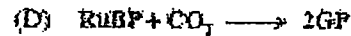
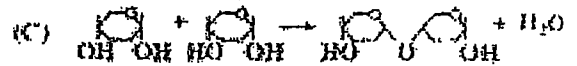
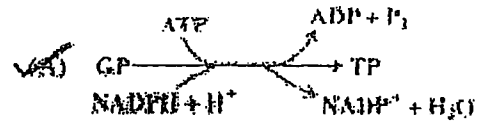


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1. ATP is often described as the 'universal energy currency of cells'. An important feature of ATP is that it
- (A) takes part in a limited number of reactions of metabolism
 - (B) is used only where it is made
 - (C) couples catabolic and anabolic processes.
 - (D) is released in large amounts
2. When non-cyclic photophosphorylation occurs
- (A) light energy in the green region of the spectrum is absorbed
 - (B) carbon dioxide is fixed
 - (C) oxygen is produced
 - (D) NAD is reduced
3. The products formed at the end of stage 1 in the light dependent reactions of photosynthesis are
- (A) oxygen, ATP and NADP
 - (B) oxygen, ATP and reduced NADP
 - (C) water, ATP and NADP
 - (D) water, ATP and reduced NADP

4. In which of the following reactions of photosynthesis is the first carbohydrate formed?

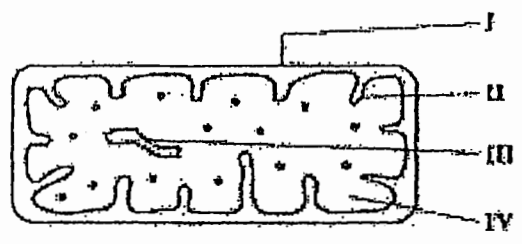


5. The knowledge of the limiting factors which affect the rate of photosynthesis of a particular plant species CANNOT be used directly to
- (A) produce disease resistant plants
 - (B) increase the food yield of the plant
 - (C) control environmental stress
 - (D) control flowering and fruiting
6. Glycolysis requires glucose, the appropriate enzymes and
- (A) reduced NAD
 - (B) ATP
 - (C) pyruvate
 - (D) acetyl co-enzyme A



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7. The diagram below represents a mitochondrion. Which of the labels I to IV indicate the sites of Krebs Cycle and the Electron Transport Chain?

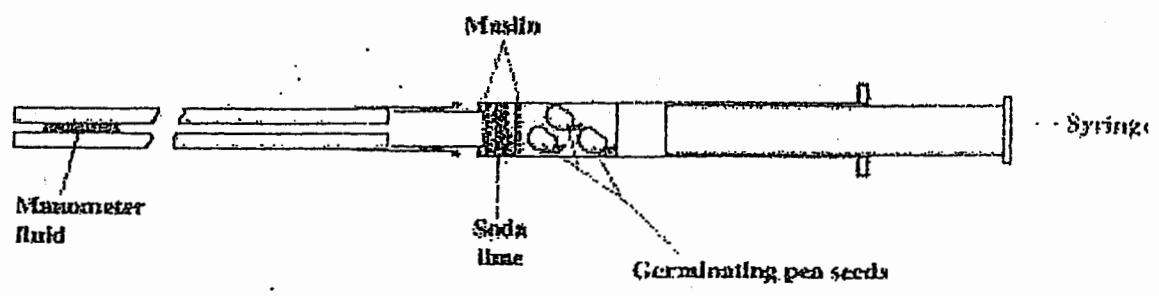


8. Pyruvate produced by glycolysis can become part of the Krebs cycle if it is first converted to

- (A) NADH
- (B) ethanol
- (C) acetyl-coenzyme A
- (D) citrate

	Krebs Cycle	Electron Transport Chain
(A)	I	II
(B)	II	III
(C)	III	IV
(D)	IV	II

9. The diagram shows a simple respirometer.



10. Which of the following is NOT a function of anaerobic respiration in yeast?

- (A) Generation of reduced NAD
- (B) Continuation of glycolysis
- (C) Generation of ATP
- (D) Production of carbon dioxide

11. Which of the following BEST describes an ecological niche?

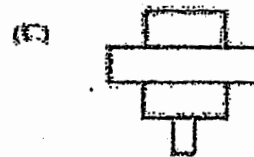
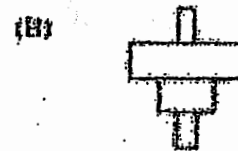
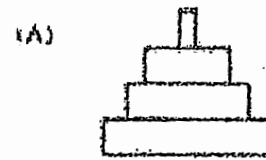
- (A) The relationship between the species and the other organisms in the habitat
- (B) The functional role that the organism plays in its habitat
- (C) The habitat that provides food for the organism
- (D) The habitat that provides the most suitable environmental conditions for the organism

12. Which of the following is considered as a limit to the number of trophic levels in a food chain?

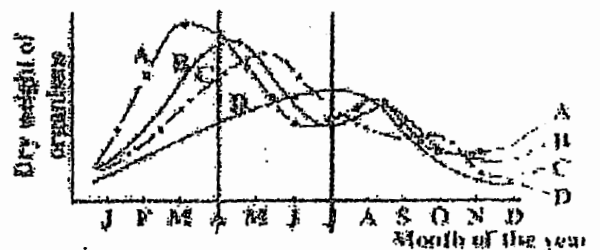
- (A) The diversity of species in the ecosystem
- (B) A high percentage of the energy consumed is converted to heat
- (C) Some of the energy consumed is lost in faeces and urine
- (D) The net productivity of the ecosystem

13. Tree → caterpillars → insectivorous birds → snakes.

Which of the following diagrams represent a pyramid of numbers for the food chain shown above?



Item 14 refers to the following graph which represents biomass of organisms over a period of time.



14. If all four trophic levels are represented, which graph would identify plankton?

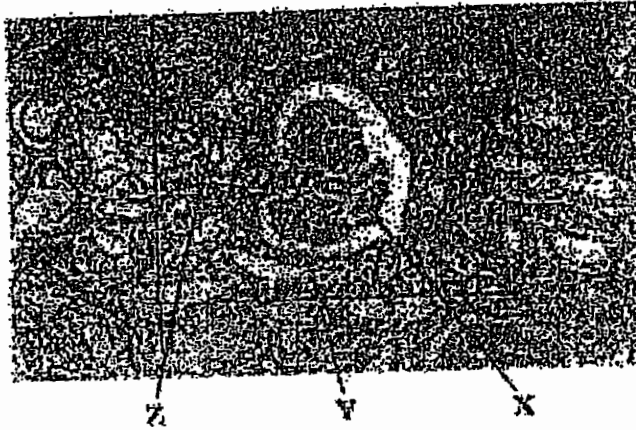
- (A) A
- (B) B
- (C) C
- (D) D

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24. Which of the following is NOT a function of the liver?

- (A) Production of plasma proteins
- (B) Metabolism of fat
- (C) Control of blood sugar
- (D) Storage of Vitamins B, C and D

Item 25 refers to a micrograph of part of the cortex of the kidney.



25. Which of the following correctly identifies X, Y and Z?

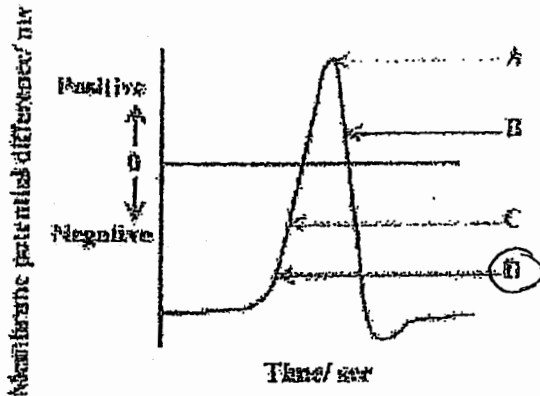
- | | X | Y | Z |
|---|--------------------------|--------------------------|--------------------------|
| (A) | Glomerulus | distal convoluted tubule | renal capsule |
| (B) | Distal convoluted tubule | renal capsule | glomerulus |
| <input checked="" type="checkbox"/> (C) | Glomerulus | renal capsule | distal convoluted tubule |
| (D) | Renal capsule | Glomerulus | distal convoluted tubule |

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26. Which of the following indicates the site and mechanism for the reabsorption of glucose into the blood capillaries from a human kidney nephron?

	Site	Mechanism
(A)	Collecting duct	Active transport
(B)	Distal convoluted tubule	Passive diffusion
(C)	Glomerulus	Selective reabsorption
<input checked="" type="checkbox"/> (D)	Proximal convoluted tubule	Active transport

Item 27 refers to the diagram below.



27. The diagram shows the changes in membrane permeability when a stimulus is applied to a neurone. In which region of the action potential A, B, C or D, do sodium ions begin to move in?

28. In a cholinergic synapse, calcium ions (Ca^{2+}) are involved in the transmission of nerve impulses by:

- (A) generating an action potential of +40mv in the postsynaptic knob
- (B) depolarizing the presynaptic knob by entering the neurone
- (C) restoring the resting potential of the neurone by leaving the cell
- (D) triggering the release of neurotransmitter from the synaptic vesicles

29. Which of the following combinations correctly identifies characteristics of both glucagon and insulin?

	Insulin	Glucagon
(A)	Raises blood sugar produced by beta cells	Lowers blood sugar produced by alpha cells
(B)	Reduces blood sugar Produced by alpha cells	Raises blood sugar produced by beta cells
<input checked="" type="checkbox"/> (C)	Reduces blood sugar Produced by beta cells	Raises blood sugar produced by alpha cells
(D)	Raises blood sugar Produced by alpha cells	Reduces blood sugar produced by beta cells

30. Which three of the following combinations correctly describes the features which are typical of endocrine communication?

- I. Transmission is slow
- II. Response is slow
- III. Response is reversible
- IV. Response is widespread

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

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31. As women pass 50 years of age they require less iron and more calcium in their diets. Which statement provides the BEST explanation for this?

- (A) Blood cells are more readily broken down and must be replaced.
- (B) Women at that age need to replace calcium lost during child bearing years.
- (C) Menstruation is gradually reducing, and bone loss is increasing.
- (D) Less active women would NOT require as many blood cells to be manufactured.

32. During starvation, the FIRST reserve used by the body to maintain energy levels is

- (A) stored glycogen
- (B) protein in muscle
- (C) vitamins stored in liver
- (D) stored fat

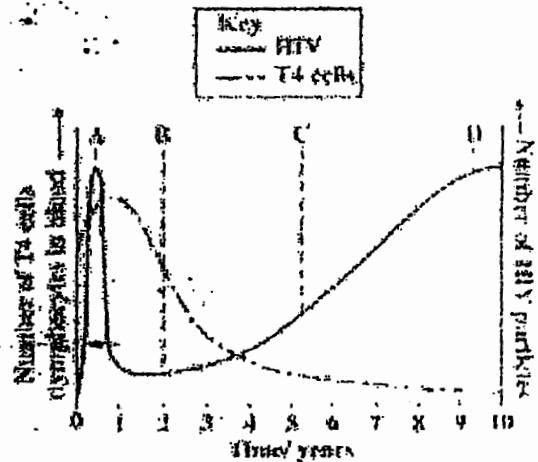
33. A student investigates the immediate effects of exercise on the body and records the following results

Time	Pulse/beats min ⁻¹	Systolic blood pressure/mm Hg
At rest	60	110
5 mins	75	130
10 mins	80	165

Which of the following is the percentage change in blood pressure after 10 minutes of exercise?

- (A) 45%
- (B) 50%
- (C) 55%
- (D) 60%

34. The graph shows the development of an infection with human immunodeficiency virus (HIV) over a period of 10 years.



The patient is MOST likely to first show symptoms of AIDS at point

- (A) A
- (B) B
- (C) C
- (D) D

35. Which of the following is NOT a mode of transmission of the human immune deficiency virus (HIV)?

- (A) Intimate sexual contact
- (B) Contamination with infected blood
- (C) Mother's breast milk to her baby
- (D) Mosquito saliva and transfer of blood

36. Which of the following is the human body's first line of defence against invading pathogens?

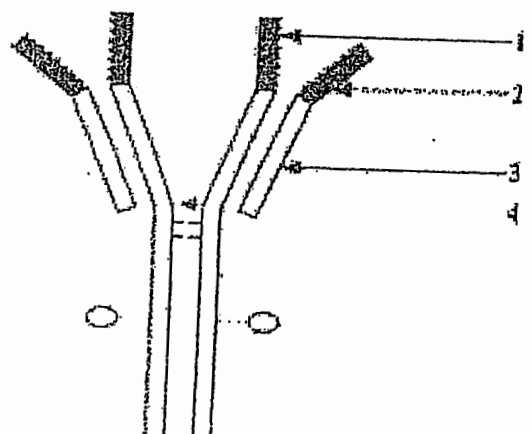
- (A) The production of antibodies
- (B) The production of antigens
- (C) The ingestion of pathogens by B-lymphocytes
- (D) The ingestion of pathogens by phagocytes

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17. Cells that divide and give rise to lymphocytes are called stem cells. In which of the following structures of the human body do these stem cells carry out their division?

- (A) Bone marrow
- (B) Spleen
- (C) Thymus
- (D) Lymph nodes

Item 38 refers to the following diagram which illustrates an antibody molecule.



The two labels which represent the antigen binding site and the region which gives flexibility in binding to antigens are

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

39. Which of the following options best describes the type of immunity that results from taking an oral vaccine for polio?

- (A) Active natural immunity
- (B) Passive natural immunity
- (C) Active artificial immunity
- (D) Passive artificial immunity

40. A monoclonal antibody is

- (A) a small quantity of several antibodies made by one particular type of B-lymphocyte
- (B) made by fusing a lymphocyte with a somatic cell
- (C) produced by T cells after exposure to one particular antigen

41. Long term exposure of the liver to high concentrations of alcohol eventually results in liver failure. This is due to the development of the disease called

- (A) Cirrhosis
- (B) Multiple sclerosis
- (C) Atherosclerosis
- (D) Arteriosclerosis

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42. The table below shows the effects of three components of tobacco smoke (X, Y, Z) in humans.

X	Y	Z
Lung cancer	Constriction of arteries	Reduces the oxygen -- carrying capacity of blood
Mucus secretion high	Release of adrenaline	Combines with haemoglobin

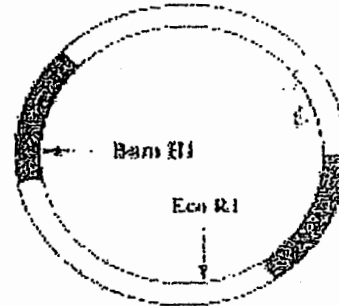
Which of the following correctly identifies X, Y and Z?

	X	Y	Z
(A)	Tar	Carbon monoxide	Nicotine
<input checked="" type="checkbox"/> (B)	Tar	Nicotine	Carbon monoxide
(C)	Nicotine	Carbon monoxide	Tar
(D)	Carbon monoxide	Tar	Nicotine

43. What is the name of the enzyme used to produce sections of DNA from messenger RNA for use in genetic engineering?

- (A) DNA polymerase
- (B) Reverse transcriptase
- (C) Restriction endonuclease
- (D) RNA polymerase

Item 45 refers to the diagram below showing a map of a plasmid showing the positions of recognition sequences of two restriction enzymes.



44. Which of the following DNA molecules can be sectioned by using a restriction enzyme with a recognition site of AATT?

- (A) GCTTGCATAAGC
CGAACGTATTTCG
- (B) CATGGCATGGCA
GTACCGTACCGA
- (C) AGTTCAGGTACC
TCAAGTCCATGG
- (D) TACCGTTAAGCT
ATGGCAATTTCGA

45. In an experiment to use this plasmid as a vector for the human insulin gene, for which of the following reasons would the genetic engineer choose the Bam location to cut this plasmid?

- (A) The insulin gene is not complementary to the Eco RI restriction site
- (B) Bam HI makes a staggered cut
- (C) To allow identification of the recombinant plasmid
- (D) The gene for tetracycline resistance is needed for the expression of the insulin gene.

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

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