



GRADE 10 EXEMPLAR EXAMINATION
NOVEMBER 2006

LIFE SCIENCES

MEMORANDUM

Time: 2 hours

150 marks

SECTION A**QUESTION 1**

- 1(a) (i) Glass tube - trachea / bronchus
Balloon - lung
Glass wall of syringe - thorax / ribcage etc
Plunger - diaphragm (4)
- (ii) Volume will increase
Pressure will decrease (2)
- (iii) Air will move into the balloon. (1)
[7]
- 1(b) (i) Grass, protea plants, trees Any (2)
- (ii) Level 3 / top carnivores
As food passes from one trophic level to another, $\frac{2}{3}$ of the energy is lost as heat,
less energy to support organisms at the next level. (4)
- (iii) Fewer food sources / options. (2)
[8]
- 1(c) (i) Fluke feeds off host and harms it. (2)
- (ii) Humans urinate into the river. (2)
- (iii) Measure 1 - educate people not to urinate into water sources
Measure 2 - educate people to boil water I add chlorine before drinking it.
Measure 3 - Introduce a predator for the snails.
Accept any reasonable solution except use of poisons. $3 \times 2 =$ (6)
[10]
- 1 (d) F, H, G, A, C, B, 0, E, J, I. $10 \times 2 =$ (20)

TOTAL FOR SECTION A = 45**SECTION B****QUESTION 2**

- 2(a) (i) 2 = cytoplasm (1)
- (ii) 4 = nucleus (2)
- (iii) Plant cell would have a cell wall, **large** vacuole(s) and plastids. (3)
- 2(b) (i) 1 represents position of the cell membrane. (1)
- (ii) Proteins, phospholipids, carbohydrates, cholesterol. Any (2)

(iv) Cell membranes are selectively permeable I or explanation.
They offer a measure of protection against injury etc. (2)

(iv) Water molecules diffuse through the membrane by the [process of osmosis. (1)

2 (c) **Advantages of surgery and chemotherapy treatment**

Surgery removes tumour

Chemotherapy kills off remaining cancerous cells

Disadvantages of treatment

Surgery may leave ugly scars, damage salivary glands

Chemotherapy has unpleasant side effects, e.g., nausea, hair loss etc.

Advantages of traditional healer or homeopathic treatment.

No surgery

Chemicals / medicine given will have fewer side effects than chemotherapy / milder in effect

Disadvantages of treatment

Less effective than surgery and chemotherapy. 4 + 4 (8)

Learner's opinion is not to be assessed, just the information given to the aunt.

[20]

QUESTION 3

3(a) (i) A tissue = a group of cells with same structure and function. (3)

3(b) (i) Epithelium (1)

(ii) A = O₂, B = CO₂ (2)

(iii) Respiration or explanation (1)

(iv) Alveolus is thin walled for rapid exchange of gases.
Alveolus has a large surface area f volume ratio for faster f more efficient exchange of gases Alveolus is lined with layer of moisture for gases to dissolve.
Any 3 x 2 = (6)

3(c) (i) Nitrogen is required to make proteins. (1)

(ii) Plants absorb nitrogen in the form of salts.
Animals eat plants and obtain nitrogen in the proteins. (3)

(iii) Bacteria. (1)

(iv) These plants have nodules on their roots which contain colonies of bacteria which 'fix' nitrogen. Farmers plough roots back into soil. (2)

[20]

QUESTION 4

- 4(a) (i) Chloroplast (1)
- (ii) Palisade layer is closer to the light source \therefore cells have more chloroplasts for photosynthesis / light absorption. (2)
- (iii) Photosynthesis –
Only process during which light energy is converted to chemical stored in 'food'
Food provides a source of energy to keep food chains and webs going
Process releases O₂
Process helps control amount of CO₂ in atmosphere. (2)
- 3 x 2 = (6)
- 4(b) (i) 23 units. (1)
- (ii) Between 26 and 29°C. (2)
- (iii) CO₂ and water (accept light) Any (2)
- 4(c) (i) E.g., To make pit waterproof and to prevent pests entering. (2)
- (ii) CO₂ (accept other reasonable answer). (1)
- (iii) Fermentation / anaerobic respiration. (1)
- (iv) So that the gases would have time to diffuse out of the pit and people would not be exposed to high concentrations of the gases.
To allow heat to escape. Any (2)

[20]**QUESTION 5**

1. Crohn's disease = an inflammation of the digestive tract. (1)
2. Genetic link
Chemicals in the environment.
Immune system attacks naturally occurring bacteria in gut, white cells invade tissues and cause inflammation. Any (2)
3. Parts labelled 4 and 5 (small intestine + colon). (2)
4. Symptoms - urgent diarrhoea, abdominal cramps and pain, fever, rectal bleeding, loss of weight, lack of energy etc. Any (3)
5. This type of food would irritate gut lining causing further inflammation.
High fibre foods stimulate peristalsis (diarrhoea). Any (2)
6. Possibly because more pollutants, chemical additives to foods etc occur there. (2)
7. Paragraph should contain components of a balanced diet. Crohn's patients are often on specialised diets but pupils cannot be expected to know this unless they have knowledge of the condition. Accept this answer if offered.
Answers should include - protein, carbohydrates, lipids, minerals, vitamins and water. (6)
8. No, the patient's needs / health will change over a period of time \therefore this must constantly be reassessed and the diet fine tuned / changed. (2)

(20)

QUESTION 6

6(a) (i) Biodiversity = variety of living organisms. (2)

(ii) Reasons for conserving biodiversity

- Seed banks store seeds for use, scientific research etc.; zoos, aquariums, botanical gardens conserve organisms that may be extinct or endangered in the wild
- Conservation areas such as parks, reserves etc., allow organisms to live in their natural environments which man has not changed too much
- Conserved species may yield food, medicines that are useful to man
- National parks and reserves are part of our heritage
- Conserved areas allow people to live there practice traditional ways of life ETC.

Any (3)

6(b) Adapted SOLO Grid to assess responses to 5(b) any TWO threats x 10

Ability to include relevant data – Causes of threat, with examples.	Ability to link data – causes to condition	Ability to argue rationality – offer a solution that relates to causes of problem	SOLO Level: 1 – 6	Translated to a mark
Not attempted or Information irrelevant or inaccurate	Nil	Nil	1	0
Data basically relevant + correct	Inability to make links between cause and effect + offer solution		2 – 4	1 – 5 (start at 3 and work up or down)
	Links made but incorrect or partially correct			
	Data correct but links made are incomplete or tenuous; solutions offered lack ability to put problem in perspective.			
Data mostly to completely relevant + correct	Data correct, 'pedestrian' links made between cause and effects, solutions offered are possible but not always reasonable		5 -7	6 – 10 (start with 8 and work up or down)
	Ability to generalise beyond immediate data i.e., see larger picture , originally in offering solution which is reasonable			

Data expected (accept any relevant data). An excellent answer displays ability to 'see the big picture'. Top pupils often present a 'different' type of answer without masses of detail but their ability to make links between cause and effect and offer original solutions is obvious. They should not be 'marked down' because they have omitted some details.

Habitat loss - peoples' activities can change habitats such as forests to pastures or forests to bare space to build houses, construct a dam etc. reducing amount of space for plants and animals to live and reproduce. Many species are becoming endangered as their habitats are reduced e.g., Wattle Crane. Stripping land for man's activities results in further damage to environment. Solution offers a compromise that covers the interests of man and environment.

Invasive species - people bring in alien plant and animal species from other countries for ornamentals, farming etc. These organisms have no natural enemies and their numbers increase. Food supplies and space for indigenous species are reduced. Examples, Port Jackson Willow, Water Hyacinth, Prickly Pear, wattles, etc. Solutions must take into account a long term, sustainable approach to get rid of aliens e.g., no further planting, eradication programme, consideration of indigenous alternatives etc.

Pollution - mans' activities can release poisonous substances into the air, soil and water resulting in the death of plants and animals, particularly higher up in food chains. Poisons can accumulate in the bodies of organisms and have an affect over a period of time. Many pollutants are not biodegradable e.g., plastic and oil. Solutions should include legislation against use of chemicals, development of alternative methods I substances, education of public etc. and increase in number again. For example, fish such as galjoen, geelbek, Kabbeljou, shell fish such as abalone; ;indigenous plants used for medicine such as wild ginger, Pepper Bark tree, cycads, wild animals that are found largely in game reserves now such as rhino, Cape Hunting dogs etc. Solutions should include legislation controlling numbers of animals removed by fishing, hunting, poaching, illegal animal and plant trade, education of public to use resources wisely etc. (10)