STUDENT EDUCATION NUMBER									

GOVERNMENT OF SAMOA
MINISTRY OF EDUCATION, SPORTS AND CULTURE

Samoa School Certificate

BIOLOGY

2017

QUESTION and ANSWER BOOKLET

Time allowed: 3 Hours & 10 minutes

INSTRUCTIONS

1. You have 10 minutes to read **before** you start the exam.
2. Write your **Student Education Number (SEN)** in the space provided on the top left hand corner of this page.
3. **Answer ALL QUESTIONS.** Write your answers in the spaces provided in this booklet.
4. If you need more space, ask the Supervisor for extra paper. Write your SEN on all extra sheets used and clearly number the questions. Attach the extra sheets at the appropriate places in this booklet.

Check that this booklet contains pages 2-18 in the correct order and that none of these pages are blank.

HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

1. Life processes in living things are described by the acronym MRSCGREN.

Describe the life process represented by the letter '**C**' in MRSCGREN.

SL 2

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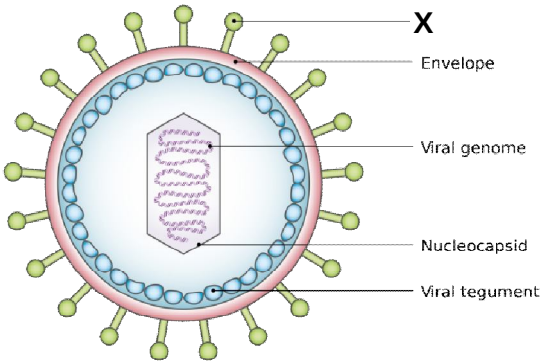
2. The diagram below shows the structure of a typical human virus.



Use the diagram to answer the following:

(a) Name part **X**.

SL 1

_____

(b) Name ONE life process which is **not** a characteristic of viruses, from the acronym MRSCGREN.

SL 1

_____

_____

(c) Discuss how the nature of viruses can cause disease.

SL 4

(d) List TWO deadly diseases caused by viruses.

SL 2

3. Explain the advantages caused by the use of micro-organisms.

SL 3

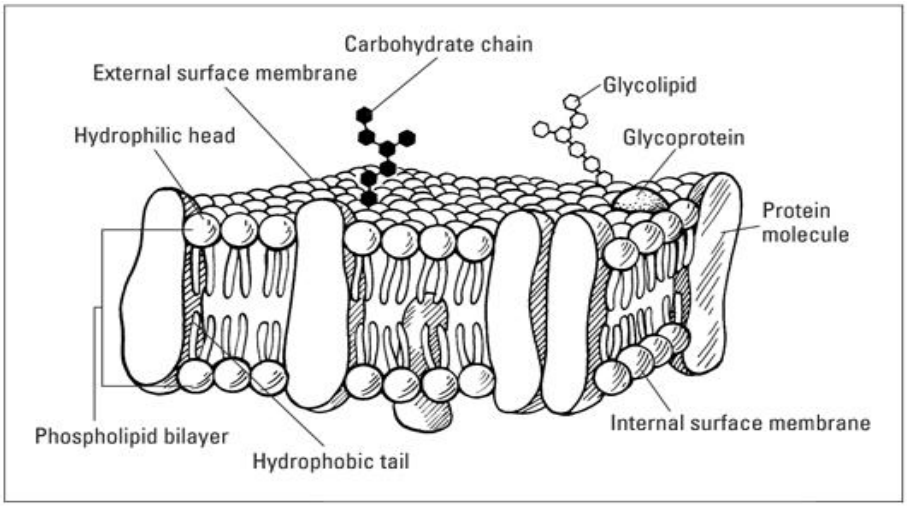
4. Compare the five Kingdoms by completing the table below to highlight the differences in features of members.

Fill in the spaces labeled (a) to (f).

SL 3

Kingdom	Monera	Protista	Fungi	Plantae	Animalia
Number of cells	Unicellular	Unicellular/ Multicellular	Unicellular/ Multicellular	Multicellular	(a)
Type of cell	(b)	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Tissues	Without	Without	With	With	With
Nutrition	Autotroph / Heterotroph	Autotroph / Heterotroph	Heterotroph	(c)	Heterotroph
Example of organisms	Bacteria	(d)	(e)	(f)	Invertebrates / Vertebrates

STRAND 2: CELL BIOLOGY Weighting 6



Use the diagram above to answer the following:

5. (a) Name the structure of the cell shown in the diagram above.

SL 1

_____

(b) Describe the role of the structure in cell transport.

SL 2

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6. Explain the importance of enzymes for life processes.

SL 3

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STRAND 3: GENETICS Weighting 12

7. The allele for green pea colour (G) is dominant whilst the allele for yellow colour is recessive (g).

Two parents, one with yellow colour peas and the other with green are crossed to give an offspring phenotypic ratio of 1:1 (50:50);

(a) Define the term *allele*.

SL 1

_____

(b) Define the term *phenotype*.

SL 1

_____

(c) State the genotype of the yellow parent.

SL 1

_____

(d) Use a Punnet square to prove your answer in (c).
(This is an example of a monohybrid inheritance).

SL 2

(e) Discuss the inheritance pattern for the above example in terms of traits, dominant and recessive alleles, genotypic and phenotypic ratios, homozygous and heterozygous gene pairs.

SL 4

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8. Describe the role of meiosis and fertilization in mixing genetic material.

SL 3

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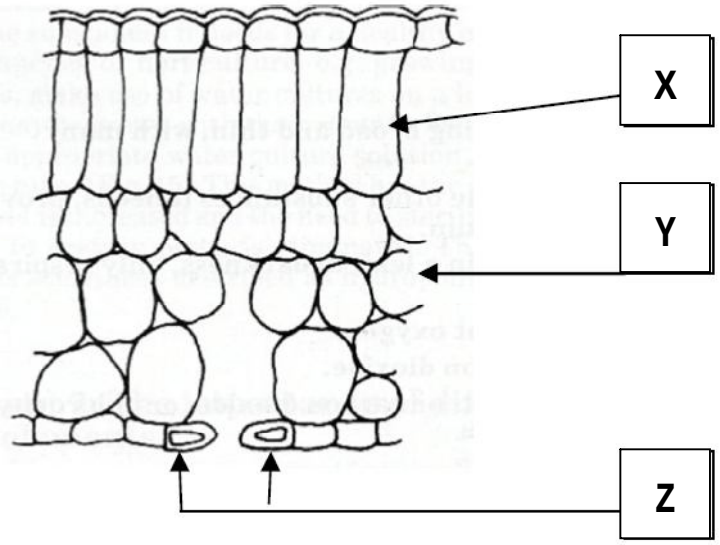
STRAND 4: PLANTS Weighting 30

9. The diagram below shows a typical cross-section of a leaf.



(a) Name structure **X**.

_____

SL 1

(b) Name structure **Y**.

_____

SL 1

(c) Name the structure (**X** or **Y**) that carries out the most photosynthesis.

_____

SL 1

(d) Describe the function of structure **Z**.

_____

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SL 2

(e) Explain how structure **Z** contributes to the processes of gas exchange and photosynthesis.

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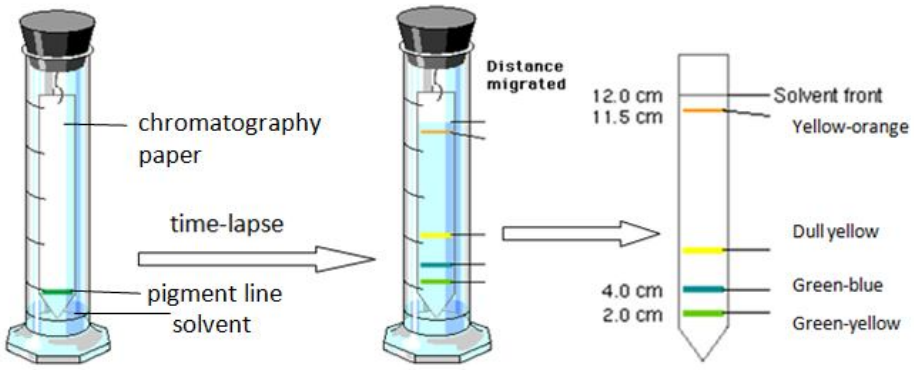
SL 3

10. The diagram below shows the set up and results of the paper chromatography experiment that was carried out by a group of students.

Using the results, report on the distribution of leaf pigments. (Include in your answer the name of the four leaf pigments that you can identify from the band of colours on the chromatography paper as illustrated in the diagram).



SL 4

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11. Explain why photosynthesis is important to plants and other living things.

SL 3

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12. State ONE advantage of <u>asexual reproduction</u> in plants.

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SL 1

13. Write a balanced chemical equation for photosynthesis.

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SL 2

14. Define *pollination*.

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SL 1

15. Give an example of 'geotropism'. *(You can draw a diagram to illustrate and aid in drafting your answer).*

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SL 1

16. Name the plant hormone that promotes cell division in plants.

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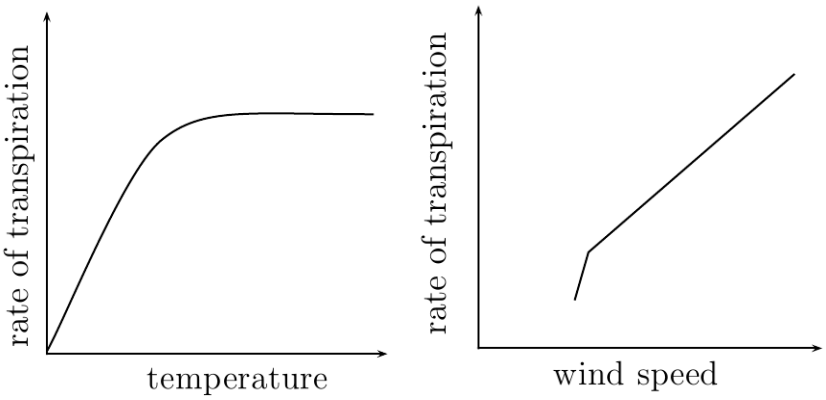
SL 1

17. Explain the importance of transpiration in plants.

SL 3

18. The two graphs below show the results from photometer experiments that were carried out to investigate the effects of light intensity and wind speed on transpiration in a plant.



Use the graphs to discuss the effects of environmental factors such as wind and temperature on transpiration rate.

SL 4

19. List the essential nutrients for plant growth.

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SL 2

STRAND 5: ANIMALS Weighting 24

20. Define the essential nutrients listed below, for animal nutrition:

(a) *carbohydrates*

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SL 1

(b) *lipids*

_____

SL 1

(c) *proteins*

_____

SL 1

(d) *vitamins*

_____

SL 1

(e) *fibre*

_____

SL 1

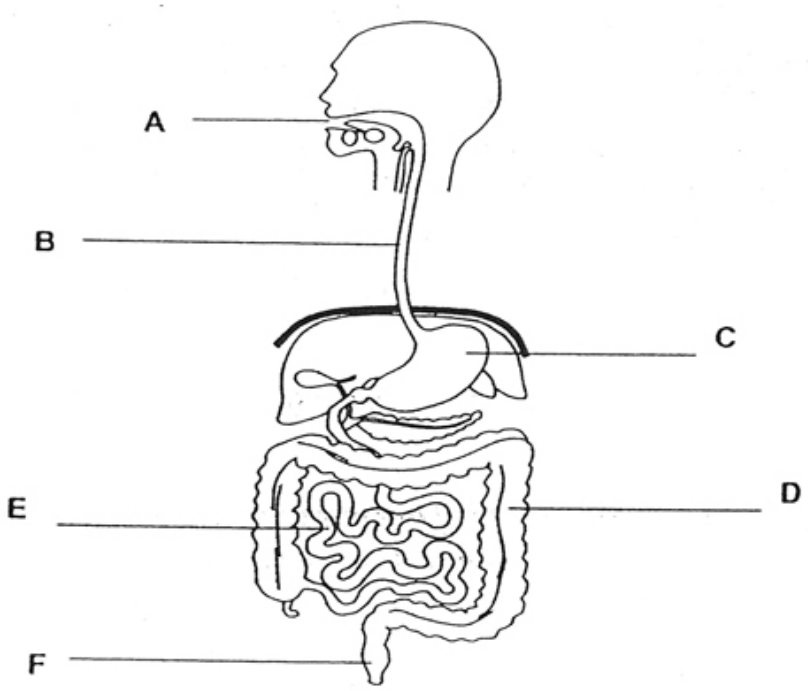
21. Describe the procedure for testing the presence of proteins in food.

_____

_____

_____

SL 2



Use the diagram of the human digestive system to answer (a) – (d).

22. (a) Name organ **B**.

_____

SL 1

(b) Name organ **C**.

_____

SL 1

(c) State the function of organ **C**.

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SL 1

(d) Explain how the structure of the organ **C** of the human digestive system adapts them to their functions.

SL 3

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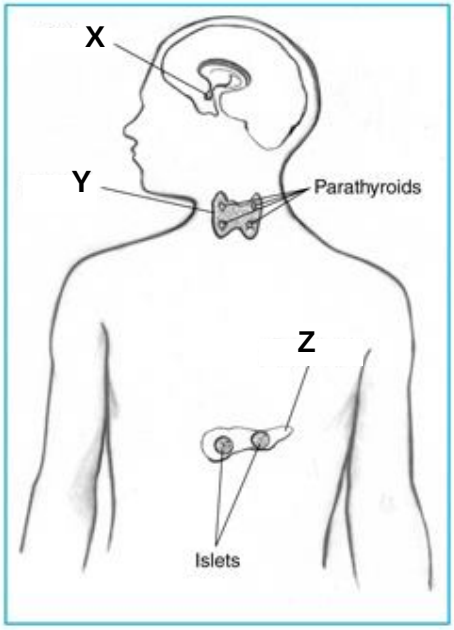
Human Endocrine System



Use the diagram to answer the following.

23. (a) Name the endocrine gland **Z**.

SL 1

_____

(b) Name ONE hormone that is released from endocrine gland **Z**.

_____

SL 1

(c) Explain the effects of a lack of the hormone you named in (b) above on human bodily functions.

SL 3

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24. List THREE excretory organs in humans.

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SL 2

25. Discuss the significance of reflex actions relating it to everyday situations.

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SL 4

26. Define the following terms:

(a) *environment*

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SL 1

(b) *adaptation*

_____

_____

SL 1

(c) *food chain*

_____

_____

SL 1

(d) *food web*

_____

_____

SL 1

(e) *biological control*

_____

_____

SL 1

(f) *commensalism*

_____

_____

SL 1

(g) *predation*

_____

_____

SL 1

27. Give TWO examples of local environmental issues that you have learned in class.

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SL 2

28. Explain the causes and effects for Samoa of the environmental issues you raised in Number 27.

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SL 3

STUDENT EDUCATION NUMBER									

BIOLOGY

2017

(For Scorers only)

STRANDS	Weighting	Scores	Chief Scorer
STRAND 1: VARIETY OF LIFE	16		
STRAND 2: CELL BIOLOGY	6		
STRAND 3: GENETICS	12		
STRAND 4: PLANTS	30		
STRAND 5: ANIMALS	24		
STRAND 6: ENVIRONMENT	12		
TOTAL	**100**		