fresh water pond

Items 6 - 7 refer to the following plant cell structures.

- (A) Mitochondria
- (B) Cell membranes
- (C) Chloroplasts
- (D) Chromosomes

Match EACH of the descriptions given below with the correct cell structure.

Each option may be used more than once, once or not at all.

6. The sites of the production of ATP (adenosine triphosphate)

7. Structures that move to the poles of the cell during cell division

8. Which of the following processes does NOT contribute to the carbon dioxide content of the atmosphere?

(A) Photosynthesis  
(B) Decay  
(C) Burning  
(D) Respiration

9. The part of the gut into which bile empties is the

(A) duodenum  
(B) caecum  
(C) ileum  
(D) stomach

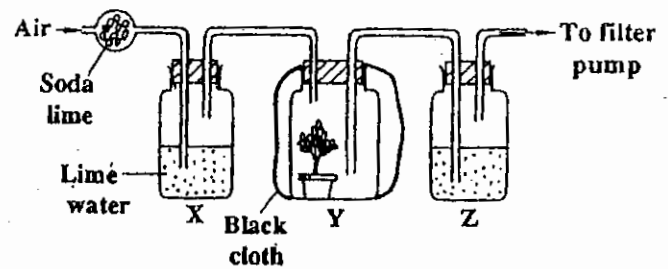
10. The variation in cellular structure found in any complex organism is due to a process called

(A) growth  
(B) elaboration  
(C) metabolism  
(D) specialization

11. When athletes run a long-distance race, which of the following changes takes place in their bodies?

(A) An increase in the breakdown of maltose in the intestines  
(B) A drop in the level of glycogen in the liver  
(C) Constriction of the veins in the legs  
(D) Dilation of the blood vessels to the gut

Item 12 refers to the following apparatus set up to test for products of aerobic respiration.



12. The solution in Jar Z should be

(A) iodine  
(B) tap water  
(C) calcium hydroxide (lime water)  
(D) sodium hydroxide (caustic soda)

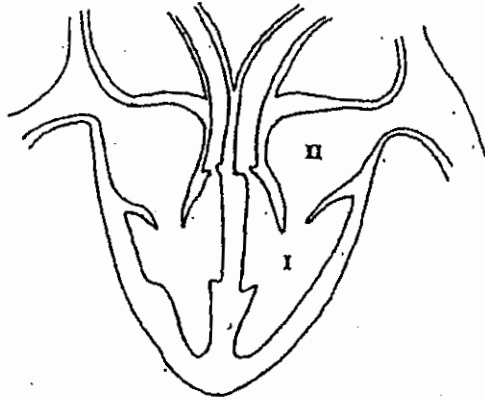
Item 13 refers to the following characteristics of certain structures.

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

13. These characteristics are MOST likely to be associated with the

(A) diffusion of gases  
(B) production of energy  
(C) movement of water  
(D) transport of digested food

Item 14 refers to the following diagram of the human heart.



14. In a patient with a certain defective heart condition, it is found that blood flows from Point I to Point II. This is MOST likely due to the malfunction of the
- (A) left atrium
  - (B) left ventricle
  - (C) semi-lunar valve
  - (D) bicuspid valve

Items 15 - 16 refer to the following structures found in the leaf of a flowering plant.

- I. Epidermis
- II. Mesophyll layer
- III. Guard cells
- IV. Vein

15. Which of the structures contain chloroplasts?
- (A) I and II
  - (B) I and III
  - (C) II and III
  - (D) II and IV
16. A whole plant has its roots submerged for a few hours, in water coloured with red ink. In which part of its leaves does the ink FIRST show up?
- (A) Epidermis
  - (B) Mesophyll layer
  - (C) Guard cells
  - (D) Vein

17. Human red blood cells are normally

- (A) disc-shaped, without a nucleus
- (B) disc-shaped, with a nucleus
- (C) spherical, with a nucleus
- (D) spherical, without a nucleus

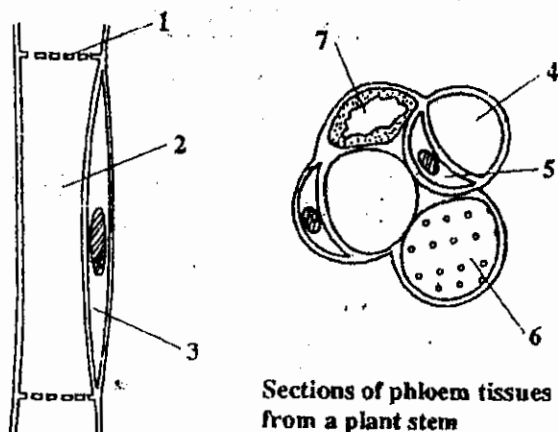
Item 18 refers to the following table which shows approximate concentrations of some substances in the blood plasma and urine of a healthy man.

Substance	% in Plasma	% in Urine
Water	90-93	95
Protein	7.0	0
Glucose	0.1	0
Sodium	0.3	0.35
Chloride	0.4	0.6
Urea	0.03	2.0
Uric acid	0.004	0.05

18. In which organ of the body do the changes in concentration of the substances shown in the table occur?

- (A) Liver
- (B) Lung
- (C) Kidney
- (D) Rectum

Items 19-20 refer to the following diagrams of plant cells.



19. Manufactured food is transported in

- (A) 1 and 5
- (B) 2 and 4
- (C) 3 and 5
- (D) 3 and 6

20. Companion cells are represented by

- (A) 1 and 7
- (B) 2 and 6
- (C) 3 and 5
- (D) 2 and 5

21. Which of the following substances is NOT an excretory product of body metabolism?

- (A) Faeces
- (B) Water
- (C) Urea
- (D) Sweat

22. Which of the following organisms has the LEAST need for a transport system?

- (A) Amoeba
- (B) Honey bee
- (C) Seedling
- (D) Tadpole

23. Which of the following arteries does NOT carry oxygenated blood?

- (A) Carotid
- (B) Hepatic
- (C) Pulmonary
- (D) Renal

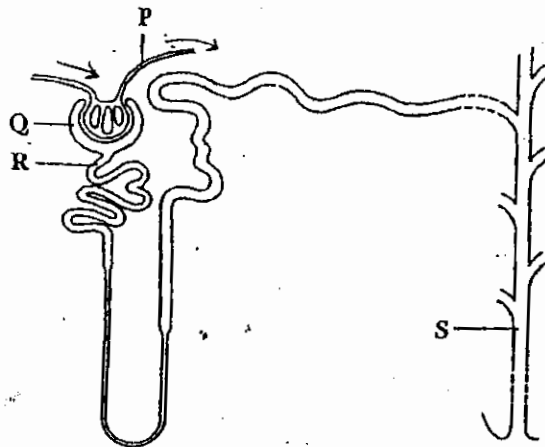
24. Which of the following sequences BEST describes the circulation of blood in the body?

- (A) Lungs → left side of heart → other parts of the body → right side of heart
- (B) Lungs → right side of heart → left side of heart → other parts of the body
- (C) Lungs → right side of heart → other parts of the body → left side of heart
- (D) Lungs → left side of heart → right side of heart → other parts of the body

25. The MAIN function of cartilage at the end of long bones is to

- (A) lubricate joints
- (B) increase flexibility
- (C) reduce friction
- (D) protect nerves

Item 26 refers to the simplified drawing of a renal tubule (nephron) below.



26. The name of the process which occurs in Q is

- (A) secretion
- (B) reabsorption
- (C) osmosis
- (D) filtration

27. The primary function of the neural spine of the lumbar vertebra is for

- (A) attachment of muscles
- (B) support of adjacent vertebrae
- (C) protection of the spinal cord
- (D) movement of bones

Item 28 refers to the actions of the following organisms:

- I. Withdrawal of an earthworm into its burrow when touched
- II. Bending of shoots towards light
- III. Rolling up of a millipede when touched with a needle
- IV. Movement of maggots away from light

28. These actions are examples of

- (A) growth movements
- (B) locomotion
- (C) stimuli
- (D) responses

29. Which of the following conditions does NOT increase the rate of transpiration?

- (A) Decreased humidity
- (B) Decreased temperature
- (C) Increased wind velocity
- (D) Increased light intensity

30. Internal reflection of light within the eye is prevented by the

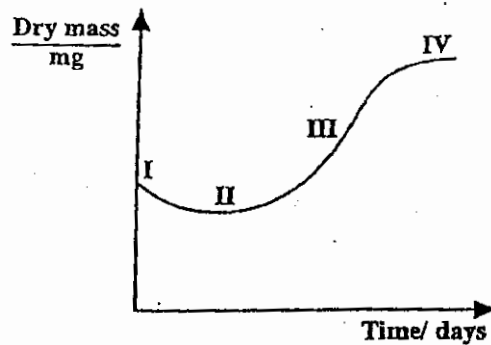
- (A) lens
- (B) retina
- (C) choroid layer
- (D) sclerotic layer

31. Which of the following statements are true of humans?

- I. Males produce more gametes than females.
- II. Females produce more gametes than males.
- III. Males produce gametes for a longer period than females.
- IV. Females produce gametes for a longer period than males.

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

32.

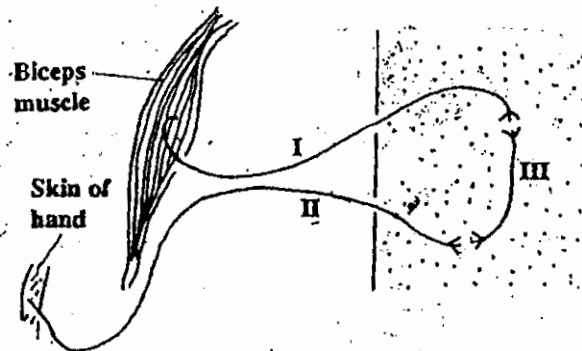


Changes in dry mass in pea seedlings during germination

Which of the following processes is likely to contribute MOST to the decrease in dry mass between stages I and II on the graph above?

- (A) Photosynthesis
- (B) Transpiration
- (C) Translocation
- (D) Respiration

Items 33 – 34 refer to the following diagram of a reflex arc.



33. When the skin of the hand touches a hot object, the sequence of impulse flow is

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

34. The numbered structures in the reflex arc are

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

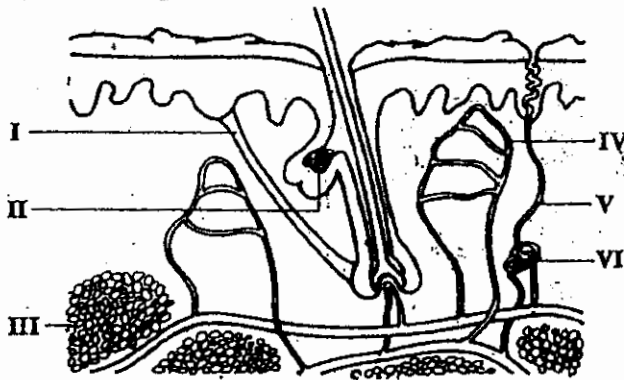
35. For a student to recall his biology notes, action takes place in

- (A) a reflex arc
- (B) the cerebellum
- (C) the medulla oblongata
- (D) the cerebrum

36. 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

Item 37 refers to the following diagram of a vertical section through human skin.



37. Which structure(s) above will be involved in temperature regulation if there is a decrease in the external temperature?

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

38. Sexual reproduction is important because

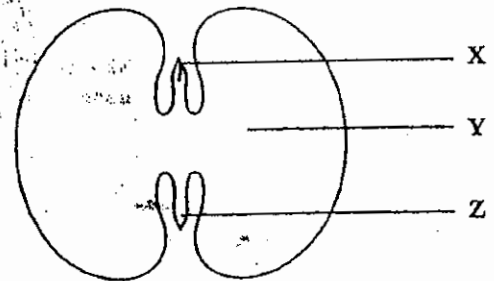
- (A) it prevents too much variation in the species
- (B) it results in offspring which may not be identical to the parents
- (C) the embryos produced by this method are healthier
- (D) a larger number of offspring can be produced

39. A flower has a long style with a feathery stigma, long filaments, no corolla and very small sepals.

This flower is adapted for

- (A) cross-pollination
- (B) pollination by the wind
- (C) self-pollination
- (D) easy access by insects

Item 40 refers to the following diagram of a germinating seed.



40. Which of the following correctly identifies the structures labelled X, Y and Z in the diagram above?

- |     | X       | Y         | Z         |
|-----|---------|-----------|-----------|
| (A) | Radicle | plumule   | cotyledon |
| (B) | Radicle | cotyledon | plumule   |
| (C) | Plumule | radicle   | cotyledon |
| (D) | Plumule | cotyledon | radicle   |



41. Which of the following processes produce clones?
- The growth of a fungus on a piece of bread
  - The development of plantlets at the leaf margins of Bryophyllum
  - Propagation of sugar cane from cuttings
  - Germination of seeds from the same pod
- I and II only
  - II and III only
  - III and IV only
  - I and IV only
42. Each daughter cell produced by mitosis has
- half the number of chromosomes as the parent
  - the same number of chromosomes as the parent
  - twice the number of chromosomes as the parent
  - a variable number of chromosomes
43. The sperm of a certain animal contains 16 chromosomes. How many chromosomes will there be in the nucleus of its skin cell?
- 8
  - 16
  - 32
  - 64
44. In which of the following parts of the plant would you expect the process of mitosis to occur?
- Phloem
  - Xylem
  - In the region behind the root hair
  - In the region behind the root tip
45. Two plants grown from seeds from the same pod looked exactly alike. They are described as having
- the same genotype
  - the same phenotype
  - homozygous genes
  - dominant genes
46. Which of the following crosses will produce a 1:1 ratio in the genotype of the offspring?
- Homozygous-recessive female x heterozygous male
  - Heterozygous female x heterozygous male
  - Homozygous recessive female x homozygous male
  - Homozygous female x homozygous-dominant male
47. Which of the following shows the sex chromosomes present in the human male and female?
- |     | Male | Female |
|-----|------|--------|
| (A) | xx   | xy     |
| (B) | y    | xy     |
| (C) | xy   | xx     |
| (D) | y    | xx     |
48. Breeders have developed many varieties of plants and animals with desirable characteristics. This process is called
- cloning
  - genetics
  - natural selection
  - artificial selection

49. To which of the following groups does a disease caused by a pathogen belong?

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

50. Through which of the following means 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

51. Which of the following are direct consequences of disease in humans?

- I. Loss of man hours and productivity
- II. Loss of human life
- III. Loss of livestock and crops

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

52. The following statements were made by a number of drug users.

- I. I drink strong coffee every hour. The caffeine keeps me going.
- II. I have to inject myself with insulin twice a day.
- III. I know alcohol is not good for me so I only have three drinks a day.
- IV. I take antibiotics regularly in case I catch a cold.

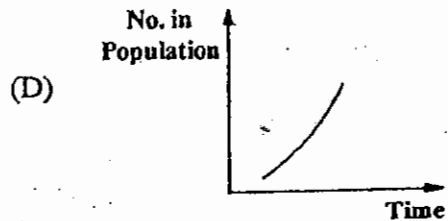
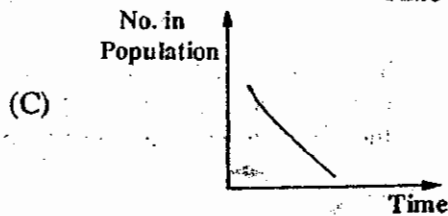
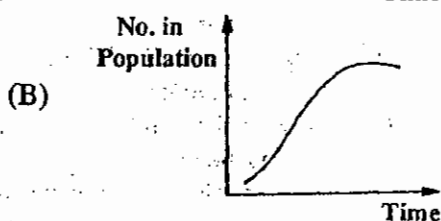
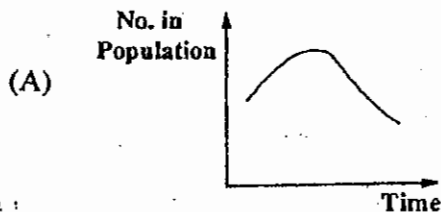
Which of these individuals could be considered drug abusers?

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

53. Which of the following is the BEST method for investigating the range of organisms found between the low tide mark and the high tide mark on a sloping, rocky sea shore?

- (A) Use a line transect.
- (B) Collect as many species as possible.
- (C) Use large quadrats.
- (D) Take a complete census of the area.

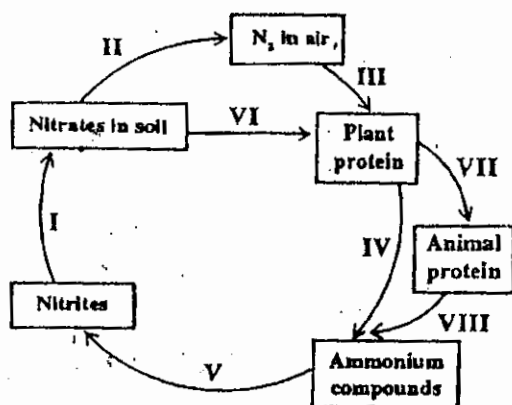
54. Which of the following graphs BEST represents what will happen to the fish population in a pond after caustic soda is dumped in it?



55. Two soil components that are derived from the parent rock material are

(A) humus and mineral salts  
(B) sand and humus  
(C) sand and mineral salts  
(D) clay and micro-organisms

Item 56 refers to the diagram of the nitrogen cycle below.



56. Which of the stages in the cycle identified below result from the activity of micro-organisms?

(A) I, II, III, IV only  
(B) I, II, III, VII only  
(C) II, III, IV, VI only  
(D) III, IV, V, VI only

57. Which of the following factors has NOT contributed to the marked increase in the life expectancy of humans over the last 100 years?

(A) Gene mutations  
(B) Better medical care  
(C) Improved sanitation  
(D) Increased information about disease

Item 58 refers to the following characteristics of a plant.

I. Thick hairy leaves  
II. Concealed stomata  
III. Deeply penetrating root system

58. These characteristics MOST likely belong to a plant which grows in a region that is

(A) warm and dry  
(B) warm and shady  
(C) cool and exposed  
(D) cool and wet

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

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

60. Which of the following is an advantage of using inorganic fertilizers rather than organic manure?

(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.

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