

INDEPENDENT TRIAL EXAMS – 2001 **BIOLOGY - SUGGESTED ANSWERS**

SECTION I - PART A

C	2	C	3	B	4	D	5	B	6	A	7	A	8	B
C	10	C	11	B	12	C	13	B	14	A	15	B		

SECTION I - PART B

- 2 TWO named responses/adaptations that are correct for the species.
2 TWO correct explanations for how the response/adaptations regulate body temperature.
- Uses of a range of pHs, temperature or substance concentration.
 - List of variables controlled/kept the same.
 - Description of how results were quantitatively obtained.
 - Replication of experiment.
 - Description of results.
- Justification
- explanation of why all variables except pH, temperature or substance concentration.
 - explanation of why experiment needs to be replicated.

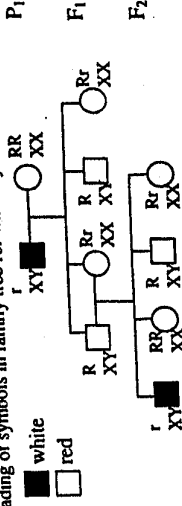
- (a) correct description of use of any correct blood product.
(b) any correct statement on current research (eg limited success; use of perfluoro compounds).
any correct useful application (eg no need to cross-match, storage advantages, less potential of infection).

Any Australian species for which the mechanism is correct (eg mangrove).
Any correct mechanism (eg restrict entry of salt through membranes, secrete salt through glands in leaves, store salt in leaves and shed these)

Filtration – small molecules (urea, water salt, glucose, amino acids) enter nephron due to pressure in glomerus forcing them through membranes of glomerulus/Bowmans capsule.
Reabsorption – some water, salts and all glucose and amino acids reabsorbed by active transport back into bloodstream while urea is left in the nephron
Explanation that by reabsorbing different amounts of water and salts from the nephron the blood concentration can be changed.
The amount of water or salt reabsorbed is to correct imbalances in blood concentration.

- (a) Compare two or more different forelimb modifications in vertebrates which all have the same basic combination of bones.
Relate the similar basic pattern to origin from a common ancestor.
(b) Say what it is/Define convergent evolution
Provide a good example of convergent evolution
Describe how the same/similar natural selection pressures result in similar adaptations arising in different groups.
Natural selection acting on different genetic material but governing the same features.

22. P1 parents: white-eyed male (X^wY) X pure breeding red-eyed female ($X^W X^W$)
F1 offspring: all males red-eyed ($X^W Y$); all females red-eyed ($X^W X^w$)
P2 parents: red-eyed male ($X^W Y$) X red-eyed heterozygous female ($X^W X^w$)
F2 offspring: 1 white-eyed male ($X^w Y$); 1 red-eyed male ($X^W Y$)
1 red-eyed homozygous female ($X^W X^W$); 1 red-eyed heterozygous female ($X^W X^w$)
Correct shading of symbols in family tree for white eyes.



23. (a) Diagram(s) showing correct base pairing resulting in 2 identical molecules.
(b) change in the DNA sequence will result in a different protein/polypeptide being formed. which will result in a change/failure of an enzyme-mediated reaction or structural cell component.
24. (a) Non-random possible combinations of gametes will reduce genetic variability within the population.
(b) Ethical issue related to that organism
25. • Control = heated swan-necked flask intact – no growth as microbes could not enter the broth.
• Treatment = heated swan-necked flask with neck broken – microbes able to enter causing decay.
• Other conditions remained the same/controlled other variables.
• experiment showed that non-living matter could not give rise to living matter/refuted theory of spontaneous generation.
• changed thinking by giving support to cell theory/all living cells come from pre-existing cells.
26. (a) Any disease carried by vector (eg malaria).
Name of pathogen which matches disease given in (a) (eg *Plasmodium*, malarial parasite).
(b) Name the insect which matches the disease given in (a) (eg *Anopheles* mosquito).
Accurate life cycle.
Place where life cycle can be broken (eg antimalarial chemicals in blood).
Reason why control/prevention is effective at the stage of life cycle identified.
27. (a) Compare a correct first-line defence barrier preventing pathogen entry with phagocytic cells
(b) destroying pathogens that have entered the body, and the triggering of immune response
Rejection – Immune system mounts an immune response to the foreign tissue.
Knowing this means that can use immune-suppression drugs to reduce rejection.
28. There has been a steady increase in the number of cases.
Any reasonable explanation (eg increase in number of places using the technology of air conditioning, more people in the community infected and so more likely to pass on the disease, more crowded conditions makes the spread more likely.)

- (e) (i) Named example of one of the technologies. 1
 Outline of the procedure involving at least 3 definitive steps. 3
 (ii) Identify a social issue. 1
 Discuss – provide points for and/or against. 2
- (f) Correctly named industrial process and microorganism. (eg *Saccharomyces* 2
cerevisiae/baker's yeast; *Lactobacillus acidophilus*) involved in the process. 1
 Identify important product (eg carbon dioxide to make bread rise; lactic acid gives yoghurt its taste and preserves it). 1

QUESTION 31 – GENETICS: THE CODE BROKEN?

- (a) DNA sequence $\rightarrow$ mRNA = transcription 1
 in nucleus 1
 mRNA $\rightarrow$ ribosome 1
 mRNA sequence $\rightarrow$ sequence of amino acids in polypeptide/protein = translation 1
 involvement of tRNA 1
 adequate flow diagram 1
- (b) (i) Father Rh⁺Rh⁺ and Mother Rh⁺Rh⁺ (1 mark if only % is given)

Rh ⁺	Rh ⁺	Rh ⁺
Rh ⁺	Rh ⁺	Rh ⁺
Rh ⁺	Rh ⁺	Rh ⁺

- OR if working is shown in full 3
 (ii) Characteristics that are determined by more than one pair of alleles (eg height; body size; weight) 1

- (c) Indicate that the project is intended to do the following
- DNA sequencing – determining the base sequences of all genes. 3
 - Genetic mapping – locating genes to specific chromosomes. 2
 - Physical mapping – locating the exact position of each gene on its specific chromosome. 1
- Any TWO possible benefits (eg improving detection of diseases, lead to gene therapy, tracing evolutionary pathways). 3
- (d) Named example of one of the technologies. 1
 Outline of the procedure involving at least 3 definitive steps. 3
- (e) Parents rLl and RrLl 1
 1 out of 8 or 12.5% would have white eyes and short wings.
- | | |
|----|------------------|
| rL | rl |
| RL | RrLL red/long |
| Rl | RrLl red/long |
| rL | rRll white/long |
| rl | rrll white/short |
- (f) Any correct example of cloning in an animal OR plant 2
 Describes a benefit to humans of the example given. 1