

Biology

Written examination 1



2005 Trial Examination

SOLUTIONS

SECTION A – Multiple-choice questions (1 mark each)

1. B	13. C
2. A	14. A
3. D	15. D
4. D	16. D
5. D	17. B
6. C	18. B
7. C	19. D
8. B	20. B
9. D	21. B
10. C	22. A
11. D	23. B
12. B	24. C
	25. D

SECTION B – Short answer questions

Question 1

- a. i. Diffusion
- ii. Molecules move from an area of higher concentration of oxygen outside the cell to an area of lower concentration of oxygen inside the cell.
- iii. Aerobic respiration. Transfer of energy from energy-rich (glucose) molecules to molecules of ATP.
- b. The smaller the cell, the larger the surface area to volume ratio. Hence the potential for exchange between a cell and its immediate environment is maximized.
- c. One of:
- Contractile vacuole – removes excess water hence stops cell swelling and bursting.
- Flagellum – assists movement of organism hence greater chance of coming in contact with nutrients or greater chance of escaping predators.
- Nucleus – contains genetic material which directs protein synthesis hence controls cellular functions.
- d. Bacteria or any bacterium.
- e. Cell membrane, flagellum, ribosomes or cell wall.
- f. Prepares proteins for secretion.
- Packages proteins for secretion.

Question 2

- a. The immediate surrounds of the cells or extracellular fluid.
- b.
 - i. Insulin.
 - ii. Stimulates breakdown of stored glycogen to glucose.
- c. Carried in bloodstream or
Proteins / chemicals produced by the endocrine / ductless glands or
Slow acting or
Long lasting.
- d. Messages carried largely by electrical impulses and passed along nerves which follow a more direct pathway than blood vessels, to target organ.

Question 3

- a. Virtually no transpiration (rate close to zero) at 2pm in Feb but significantly higher (rate of 6) at 2pm in June.
- b. Both carbon dioxide uptake and transpiration rely on stomatal aperture. If stomata open both move in or out. If stomata closed then no movement of either.
- c. Three of
 - thick cuticle
 - hairy leaves
 - sunken stomata
 - rolled leaves
 - succulent leaves

Question 4

- a. Sensitive cells.
- b. Guard cells.
- c. Reduction in water content of sensitive cells.
- d. It is a system of regulation where the response alters the stimulus.

Question 5

- a. Two of
 - large numbers of larvae produced
 - two hosts - pig and human
 - larvae can enter lymph or blood
 - production of cysts which survive outside host
 - different stages occupying very different organs
- b. Two of
 - meat inspection
 - thorough cooking of meat
 - cease feeding pork scraps to pigs
- c. Successful. If a parasite has too severe an effect on its host then it eliminates or reduces its own chances of reproduction.

Question 6

- a. Situation where many people world wide contract a specific disease over a relatively short time period.
- b. Avian ‘flu virus is new to the human community and hence no previous exposure to enable build-up of immunity.
- c. An organism who is carrying a disease but exhibiting no symptoms of the disease.
- d. Contaminated food or water resulting from poor hygiene.
- e. One of
 - Preparation of large quantities of avian ‘flu vaccine
 - Slaughtering infected animals
 - Producing antiviral drugs specific to avian ‘flu

Question 7

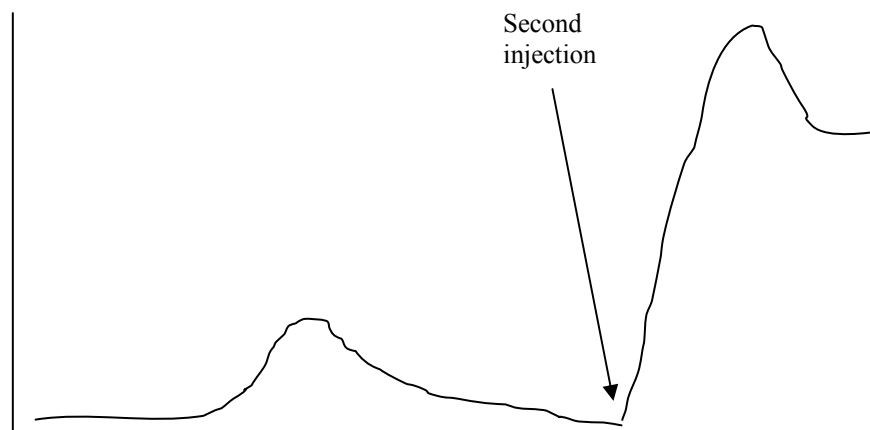
- a. All cells have proteins called markers on their surfaces which are determined by genes. B & T cells recognise and ignore cells that have the same markers as themselves. Markers not produced within a person are called “non-self”.
- b. Helper T cells help B cells to recognise foreign antigen on the surface of phagocytes. B cells will not reproduce and form plasma cells without this assistance from helper T cells

Question 8

a. Two of

	Body cell type	Function
1	B cells	Detect antigen and produce plasma cells
2	T cells	Help activate B cells
3	Phagocytes	Process antigen and present to lymphocytes
4	Plasma cells	Produce antibodies

b. i.



ii. Faster response because memory cells still exist from first injection so no “learning period”.

Greater concentration of antibody because memory cells still exist and so many more B cells produced quickly and hence more antibody produced.

c. Test mice would still retain memory cells and also antibodies from the second injection and hence would either be totally protected from disease or experience only a mild form of it.

END