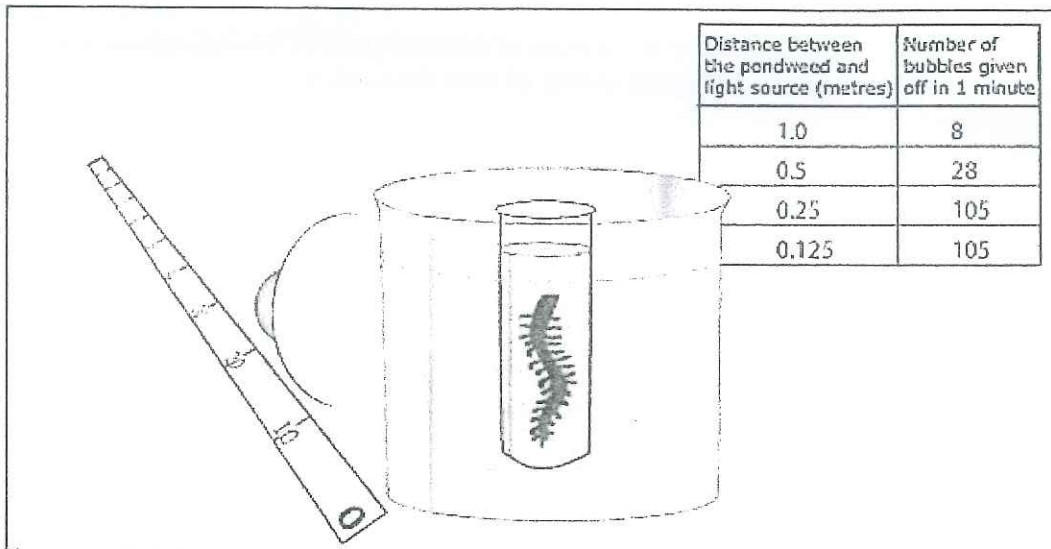
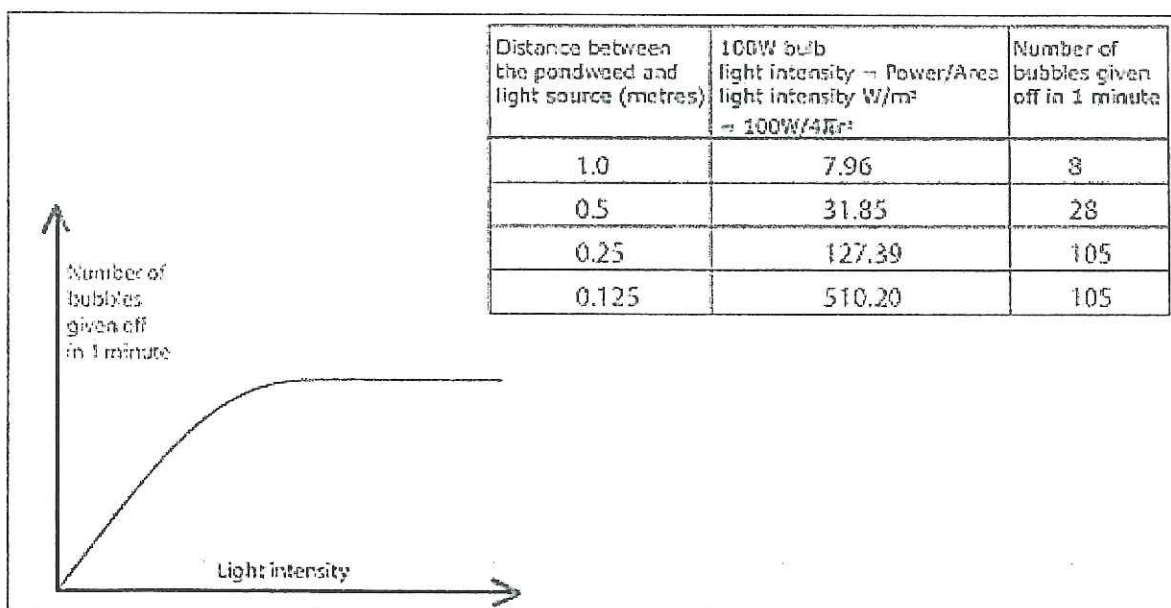


23. The experimental set-up below shows an investigation on the effect of light intensity on the rate of photosynthesis.



Source : <http://biology-igcse.weebly.com/effect-of-light-intensity-on-the-rate-of-photosynthesis.html> The results obtained are shown below.



(i) Interpret the result shown.

(2marks)

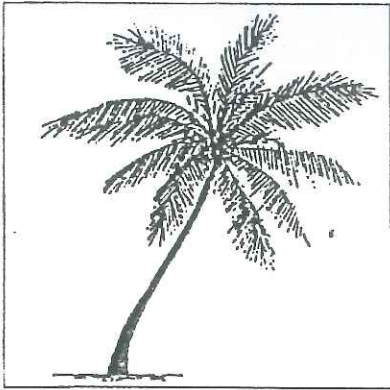
(ii) Explain why the test tube containing the water weed was placed in a beaker of water ?

(1mark)

Turn Over

STRAND 1 : STRUCTURE AND LIFE PROCESSES (continued)

24.



Some varieties of coconut palm (*Cocos nucifera*) give higher yields of nuts than others. Tall varieties can produce nuts of up to 3 kg in weight. Dwarf varieties produce smaller nuts. However, some dwarf coconut palms are resistant to a serious coconut virus which affects tall varieties.

A farmer has two pure-breeding strains of coconut palms which are shown below:

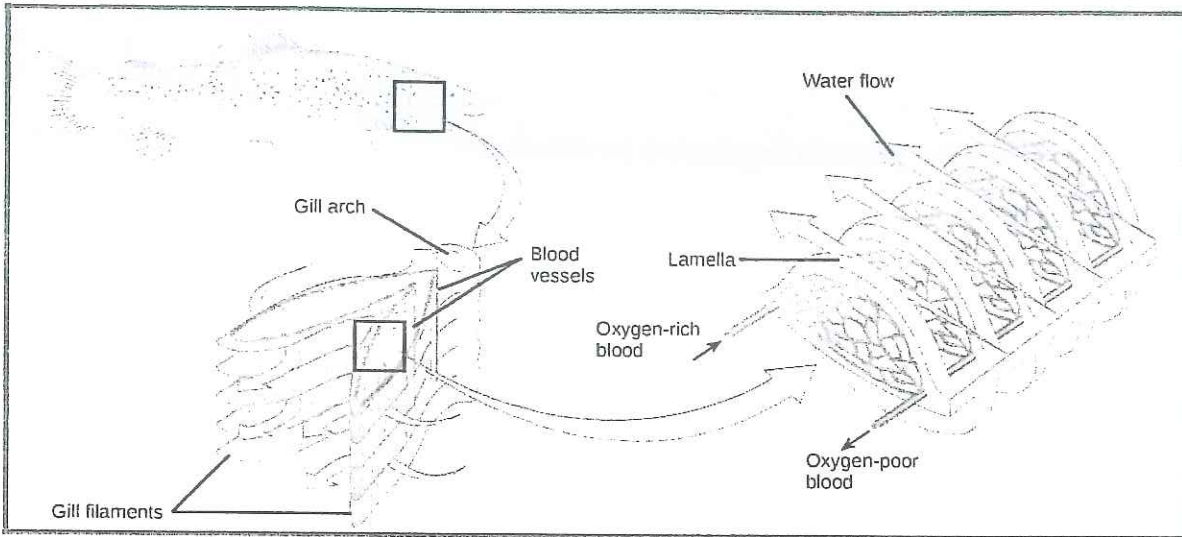
Strain A	Strain B
<ul style="list-style-type: none"> • Tall plants • Not resistant to coconut virus 	<ul style="list-style-type: none"> • Dwarf plants • Resistant to coconut virus

The allele for tall plants (T) is dominant to the allele for dwarf plants (t). The allele for non-resistance (N) to the virus is dominant to the allele for resistance (n) to the virus.

A farmer wished to cross these two strains to produce a tall coconut palm which is resistant to the coconut virus.

- (i) Explain how the farmer could make a genetic cross between these two pure-breeding varieties. (1mark)
- (ii) Give the meaning of the term **pure breeding**. (1mark)
- (iii) Give the genotype of Strain A and Strain B. (1mark)
- (iv) Give the gamete types that can be produced by Strain A and Strain B. (1mark)
- (v) Give the genotype and the phenotype of the F₁ palm produced by crossing these two varieties of pure-breeding palms. (2marks)
- The farmer then crossed two of these F₁ palms.
- (vi) Complete the punnette square for this cross. (2marks)

25. Diagram below shows gas exchange in fish.



Source : https://getrevising.co.uk/revision-cards/gas_exchange_in_fish

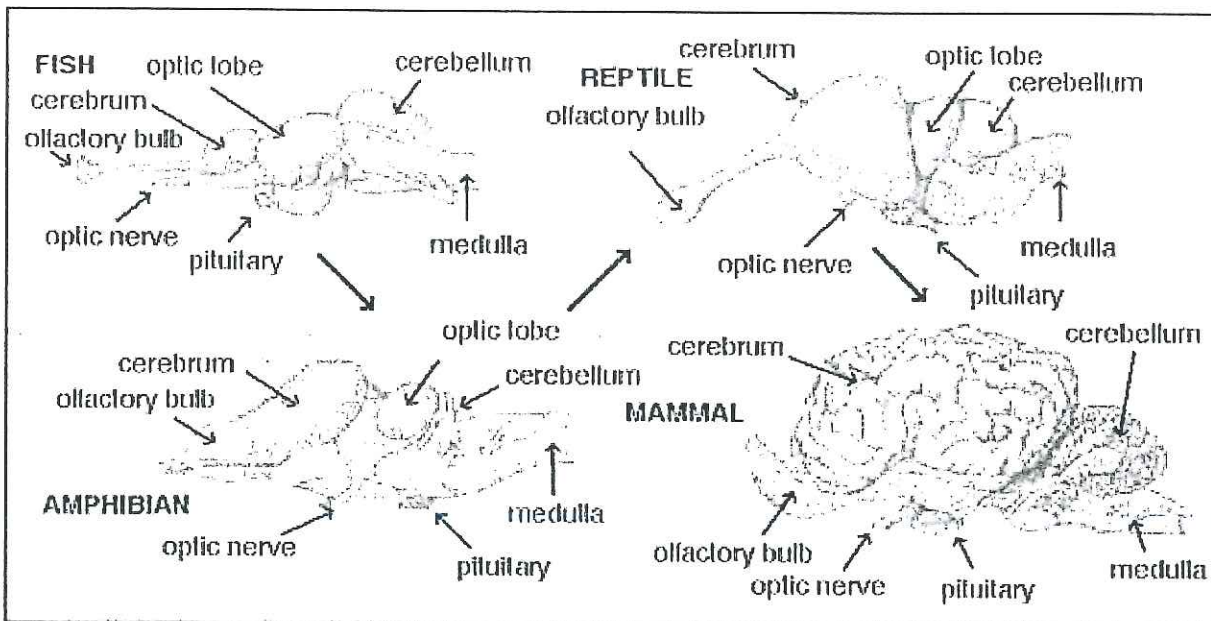
(i) State two reasons why gas exchange in water is more difficult than gas exchange in air .

(2marks)

(ii) Explain how the diffusion of oxygen into the blood of fish is maximised.

(1mark)

26. Shown below are vertebrate brains.



Source : <https://www.pinterest.com/pin/565905509396941331>

Identify a trend in the evolution of brains in vertebrates.

(2marks)

Turn Over

STRAND 1 : STRUCTURE AND LIFE PROCESSES (continued)

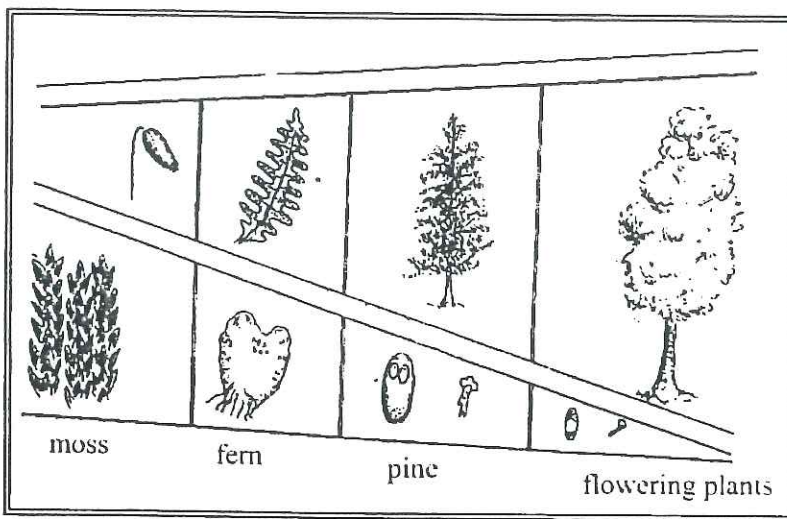
27. **Double fertilization** is a unique process in an angiosperm.

(i) Briefly explain the events that take place during double fertilization. (1mark)

(ii) Give an advantage of double fertilization over single fertilization in gymnosperms. (1mark)

28. State one advantage of excreting uric acid in birds. (1mark)

29. Study the diagram below and use it to answer the question that follows.



Discuss one trend shown in the illustration above and state a reason for the trend seen. (2marks)

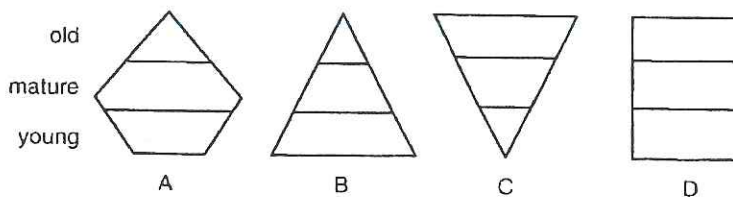
STRAND 2 : LIVING TOGETHER

[14 marks]

MULTIPLE CHOICE QUESTIONS

[3marks]

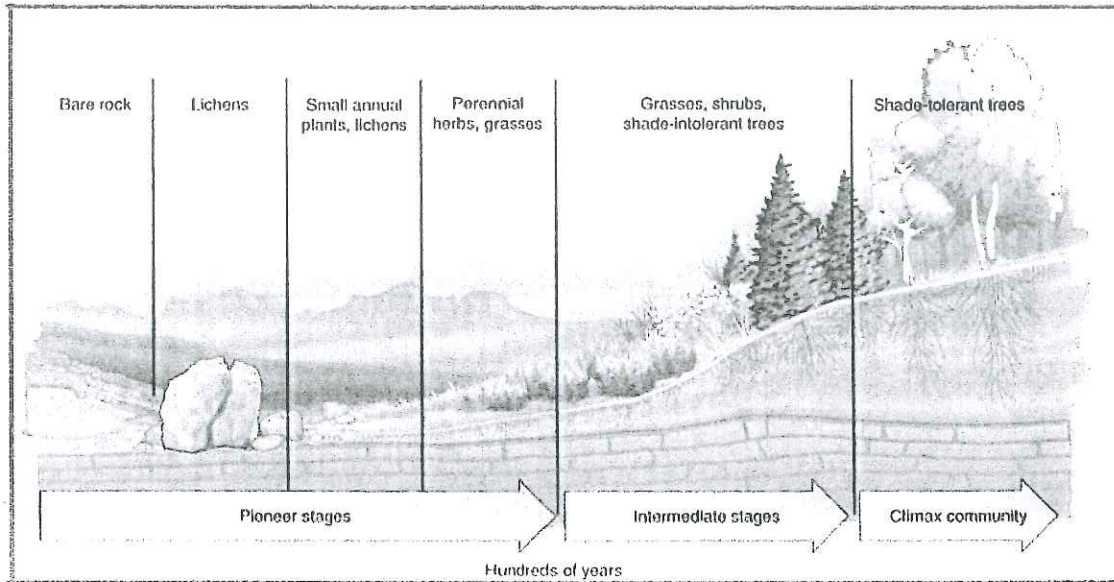
1. A population which is declining is depicted by which one of the following:



2. An organism's daily cycle of activity whereby it is active during the day is called

- A. nocturnal
- B. periodicity
- C. crepuscular
- D. diurnal

3. The community pattern shown in the diagram is



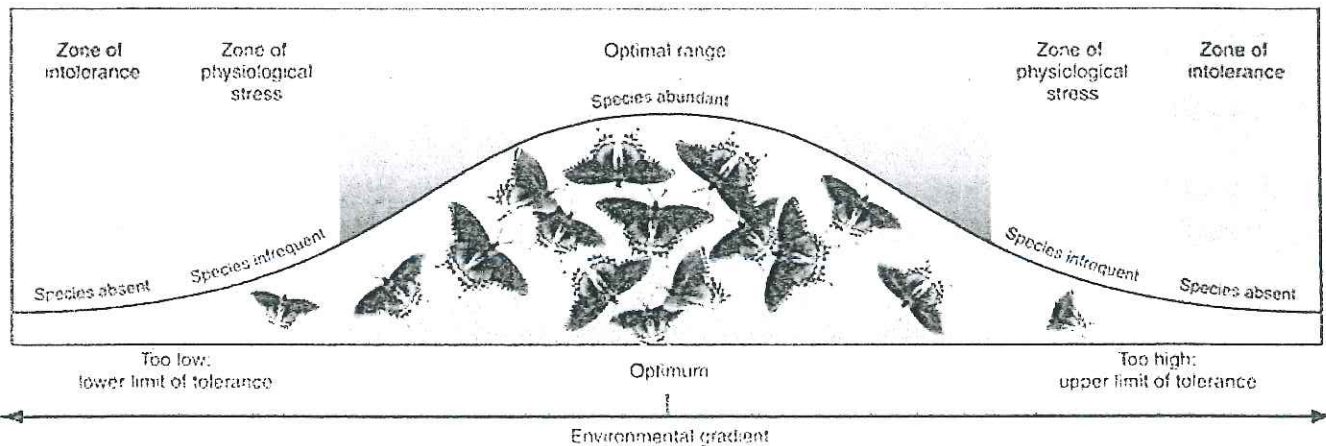
Source : <https://www.learner.org>

- A. zonation
- B. stratification
- C. succession
- D. periodicity

SHORT ANSWER QUESTIONS

[11 marks]

4. Shown below is the temperature tolerance curve of butterflies.



Source : <http://bio427.blogspot.com/2009/07/law-of-limiting-factors-law-of-minimum.html>

Turn Over

STRAND 2: LIVING TOGETHER

(continued)

(i) Which zone is the most suitable to the butterflies ?

What evidence does the graph provide for your answer ?

(1mark)

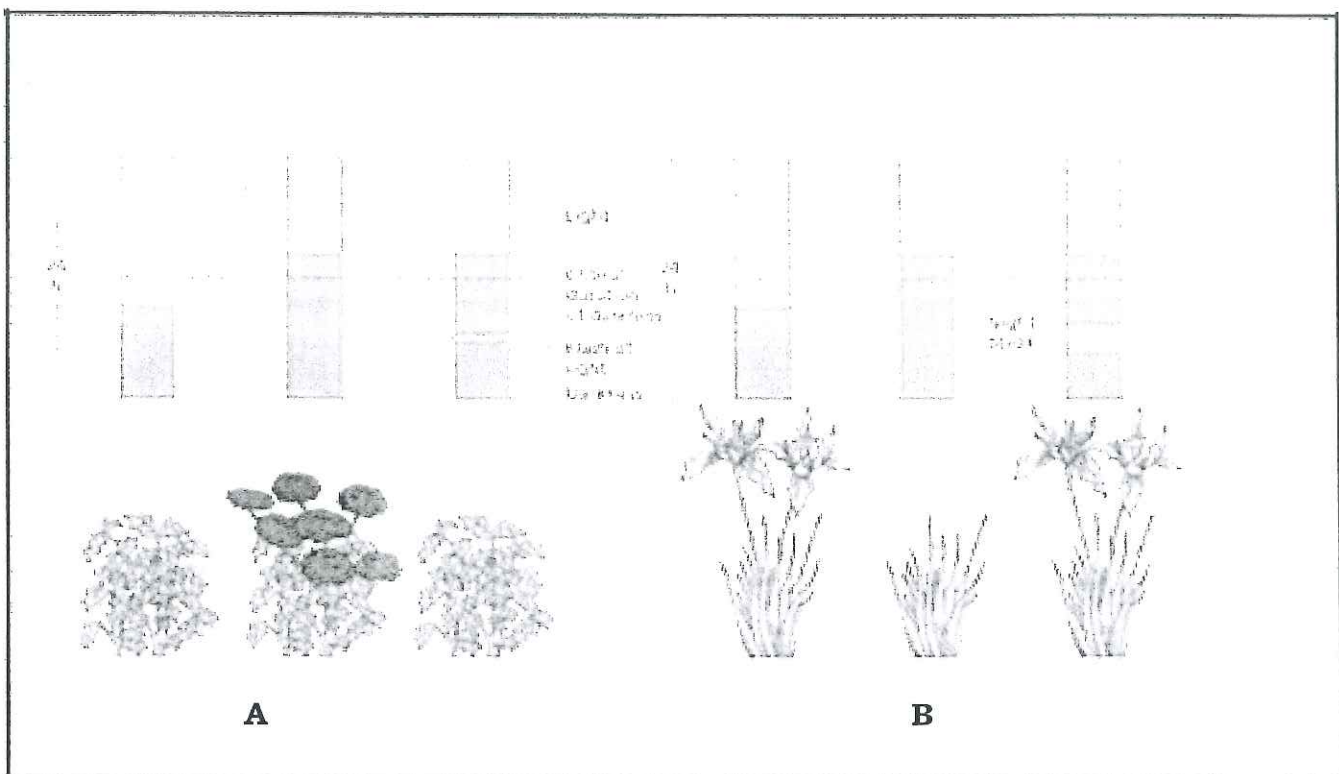
(ii) Acclimation could happen to the fish to enable them to exist in the zone of optimum range. Define the term **acclimation**.

(1mark)

(iii) Name the Biological law illustrated in the graph shown.

(1mark)

5. The diagram below illustrates the effects of light duration on a flowering plant.

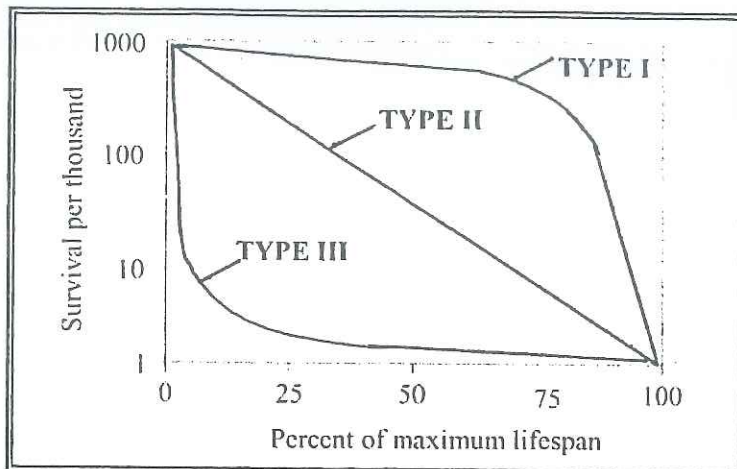
Source : <https://ib.bioninja.com.au>

(i) What term describes the regulation of a plant's seasonal activity by the length of day and the length of night ? (1mark) (ii) Identify photographs A and B as either a short- day plant or a long day plant.

(2marks)

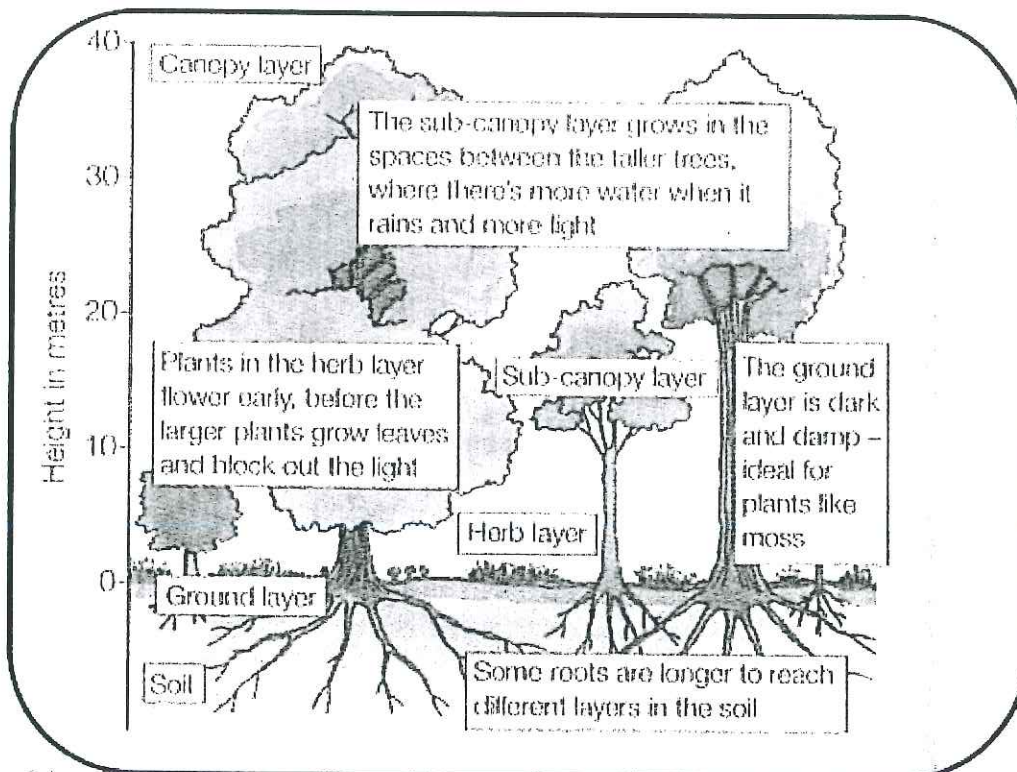
6. Study the survivorship curves below and answer the questions that follow.

SURVIVORSHIP CURVES



- (i) Which type of survivorship curve is typical of organisms like fish that experience a high, early mortality and once established, manage to live a long time? (1mark)
- (ii) Lizards and mice are constantly threatened by predators and food shortages. Which type of survivorship curve would they have? (1mark)

7. In a forest community several vertical layers as shown below, each with its own biotic and abiotic characteristics exist.



Source : <http://www.acegeography.com/lw--trop-r1.html>

Turn Over

STRAND 2: LIVING TOGETHER (continued)

- (i) Name the community pattern shown. (1mark)
- (ii) Name the abiotic factor which causes this pattern of distribution. (1mark)
- (iii) Explain why the topsoil from a forest would be more fertile than the topsoil from a plantation. (1mark)

STRAND 3: BIODIVERSITY, CHANGE AND SUSTAINABILITY

[12 marks]

MULTIPLE CHOICE QUESTIONS

[3marks]

1. Which of the following is **not** a greenhouse gas ?

- A. Methyl chlorofoam
- B. Carbon dioxide
- C. Methane
- D. Nitrous oxide

2. Classifying organisms into some type of group is known as

- A. Kingdom
- B. Domain
- C. Taxonomy
- D. Prokaryotes

3. Which of the following Kingdom belongs to prokaryotes ?

- A. Kingdom Protista
- B. Kingdom Fungi
- C. Kingdom Plantae
- D. Kingdom Archaea

SHORT ANSWER QUESTIONS

[9marks]

4. The widely used classification system today is the 3 Domain and 6 Kingdom classification.

- (i) Name the 3 Domains. (3marks)
- (ii) Describe the three characteristics used to place organisms into domains. (3marks)

5. (i) State the difference between **Greenhouse Effect** and **Enhanced Greenhouse Effect**. (2marks)

- (ii) State one effect on the ecosystem due to Greenhouse effect. (1mark)

ESSAY WRITING**(10 marks)**

Choose any **one** out of the three essay questions given below and write an essay on the question chosen using approximately 200-250 words(**2marks** are allocated for the structure of the essay).

EITHER**OPTION 1****STRAND 1 : STRUCTURE AND LIFE PROCESSES**

Protein synthesis is important cellular process of the human body, involving two major steps, **transcription** and **translation**.

With reference to the statement given above, discuss the following :

- (i) Definitions of the terms **transcription** and **translation**. **(2 marks)**
- (ii) The two **processes** of protein synthesis **(4 marks)**
- (iii) **Two reasons** why proteins are important to the body. **(2 marks)**

OR**OPTION 2****STRAND 2 : LIVING TOGETHER****OR**

There are many patterns evident in a community. The most important patterns are **Zonation, Stratification** and **Ecological succession**.

With reference to the statement given above, discuss the following :

- (i) Differentiate between **Zonation, Stratification** and **Ecological succession** **(3marks)**
- (ii) Discuss an example of each type of community patterns mentioned in (i). **(3marks)**
- (iii) For **any two** of the community patterns , explain how this pattern is of an advantage to the organism in the community. **(2marks)**

OPTION 3

STRAND 3: BIODIVERSITY, CHANGE AND SUSTAINABILITY

“ **Climate change** is a tangible problem and its existence can no longer be denied.”

Greenhouse effect and ozone depletion contribute to the changing climate. With reference to the above statement,

- (i) Differentiate between **greenhouse effect** and **ozone depletion**. (2 marks)
- (ii) Discuss **any one cause** and **one effect** of each environmental problem stated above . (4 marks)
- (iii) Discuss one preventive measure you would take as a youth for each environmental problem. (2 marks)

THE END