

Pymble Ladies' College

BIOLOGY

YEAR 12 TRIAL HSC TASK 5

ANSWER SHEET

TERM III, 2007

TIME ALLOWED: 3 hours

PLUS 5 minutes reading time

General Instructions

- Write your Student Number at the top of this page.
- Answer ALL multiple choice questions on this Answer Sheet.
- Use a pencil to fill in the circle indicating your answer.

PART A

- Start here** →
1. A B C D
 2. A B C D
 3. A B C D
 4. A B C D
 5. A B C D
 6. A B C D
 7. A B C D
 8. A B C D
 9. A B C D
 10. A B C D
 11. A B C D
 12. A B C D
 13. A B C D
 14. A B C D
 15. A B C D

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Pymble Ladies' College

TERM III, 2007

TRIAL HSC EXAMINATION

Biology

TIME ALLOWED: 3 hours

PLUS 5 minutes reading time

Total marks – 100

Section I Pages 3 - 18

75 marks

This section has two parts, Part A and Part B.

Part A – 15 marks

- Attempt questions 1 - 15
- Allow about 30 minutes for this part

Part B - 60 marks

- Attempt questions 16 - 29
- Allow about 1 hour and 45 minutes for this part

Section II Page 19 and 20

25 marks

- Question 30 is compulsory
- Allow about 45 minutes for this section

General Instructions

- Reading time - 5 minutes
- Working time - 3 hours
- Write using blue or black pen.
- Draw diagrams using pencil.
- Board -approved calculators may be used.
- Write your student number on pages: 1, 3, 9, 11, 13, 15, 17, 19 and your writing paper.

Section I

PART A

Total marks (15)

Allow about 30 minutes for this part

Use the multiple choice Answer Sheet for ALL multiple choice answers.

Select the alternative A, B, C or D that best answers the question. Fill in the response circle completely.

Sample $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9

A ○ B ● C ○ D ○

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A ○ B ✗ C ○ D ○

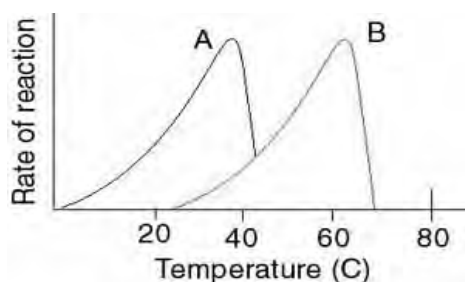
If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word **correct** and drawing an arrow as follows:

A ✗ B ✗ C ○ D ○
 correct ↙

Questions 1-15 are multiple choice questions.

Use the multiple choice Answer sheet to answer these questions.

1. The graph below shows the optimum temperature for two enzymes, A and B.



Which of the following is the most likely interpretation of these graphs?

- (A) Enzyme A catalyses more reactions than Enzyme B.
- (B) Enzyme A is more likely to be a human enzyme than Enzyme B.
- (C) Enzyme B is more reactive than Enzyme A.
- (D) Enzyme A is found in the mouth of humans.

2. Which of the following is the best definition of the term 'homeostasis'?
- (A) The use of a simple model to describe the specificity of enzymes.
- (B) The production of ATP during cellular respiration at a constant rate.
- (C) The process whereby organisms maintain a relatively stable internal environment.
- (D) The maintenance of a relatively stable external environment by living things.
3. Mammalian blood contains a substance called haemoglobin. Which of the following best describes the function of haemoglobin?
- (A) Maintains the correct pH of the blood.
- (B) Increases the oxygen carrying capacity of the blood.
- (C) Enables you to be able to survive at high altitudes, decreasing the need for oxygen.
- (D) Allows oxygen to easily be carried through the walls of blood vessels to where it is needed.
4. During renal dialysis (haemodialysis), many small molecules can easily diffuse through a synthetic membrane to allow the removal of excess wastes and water from the patient's blood. The blood passes outside the body and then after wastes are removed, the blood is returned to the body. The table below shows a comparison of kidney function and haemodialysis. Choose the correct comparison.

	Kidney	Haemodialysis
A	Active and passive transport required	Active and passive transport required
B	Only active transport required	Only passive transport required
C	Water and urea diffuse out of the kidney	Water only diffuses out through the synthetic membrane
D	No anticoagulant used	Heparin an anticoagulant is used

From your knowledge as a Biologist which of the above is the most correct?

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

5. Which of the following is a water conservation measure for a plant?
- (A) Stomates are found on the undersurface of the leaves.
 - (B) Stomates are found on both surfaces of the leaves.
 - (C) Large leaves that are hanging vertically.
 - (D) Large leaves that are facing direct sunlight.
6. Which of the following explains why sexual reproduction is advantageous to a species?
- (A) Increases variation of a species in a constant environment.
 - (B) Decreases variation of a species in a constant environment.
 - (C) Increases variation in a changing environment.
 - (D) Decreases variation in a changing environment.
7. DNA is a double stranded molecule. Which part of the molecule contains the genetic code?
- (A) A nucleotide.
 - (B) The sequence of nitrogenous bases.
 - (C) The sugar / phosphate backbone.
 - (D) The repeating deoxyribose units.
8. In humans the ABO blood grouping is an example of Codominance. If a mother has blood type O and the father has blood type AB, what are the possible phenotypes of the offspring?
- (A) O and A.
 - (B) O and B.
 - (C) O and AB.
 - (D) A and B.
9. Mendel's work was not recognized until well after his death. Which of the following is **NOT** a reason for why his work was so good?
- (A) He carried out his experiments numerous times.
 - (B) He used discontinuous lines.
 - (C) He studied many characteristics at the same time.
 - (D) He always self pollinated his pea plants.

10. In humans albinism is recessive to normal pigmented skin. In a family, the mother has normal skin, the father has normal pigmented skin and they have a daughter who is albino. Which of the following genotypes correctly corresponds to the mother, father and daughter?
- (A) AA, AA, aa.
(B) Aa, Aa, aa.
(C) Aa, AA, aa.
(D) AA, Aa, aa.
11. 'Health' and 'disease' are two words used regularly in the media. Which of the following is the correct scientific definition of 'Health'?
- (A) Any condition which impairs the proper physical, mental or social well-being of an organism.
(B) A state of complete physical, mental and social well-being and not merely the absence of disease.
(C) The absence of disease.
(D) The result of a healthy diet, exercise and lifestyle.
12. Over 3,000 years ago the Chinese and Hebrews were advocating cleanliness in food, water and personal hygiene. Which of the following practices carried out by the Hebrews **does not** assist in the control of disease?
- (A) Purifying cooking utensils in boiling water.
(B) Isolation of people with disease.
(C) Building of public sewers.
(D) Wearing the Kippur on their head when praying.
13. The following observation was made in the early 1800's. "*When an open container of rich broth is left standing, various living things such as moulds and bacteria soon appear in it*". Which of the following scientists disproved the idea that living things could be produced from non-living things?
- (A) Louis Pasteur.
(B) Robert Koch.
(C) Macfarlane Burnet.
(D) Maurice Wilkins.

14. A pathogen is described as ‘an infective protein that causes the degeneration of brain tissue.’ This pathogen would most correctly be described as –
- (A) A virus.
 - (B) A bacteria.
 - (C) A prion.
 - (D) A protozoan.
15. Defence barriers prevent entry of pathogens in humans. Which statement below correctly describes a defence barrier?
- (A) Skin produces mucous which traps microorganisms.
 - (B) Cilia are tiny hairs that trap debris and beat together to move mucous.
 - (C) Skin is moist and alkaline which kills microorganisms.
 - (D) Cilia are hairs on the skin which beat together to move dead skin cells.

Section I (continued)

PART B

Total marks (60)

Attempt Questions 16 – 29

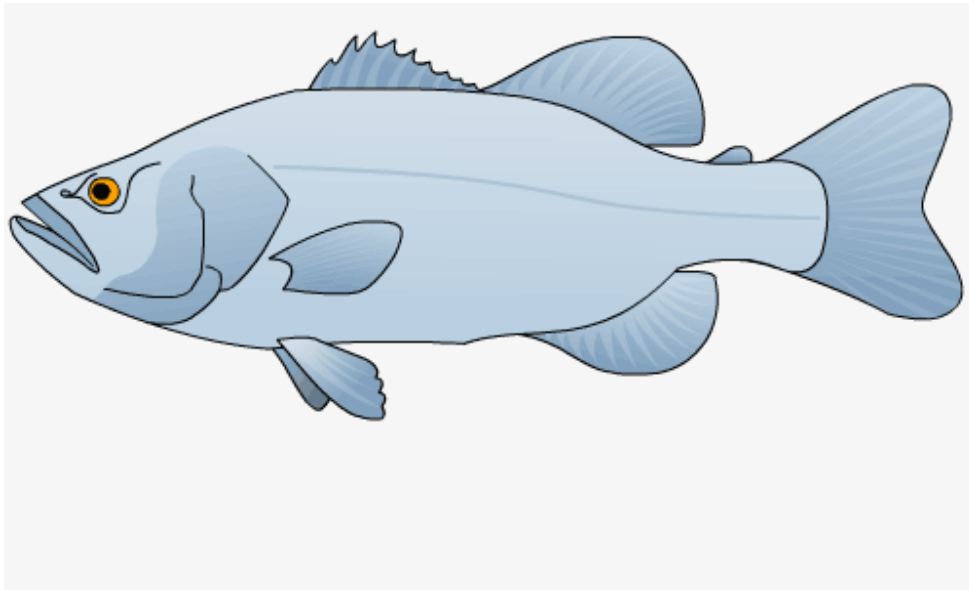
Allow about 1 hour and 45 minutes for this part

Answer the questions in the spaces provided.

Question 16 (4 marks)

Using the diagram below, explain the strategies used by the freshwater fish to cope with living in its environment. Labels should be placed on the diagram.

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Question 17 (5 marks)

During your study of the Biology course, you performed investigations to test the effect of increased temperature and increased pH on the activity of a **named** enzyme. Describe the investigations you carried out and describe the similarities in your results for both investigations.

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Question 18 (3 marks)

Mammals use feedback mechanisms to maintain homeostasis. Explain using an example what is meant by a negative feedback mechanism.

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Question 19 (4 marks)

Plants and animals both have vascular tissue. Explain the processes for the movement of substances through the xylem vessels.

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Question 20 (4 marks)

Blood donations are imperative to the ongoing health and well-being of our society.

- a) Describe the use of **two** blood products extracted from donated blood.

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- b) Assess the importance of artificial blood in our society today.

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Question 21 (3 marks)

Hybridisation has been used in Biology for many years. Describe an example of hybridisation within a species and explain the purpose of this hybridisation.

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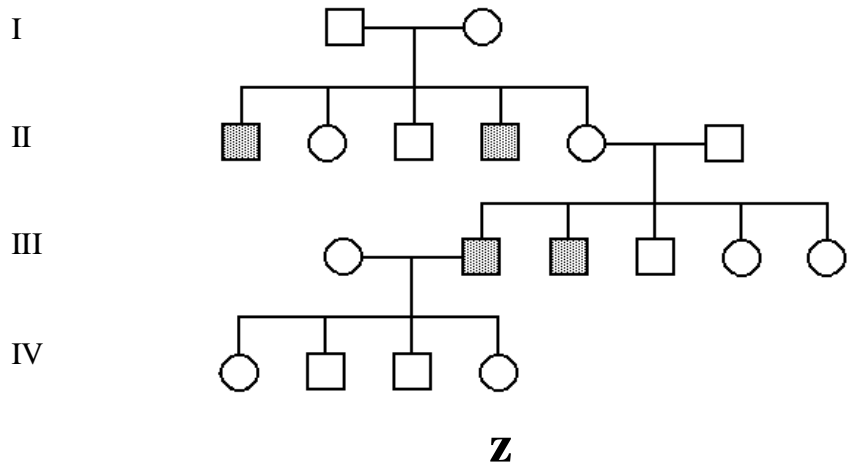
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Question 22 (6 marks)

Becker's muscular dystrophy is a sex-linked muscular disorder which occurs in approximately 5 in 100,000 male births. Symptoms usually appear in men about age 12, but may sometimes begin later. The average age of becoming unable to walk is 25-30. Women rarely develop symptoms. Below is a pedigree for the disorder.



a) Is the disorder dominant or recessive? Explain 2

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b) Predict the likely genotypic and phenotypic ratio of offspring of a mating between Z and a male that does not have the disease. 4

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Question 23 (6 marks)

Below is a DNA sequence for a particular gene which codes for insulin. Only the active side of the DNA sequence is shown. In your answers show all your working.

TACCGGACGTCGATGCGCTAG

The Genetic Code (mRNA)

1st position	2nd position (middle)				3rd position
	U	C	A	G	
U	Phe Phe <i>Leu</i> <i>Leu</i>	<i>Ser</i> <i>Ser</i> <i>Ser</i> <i>Ser</i>	Tyr Tyr STOP STOP	Cys Cys STOP Trp	U C A G
C	<i>Leu</i> <i>Leu</i> <i>Leu</i> <i>Leu</i>	Pro Pro Pro Pro	His His Gln Gln	<i>Arg</i> <i>Arg</i> <i>Arg</i> <i>Arg</i>	U C A G
A	Ile Ile Ile Met	Thr Thr Thr Thr	Asn Asn Lys Lys	<i>Ser</i> <i>Ser</i> <i>Arg</i> <i>Arg</i>	U C A G
G	Val Val Val Val	Ala Ala Ala Ala	Asp Asp Glu Glu	Gly Gly Gly Gly	U C A G

- (a) Using the table of mRNA codons above, write down the amino acid sequence for the DNA strand above. **2**

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- (b) A mutation results in this DNA sequence and now it looks like the following, an A has been inserted into the code -

TACCG GACGTCGATGCGCTAG

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A

Using the Genetic code above predict the amino acid sequence produced by this insertion.

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(c) Explain how mutations in DNA may lead to a generation of new alleles. 2

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Question 24 (5 marks)

During your study of Blueprint of Life you performed a first hand investigation to demonstrate the effect of environment on phenotype. Discuss this experiment.

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Question 25 (3 marks)

Polio is a viral disease which in its most severe form can cause muscle paralysis and death. It is transmitted by drinking contaminated water and not washing your hands after using the toilet. In 1988, the World Health Assembly (WHA) the annual meeting of the ministers of health of all Member States of the World Health Organization, voted to launch a global program to eradicate polio. Evaluate the effectiveness of this vaccination program in preventing the spread and occurrence of polio. 3

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Question 26 (3 marks)

In May this year a Dutch reality TV show was launched in which a woman would donate a kidney to one of three contestants. The program was revealed to be a hoax with the presenters trying to pressure the government into reforming organ donation laws. If the kidney transplant had happened the patient may have experienced an immune response. Explain why organ transplants sometimes trigger an immune response and how this can be prevented. **3**

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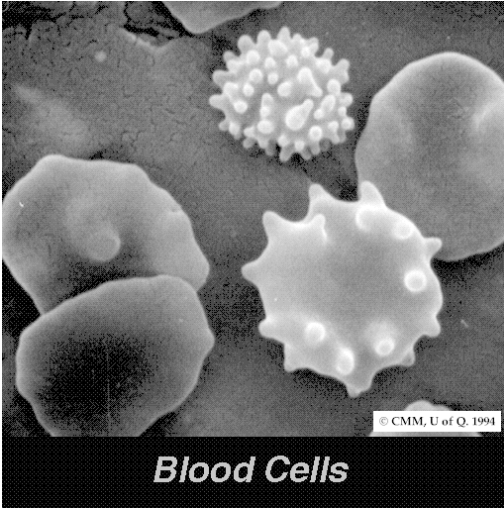
Question 27 (3 marks)

In Australia, most water is fairly clean when it is collected for human use. However, water usually requires some treatment before we can drink it. Choose one of these water treatment methods and explain how it reduces the risk of infection from pathogens. **3**

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Question 28 (3 marks)

The diagram below shows some B and T lymphocytes interacting in response to a bacterial infection.



There are 4 different types of T lymphocyte. Choose three (3) and describe their role. **3**

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Question 29 (8 marks)

You have been given the Human Papilloma Virus vaccination this year. At this stage you will have been given two injections with a third one next term.

- i) Draw a graph to show the effect this vaccination has had on antibody levels in your body after the first and second injection. Use the axes in the space below to draw your graph. Be sure to label the 1st and 2nd injections.
- ii) Explain the graph.

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END OF SECTION I

Please turn over for Section II

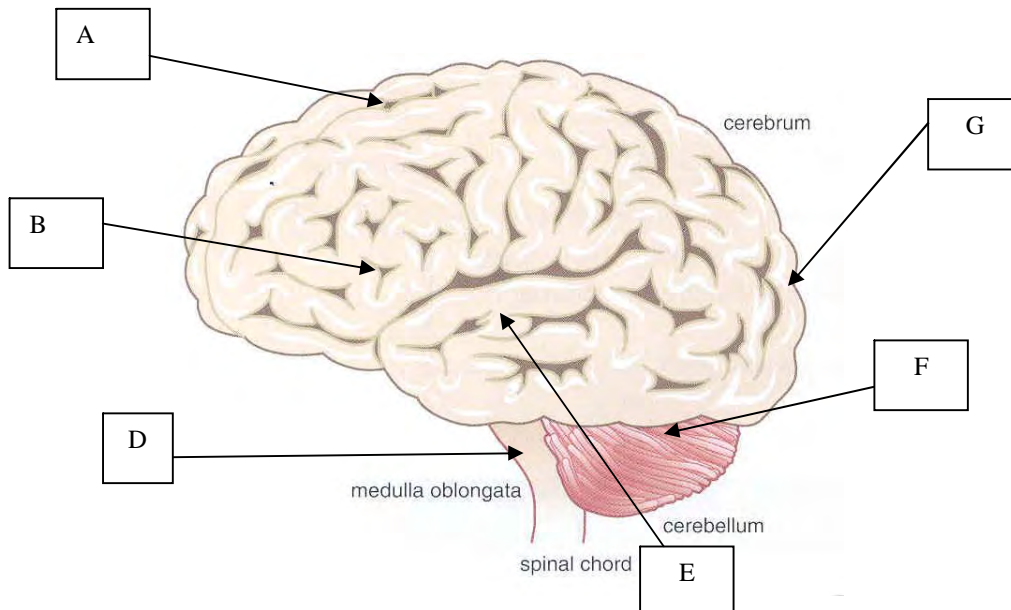
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SECTION II**Total marks (25)****Attempt one option****Allow about 45 minutes for this part****Answer the questions in this section *ON THE WRITING PAPER PROVIDED.*****Question 30 - COMMUNICATION (25 marks)**

- (a) During your study of Communication you performed a first-hand investigation to examine a brain. Identify one safety procedure you followed during your dissection.

1

- (b) On your lined paper write the letter from the diagram of the brain below that corresponds to
- speech
 - light interpretation
 - sound interpretation.

3

- (c) Explain how the production of two different images of a view can result in depth perception.

2

- (d) Photoreceptor cells contain light sensitive pigments which convert light images into electrochemical signals the brain can interpret. Identify the types of photoreceptor cells in a mammalian eye and an insect eye.

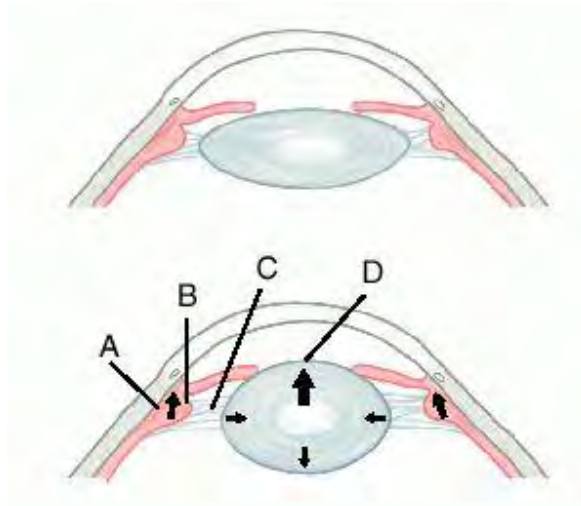
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- (e) Explain how colour blindness in humans occurs.

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- (f) i) The diagram below shows what happens to the lens when you focus on a close object. Parts A and B are the Ciliary body. What are labels C and D?

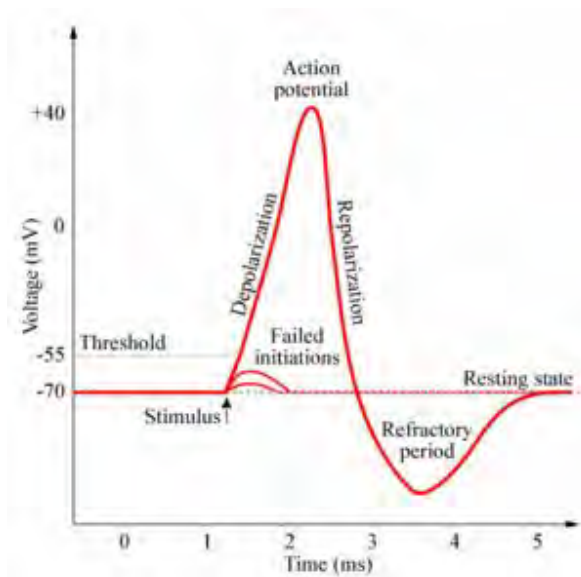
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- ii) Describe what happens to parts B, C and D when you focus on a distant object.

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- (g) During your study of Communication, you drew a graph similar to the one below which shows a typical action potential.



In this graph there are some failed initiations labelled. Explain why these occur and describe how the successful stimulus is transmitted along a neurone and to the next neurone.

7

- (h) (i) Distinguish between myopia and hyperopia.

2

- (ii) People with hyperopia can wear spectacles with convex lenses to correct the problem. Explain why convex lenses work.

2

END OF PAPER

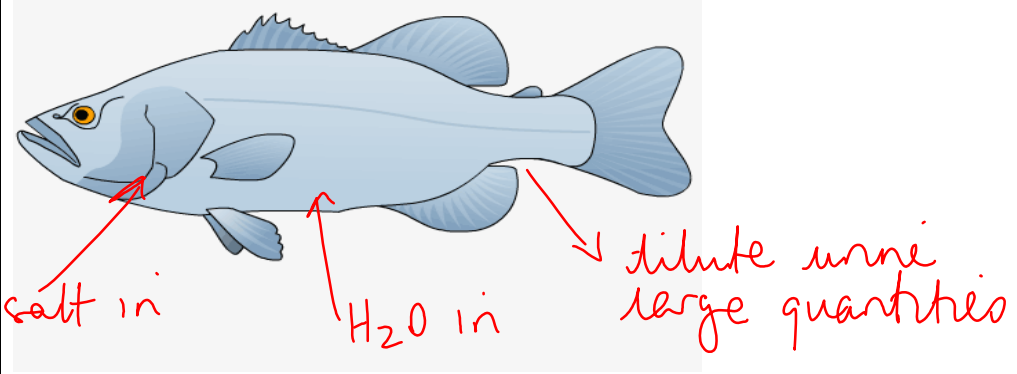
YEAR 12 BIOLOGY
TRIAL HSC EXAMINATION, 2007
Marking Guidelines

SECTION /
PART A

Questions 1-15 are Multiple Choice (15 marks)

Question	Marks	Answer	Question	Marks	Answer
1	1	B	9	1	C
2	1	C	10	1	B
3	1	B	11	1	B
4	1	D	12	1	D
5	1	A	13	1	A
6	1	C	14	1	C
7	1	B	15	1	B
8	1	D			

Question 16 (4 marks)

Question	Marks	Marking Guidelines
16	4	 <p>1mk higher water concentration outside fish so water moves in by osmosis 1mk fish loses salts so needs to actively absorb salts across its gills. 1mk fish produces large quantities of dilute urine 1mk labels (any two correct) Salt being lost arrow only counts for label mark not explanation.</p>

Question 17 (5 marks)

Question	Marks	Marking Guidelines
17	5	<p>Naming enzyme or enzymes eg catalase (1mk) no marks for incorrect enzyme Enzyme + peroxide in different temps (1mk) remove 1 mk for no peroxide Enzyme + diff concs of substrate (1mk) Both rates of reactions increase to a point (optimum temp / pH) then both decrease (decrease rapidly, activity goes down, activity slows down after a point - all accepted) as the enzyme denatures at a certain temp / pH.(2mks)</p>

Question 18 (3 marks)

Question	Marks	Marking Guidelines
18	3	<p>Negative feedback occurs when the feedback reduces the effect of original stimulus (1mk) - also accepted counteract, altered, changed but Homeostasis definition not accepted. Eg I increase in environmental temperature → sweating → lowering of the body temp (2mks) Complete feedback (2 mk) , only two correct parts of feedback (1 mk)</p>

Question 19 (4 marks)

Question	Marks	Marking Guidelines
19	4	Xylem transports water and mineral ions (1mk) upwards only (1mk) (2mks) to explain cohesion / adhesion or transpiration. Root pressure accepted for 1mk but had to explain them further.

Question 20 (6 marks)

Question	Mark	
20 (a)	2	RBC's - used for anaemic patients, not enough oxygen being transported, bleeding after trauma (1mk) Plasma - used for bleeding, trauma, for clotting Platelets - used for blood clotting, leukemia patients, bone marrow transplants WBC's - immune deficient patients, severe infection, can't make their own Factor VIII - haemophiliacs Other possibilities Any 2 for 2 mks
(b)	2	Judgement - as our blood supplies are depleting there is a need for artificial blood to keep up with demands (2mks) or by having artificial blood it eliminates the need for screening blood or blood typing (2mks) Not beneficial accepted if good reason given.

Question 21 (3 marks)

Question	Mark	
21	3	Hybrid wheat (1mk) Crossing 2 different types of wheat increases the yield (1mk) and resistance to fungal disease (1mk) (ability to grow in arid soil) Or Cattle or corn (increased birth weights) If not within species 1 mark could still be given for the identification of a correct reason.

Question 22 (6 marks)

Question	Mark	
22 (a)	2	Recessive (1mk) Parents do not show characteristic yet produce children (boys) with characteristic, mother is heterozygous (carrier) (1mk)
(b)	4	(1mk) Key: D = normal, d = muscular dystrophy (MD) (1mk) for cross $Z X^D X^d$ with $X^D Y$ (1mk) for punnett square (1mk) for ratio - all females normal, 50% of males normal, 50% of males have MD Max of 2 marks for non-sexlinked. 1 mark removed is two punnett squares given.

Question 23 (6 marks)

Question	Mark	
23 (a)	2	mRNA - AUG GCC UGC AGC UAC GCG AUC (1mk) . Working can be anywhere on page. Met - ala - cys - ser - tyr - ala - ile (1mk)
(b)	2	mRNA - AUG GCU CUG CAG CUA CGC GAU C (1mk) . Working can be anywhere on page. Met - ala - leu - gln - leu - arg - asp (1mk)

(c)	2	By changing the DNA sequence this has the potential to change the amino acid sequence (1mk) which will code for a different polypeptide giving a different phenotype (1mk)
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Question 24 (5 marks)

Question	Mark	
24	5	Discussion of expt will include equipment, procedure and results Equipment (1mk) eg genetic barley, petri dishes, cotton wool, water, boxes Procedure (2mks) eg using 2 petri dishes place 10 seeds on cotton wool on each dish. Place 1 dish in a covered shoe box and the other open to light. Water each. Leave for a few days for the seeds to germinate. Results (2mks) the seeds in the dark grow all white , the seeds in the light grow in the ratio of 3 green : 1 white (or most green, some white).

Question 25 (3 marks)

Question	Mark	
25	3	Judgement (1 mark) Evidence to back it up (2 marks) Judgment - The vaccination program to prevent the spread and occurrence of polio has been reasonably effective but not completely successful. (1 mark) Evidence - eradicated from Western countries, last reported case in Australia in 1992. Still found in parts of the developing world as it is difficult getting access to all people. (2mks) <i>This was our original suggested answers</i> <i>Evidence - Since 1988 when the vaccination program was launched the number of cases has dropped from more than 350,000 cases in 1988 to 1998 cases in 2006.</i> Or polio was endemic in 125 countries in 1988 and is only endemic in 4 countries in 2006 (Nigeria, India, Afghanistan, Pakistan). Or it was widely endemic on five continents in 1988, polio is now found only in parts of Africa and south Asia. (1 mark) <i>However, as long as a single child remains infected with poliovirus, children in all countries are at risk of contracting the disease. The poliovirus can easily be imported into a polio-free country and can spread rapidly amongst unimmunised populations. Or As there are still cases of Polio being reported the vaccination program is not completely successful. (1 mark)</i>

Question 26 (3 marks)

Question	Mark	
26	3	Answer which mentions rejection because the tissue is foreign and mentions MHC molecules to explain why (2 marks) Way to prevent it (1 mark) Each cell has a Major Histocompatibility Complex Molecule (MHC) which is unique to the person or specific surface antigens (1 mark) Transplanted donor tissue will not match that of the recipient so their immune system will react against the non-self material. (1 mark) This can be prevented by taking immunosuppressive drugs eg. Cyclosporine to suppress the activity of the immune system (1 mark)

Question 27 (3 marks)


Question	Mark	
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27	3	<p>Name of water treatment method (1 mark) What happens (1 mark) How it prevents pathogens (1 mark)</p> <p>Filtration - the removal of nearly all microbes and fine mud by passing water through sand beds or charcoal - breaks the link between humans/water and bacteria.</p> <p>Chlorination - addition of chlorine - kills off harmful microbes</p> <p>Chloramination - ammonia is added before the chlorine giving a longer lasting disinfection by killing microbes</p> <p>Screening - removes large objects that would rot and keep adding microbes to the water</p> <p>UV treatment - UV light is used to kill microbes</p> <p>Ozone treatment - ozone is injected into water if chlorination is unsuitable - kills microbes and removes some metal ions from water</p>
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Question 28 (3 marks)

Question	Mark	
28	3	<p>3 X T lymphocytes and their roles (3 marks)</p> <p>Helper T-lymphocytes (T4 cells) - activate killer T-lymphocytes and B-lymphocytes</p> <p>Killer T-lymphocytes (Cytotoxic T-lymphocytes or T8 cells) - identify cells containing antigens and puncture the cell membrane allowing contents to spill out and be acted on by macrophages and antibodies</p> <p>Natural killer T cells - kill cancer cells and produce interferon which prevents viruses from invading neighbouring cells.</p> <p>Suppressor T-lymphocytes - regulate the immune system by turning it off when no more antigen is present</p> <p>Memory T-lymphocytes - live for a long time in the blood and attach to antigens if re-infected</p>

Question 29 (8 marks)

Question	Mark	
29 (i)	5	 <p>(1mk) labeling of axes</p> <p>(1mk) label 1st and 2nd injection</p> <p>(1mk) shape of graphs ie increasing and then decreasing</p> <p>(1mk) 1st injection - slower to build up antibodies</p> <p>(1mk) 2nd injection - antibody level goes up higher</p> <p>(-1mk) if they drew more than 1 graph.</p>

		(- 1mk) if the graph didn't start at zero
ii)	3	1 st injection – your body doesn't recognise the antigen so it takes time for the cloning of B cells to secrete antibodies for this virus (1mk) 2 nd injection – circulating memory B cells recognise this virus (1mk) and differentiate quickly to secrete antibodies at a faster rate to a higher level (1mk) To get the marks the following was used: 1mk – B cells producing antibodies 1mk – memory cells are produced 1mk – a comparison between first and second entry of antigen.

COMMUNICATION

(a) One reasonable safety rule (1 mark)
Example – Scalpels are sharp so take care/ Wear gloves/ Wash hands with antibacterial soap etc.

- (b) i) B
ii) G
iii) E

If more than 1 letter put for an answer – 0 marks

(c) Correct description mentioning overlapping images and different distances from each eye. (2 marks)

View same visual field with both eyes. The field of view of each eye overlaps, allowing each to observe the same object simultaneously. (1 mark)

Object is imaged by each eye at a different distance from each fovea. (1 mark) giving the perception of depth.

(d) Correct photoreceptor cells (2 marks)

Human – Rods and Cones

Insects – Ommatidia and Retinal cells – they didn't need retinal cells to get 2nd mark.

(e) Correct explanation mentioning lack of photosensitive pigments in cones and why (2 marks)

Colour blindness in humans is the result of missing one or more of the photosensitive pigments

(photopsins) in the cones (1) Each type of photopsin is coded for by a different gene. A mutation in a

gene that codes for a cone pigment leads to the inability of this pigment to function correctly (1) **or**

colour blindness can be caused by certain drugs and alcohol **or** red – green colour blindness is caused by a

recessive sex linked gene, any correct statement saying all colour blindness is caused by a sex linked

recessive gene is incorrect.

(f) Labels (1 mark) Must have both

C – suspensory ligaments

D – lens

Accurate description mentioning changes in the ciliary body, suspensory ligaments and lens (3 marks)

Ciliary body relaxes, suspensory ligaments pull taut, lens curvature becomes flatter, long and thin

(g) In order for a message to travel along a neurone there must be enough stimulation to meet the threshold ie. The amount of positive change in membrane potential which is required before an

action potential is produced. This needs to be at least 15mV more positive than the resting potential of -70mV. (1 mark for some mention of reaching threshold)

A neurone is usually negative on the inside and positive on the outside (1 mk)

When a neurone is stimulated sodium channels open and sodium ions (Na^+) rush across the membrane (1 mark for mentioning sodium moving in) making it more positive on the inside than the outside, (1 mark for becoming more positive on inside) generating the action potential. This action potential is only short-lived, because potassium ions (K^+) move out of the neurone to even up the charge difference, (1 mark for mentioning K moving out) and the membrane becomes impermeable to any further flow of Na^+ ions half a millisecond after they have rushed in. When the sodium channels close, this causes the repolarisation of the cell as the cell actively pumps sodium ions to the outside. (1 mark for sodium being pumped back out) The action potential continues to move along the neurone, however, because the area next to it becomes slightly depolarised, allowing Na^+ ions to briefly rush in and create a new action potential.

The action potentials are transmitted from neurone to neurone across small gaps called synapses. (1 mark for mentioning synapse being a gap between neurones) A synapse is the gap between the end of one axon and the dendrites of the cell body of a receiving neurone. At the synapse the movement is in one direction only. At the synapse, chemicals known as neurotransmitters diffuse across the gap from one neurone to the membrane of the receiving neurone, causing an electrical response. (1 mark for mentioning neurotransmitters diffusing across the gap)

(h) (i) Correct definition of myopia and hyperopia (2 marks)

Myopia is when a person can see near objects clearly, but distant objects appear blurred (short-sightedness)

Hyperopia is when a person can see distant objects clearly, but near objects appear blurred (long-sightedness)

(ii) Convex lenses bend the incoming light rays inwards (1 mark) which causes the focal length to shorten so a focused image falls on the retina. (1 mark)

END OF PAPER