



FORM TP2012146

TEST CODE 02207010

MAY/JUNE 2012

CARIBBEAN EXAMINATIONS COUNCIL
ADVANCED PROFICIENCY EXAMINATION
BIOLOGY - UNIT 2

Paper 01

90 minutes

12 JUNE 2012 (a.m.)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

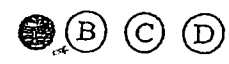
1. This test consists of 45 items. You will have 90 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. Do not be concerned that the answer sheet provides spaces for more answers than there are items in this test.
4. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.
5. 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 is NOT a form of energy storage?

- (A) ATP
- (B) Lipid
- (C) Alcohol
- (D) Lactic acid

Sample Answer

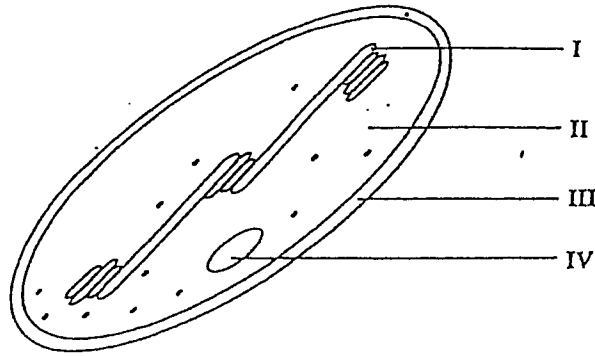


The best answer to this item is "ATP", so answer space (A) has been shaded.

6. If you want to change your answer, erase it completely and fill in your new choice.
7. 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. Your score will be the total number of correct answers.
8. You may do any rough work in this booklet.
9. Figures are not necessarily drawn to scale.
10. The use of silent, non-programmable calculators is allowed.

8.
9.
10.

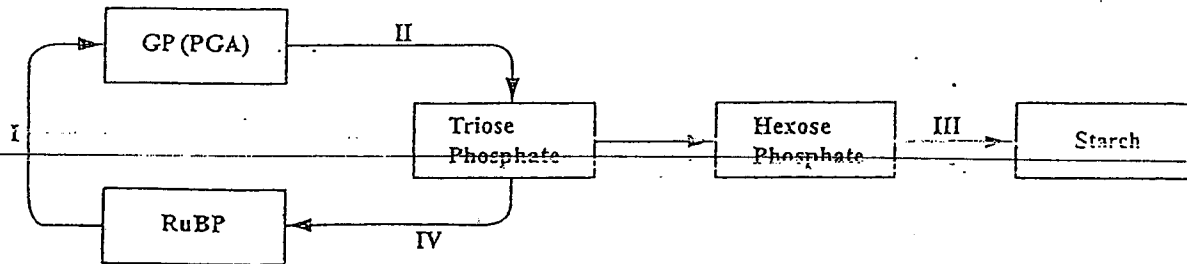
Item 1 refers to the following diagram which represents a chloroplast.



1. Ribulose biphosphate carboxylase can be found in region

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

Item 2 refers to the following diagram which outlines the events of the Calvin cycle.



2. Which of the stages labelled I - IV on the diagram represents the stage at which carbon dioxide is incorporated into the cycle?

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

3. Which of the following combinations correctly describes the MAIN factors affecting the rate of photosynthesis?

- I. Light intensity and temperature
- II. Carbon dioxide concentration and state of the stomata
- III. NAD and ATP availability
- IV. Phytochromes and the availability of ions

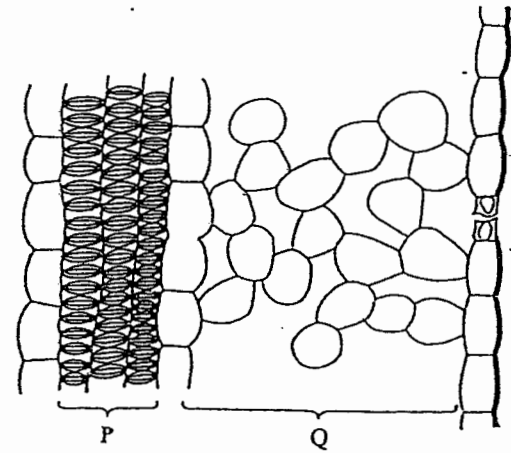
- (A) I and II only
- (B) I and III only
- (C) I, II and III only
- (D) I, II, III and IV

4. The yield of greenhouse crops is higher than that of field crops, due to increased photosynthetic activity by the plants. Which of the following factors may contribute to this?

- I. Constant application of farmyard manure
- II. Humid air and moist soil conditions
- III. Rotation of plants
- IV. Higher than average carbon dioxide levels

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

Item 5 refers to the following diagram which shows some cells in the leaves of a dicotyledonous plant.



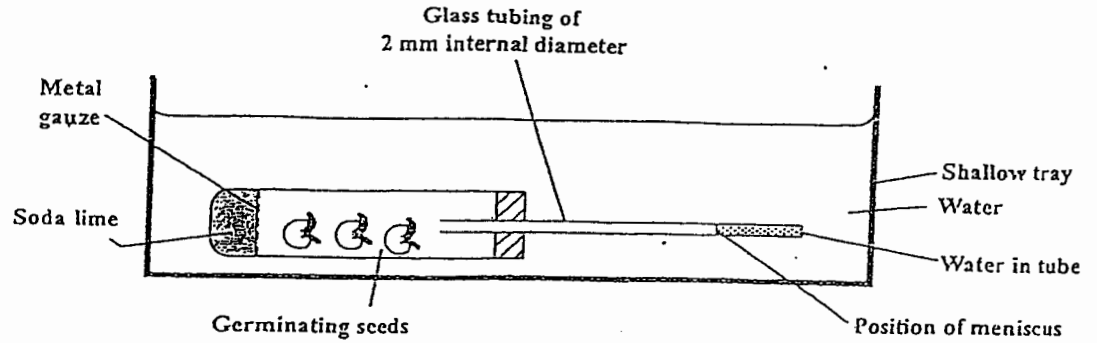
5. Which of the following correctly identifies the regions labelled P and Q?

	Region P	Region Q
(A)	Xylem	Mesophyll cells
(B)	Xylem	Root cortex
(C)	Phloem	Palisade
(D)	Phloem	Stem cortex

6. In muscle tissue undergoing strenuous contractions, the formation of lactate is due to the

- (A) low concentration of glucose
- (B) low concentration of oxygen
- (C) high concentration of glycogen
- (D) high concentration of carbon dioxide

Item 7 refers to the following apparatus which is set up to determine the rate of respiration of germinating seeds.



7. Which of the following statements explain why the apparatus is left in the water for five minutes before readings are taken?

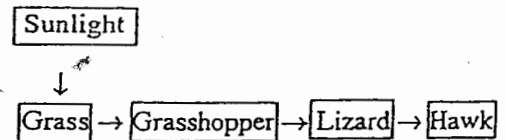
- I. To allow water to fill the capillary tube.
- II. To stabilise the pressure of the apparatus.
- III. To stabilise the temperature of the apparatus.
- IV. The seeds needed to adjust to experimental temperature.

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

8. In anaerobic respiration, the maximum number of ATP molecules that may be produced from a molecule of glucose is

- (A) 2
- (B) 4
- (C) 34
- (D) 38

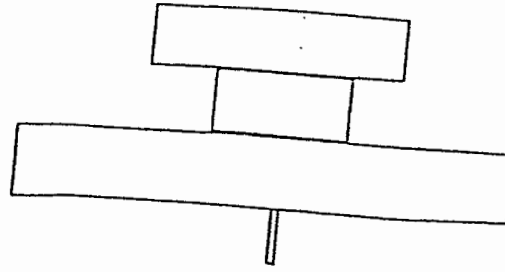
Item 9 refers to the diagram below which shows how energy flows in an ecosystem.



9. At which of the following stages is the MOST energy lost?

- (A) Lizard → hawk
- (B) Sunlight → grass
- (C) Grass → grasshopper
- (D) Grasshopper → lizard

Item 10 refers to the following pyramid of numbers.



10. Which of the following food chains would MOST likely create the pyramid of numbers represented above?

- (A) Decayed leaf → earthworms → small birds → large birds
- (B) Tree → aphids → birds → fleas
- (C) Tree → ants → lizards → birds
- (D) Decayed leaf → bacteria → fleas → bird

11. The two MAIN products of oxidative phosphorylation in the mitochondrion are

- (A) ATP and water
- (B) NAD and FAD
- (C) oxygen and water
- (D) hydrogen and oxygen

12. Which of the following describes an ecosystem?

- (A) Producers + consumers + decomposers + non-living component
- (B) Producers + decomposers + habitats + non-living component
- (C) Producers + consumers + habitats + non-living component
- (D) Consumers + decomposers + habitats + non-living component

13. The number and range of different found in an ecosystem are called its

- (A) biotic factors
- (B) abiotic factors
- (C) species diversity
- (D) community

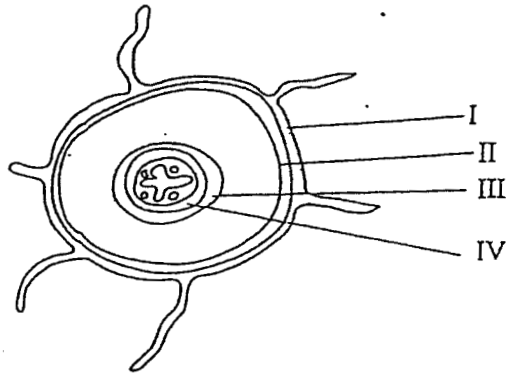
14. Which of the following statements describes the function of denitrifying bacteria in the nitrogen cycle?

- (A) Split the nitrogen molecule to nitrites.
- (B) Split nitrogen molecules to ammonium.
- (C) Convert ammonium compound to nitrates.
- (D) Convert nitrates to atmospheric nitrogen.

15. Which of the following are true about biodiversity?

- I. Variety of species on earth.
 - II. Can be defined at the genetic level.
 - III. May be defined at the ecosystem level.
 - IV. Relates only to endangered species.
- (A) I, II and III only
 (B) I, II and IV only
 (C) I, III and IV only
 (D) II, III and IV only

Item 16 refers to the following diagram which shows a transverse section of a typical dicotyledonous root.



16. The Casparian strip is found in the layer labelled
- (A) I
 - (B) II
 - (C) III
 - (D) IV

Item 17 refers to the darkly staining material labelled X in Figure I, which is often found as the inner layer of Structure Y in Figure II.

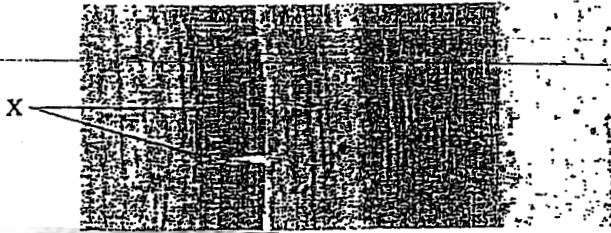


Figure I

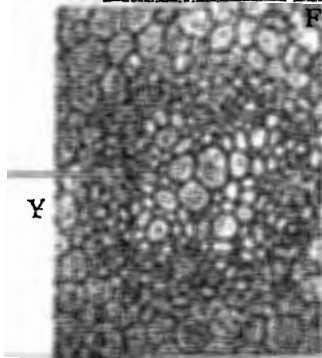
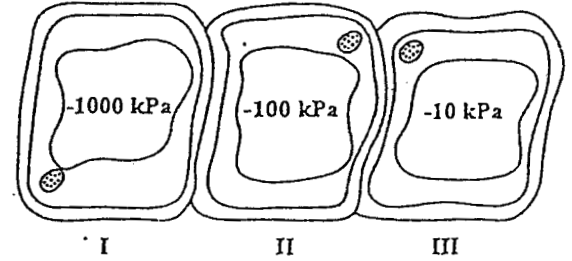


Figure II

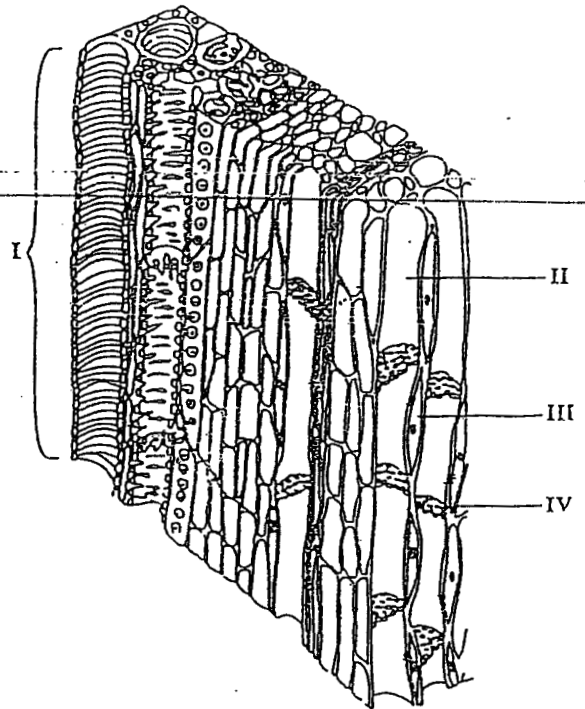
17. What is the identity of X?
- (A) Starch
 - (B) Lignin
 - (C) Callose

Item 18 refers to the following diagram which shows three adjacent plant cells, I, II and III. The values of their water potentials are given in kPa.



18. In which direction would there be a NET flow of water?
- (A) I → II and II → III
 - (B) II → I and III → I
 - (C) II → III and II → I
 - (D) III → II and II → I

Item 19 refers to the following three-dimensional diagram of part of a plant stem.

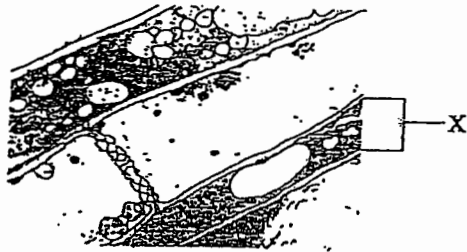


19. Which labelled part is living but lacks a nucleus?
- (A) I
 - (B) II
 - (C) III
 - (D) IV

20. Which of the following statements is true according to the mass (pressure) flow hypothesis?

- (A) Sucrose moves in the phloem against a concentration gradient.
- (B) The loading of sugars into the phloem in the leaf is achieved by osmosis.
- (C) A source is a site where sugars are utilized, while a sink is a site where sugars are produced.
- (D) Water is actively transported from the intercellular spaces into the cell sap at the root end of the system.

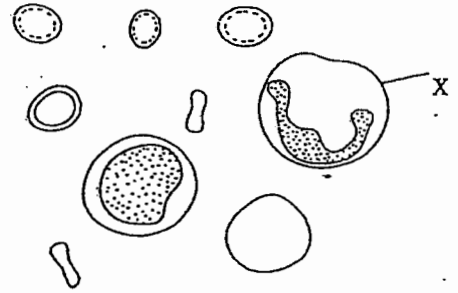
Item 21 refers to the following electronmicrograph which shows a mature sieve tube element and adjacent structures.



21. The structure labelled X is

- (A) a plastid
- (B) the sieve pore
- (C) the sieve plate
- (D) a companion cell

Item 22 refers to the following diagram of some components of blood.



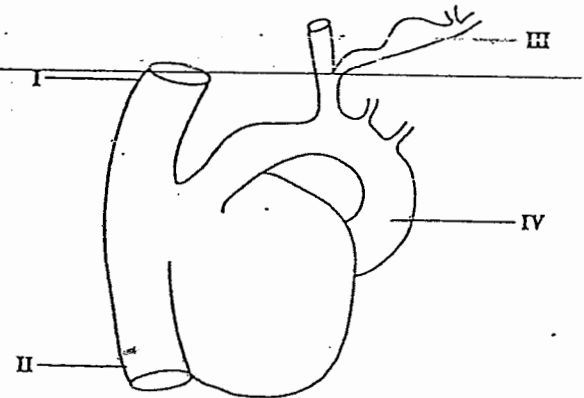
22. The cell labelled X in the diagram above is

- (A) a platelet
- (B) a monocyte
- (C) an erythrocyte
- (D) a neutrophil

23. Which of the following structures must be stimulated to increase heart rate?

- (A) Vena cava
- (B) Cardiac muscle
- (C) Sinoatrial node
- (D) Atrioventricular node

Item 24 refers to the following diagram of the heart and associated blood vessels.



24. The inferior vena cava is labelled as

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

25. The result of an increase in insulin production is
- (A) an increase in cell permeability to glucose
 - (B) a fall in glucose conversion to glycogen
 - (C) an increase in blood glucose sugar levels
 - (D) an increase in conversion of glycogen to glucose

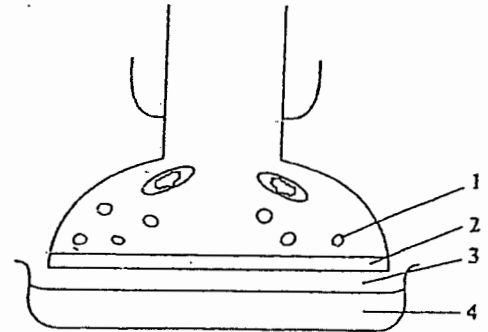
26. Bananas produced in the Caribbean are exported to markets all over the world. The bananas are harvested mature but still green, yet must arrive at the markets ready to eat. Which of the following procedures ensures that the fruit is still marketable after shipping?
- (A) Ethylene application and chilling during shipping
 - (B) Storage of the fruit in chillers with minimum lighting
 - (C) Use of carbon dioxide during shipping and ethylene application later
 - (D) Storage of the fruit in chillers followed by increased temperature when approaching port

27. Which of the following structural features prevents molecules, with a molecular mass greater than 68 000, passing from the glomerular capillaries into Bowman's capsule?
- (A) The basement membrane of the epithelial cell of Bowman's capsule
 - (B) The cell surface membrane of the endothelial cells of the capillaries
 - (C) The cell surface membrane of the epithelial cells of the Bowman's capsule
 - (D) The spaces between the extensions of the podocytes of Bowman's capsule

28. The speed of transmission of a nerve impulse is affected by the

- (A) strength of the impulse
- (B) concentration of acetyl choline
- (C) presence of the myelin sheath
- (D) amount of K^+ that enters the neurone

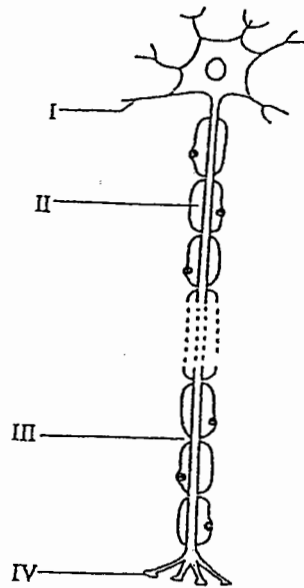
Item 29 refers to the following diagram which shows the gap between two neurones.



29. Where is acetyl choline stored and secreted?

	Stored	Secreted into
(A)	1	3
(B)	1	4
(C)	2	3
(D)	2	4

Item 30 refers to the following diagram of a neurone.



30. Which region assists in speeding up the conduction of nerve impulses?

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

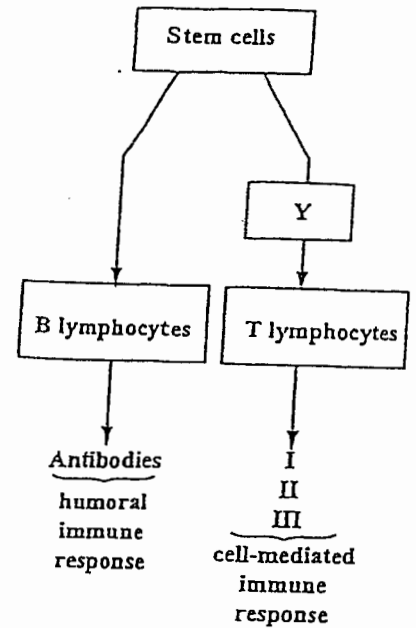
31. AIDS is caused by a

- (A) retrovirus
- (B) rhinovirus
- (C) bacterium
- (D) protozoan

32. Which of the following diseases is MOST appropriately matched to its category?

	Disease	Category
(A)	AIDS	Hereditary
(B)	Stroke	Degenerative
(C)	Diabetes	Infectious
(D)	Emphysema	Deficiency

Item 33 refers to the following diagram.



33. Which of the following correctly identifies the structure labelled Y?

- (A) Lymph node
- (B) Thymus gland
- (C) Hypothalamus
- (D) Red bone marrow

34. Which of the following statements is NOT an explanation of the way in which antibodies work to protect the body from pathogens?

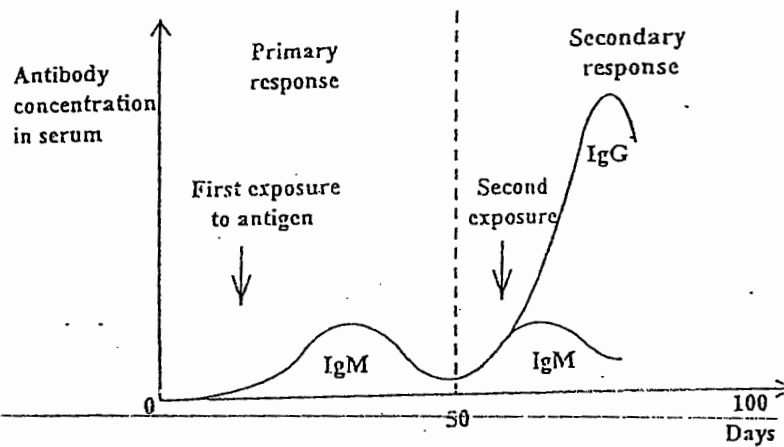
- (A) They cause agglutination of bacteria.
- (B) They combine with viruses preventing them from damaging cells.
- (C) They coat bacteria preventing phagocytes from ingesting them.
- (D) They attach to the flagella of bacteria making them easier for phagocytes to digest.

35. Which of the following are common uses of monoclonal antibodies?

- I. Prevention of transplant rejection
- II. Early diagnosis of cholera
- III. Tissue typing for transplants
- IV. Pregnancy testing

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

Item 36 refers to the following diagram which shows antibody levels in blood serum after exposure to a particular antigen.



36. Which of the following immunoglobulins is/are important in the body's first response to an antigen?

- (A) IgG
- (B) IgM
- (C) IgM and IgG
- (D) IgG and IgM

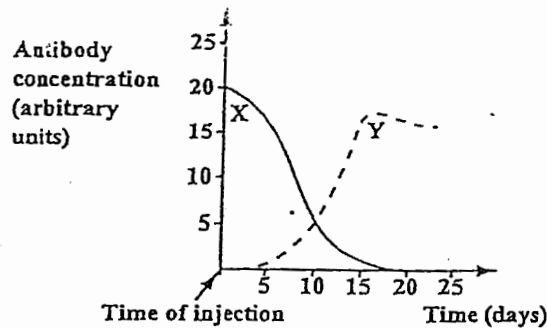
Item 37 refers to the following information.

Two types of immunity are investigated in patients suffering from tetanus.

Person X is injected with antibodies to the disease.

Person Y is injected with vaccine and produces antibodies as a result.

Blood samples are removed from both patients at regular intervals. The results are shown on the graph below.



37. The types of immunity being investigated are

- (A) passive natural; active natural
- (B) active artificial; active natural
- (C) active natural; passive artificial
- (D) passive artificial; active artificial

38. Which of the following is NOT a reason why energy requirements differ in people from birth to old age?

- (A) The amount of activity varies with occupation.
- (B) Metabolic rate reduces with age.
- (C) Gender makes no difference to energy needs.
- (D) As persons age they may be less active.

39. A runner prepares for six months to run a marathon by exercising for three hours daily. This MOST likely results in an increase in

- I. cardiac output
- II. tidal volume
- III. muscle size
- IV. blood pressure

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

40. Fatty deposits in arteries can contribute to strokes and heart disease. This condition is called

- (A) arthritis
- (B) thrombosis
- (C) arteriosclerosis
- (D) atherosclerosis

41. Which of the following correctly identifies the causative agent and the mode of transmission of dengue fever?

	Causative Agent	Mode of Transmission
(A)	Virus	Vector
(B)	Bacterium	Vector
(C)	Virus	Airborne
(D)	Bacterium	Airborne

42. After regular consumption of alcohol, fat accumulates in the liver. Which of the following provides an explanation for this?
- (A) Alcohol provides a substrate for the synthesis of fat molecules in the liver.
 - (B) Alcohol damages liver cells, so they cannot convert fat into lipoproteins.
 - (C) Alcohol acts as a buffer for fat, and absorbs the fat and stores it.
 - (D) Alcohol is used by liver cells in preference to fat, as an energy source.
43. Which of the following BEST describes tolerance, a form of physical drug dependence?
- (A) A severe craving for a drug which interferes with a person's ability to function normally
 - (B) Characterized by the continued desire for a drug, even after physical dependence is gone
 - (C) Develops in persons who have used large quantities of substances such as alcohol and barbiturates
 - (D) Occurs when the body becomes accustomed to a drug and requires ever-increasing amounts to achieve the same effect
44. It is believed that tar in cigarette smoke causes
- (A) the blood platelets to become sticky
 - (B) more adrenaline to be released into the blood
 - (C) blockage in blood vessels, resulting in less oxygen being transported
 - (D) increased secretion of mucus from goblet cells in the epithelium
45. Which of the following interventions would be appropriate to include in an AIDS prevention programme?
- (A) A one-time lecture on the morals of sex outside of marriage
 - (B) Basic education regarding the facts on HIV transmission
 - (C) Providing information about personal hygiene
 - (D) Publishing information on drugs used in the treatment of AIDS

END OF TEST

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