SEC35/c2.18m

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2017

SUBJECT:	**Agribusiness**
PAPER NUMBER:	Controlled – Unit 2
DATE:	25th May 2017
TIME:	10:00 a.m. to 11:35 a.m.

THIS PAPER SHOULD BE RETURNED TO THE INVIGILATOR AFTER THE EXAMINATION.

Name of candidate _____

I.D. number _____

School _____

Class _____

Scenario:
Your school is working on an ambitious project in which aquaculture is being combined with agriculture. In the project, tomatoes and fish are being farmed together in the same environment. Dirty water from the fish tanks is used for providing mineral nutrients that are essential for plant growth.

You are part of this project. However, before you start working on this project, you have been requested to draft a number of fact sheets which assess your knowledge about aquatic and land-based production.

Question 1 **K1 (4 marks)**

a. Label **ALL** the following figures using the structures mentioned below:

Fins	Head	Lateral line	Scales

Figure 1 – A Goldfish

Image obtained from: http://www.warrenphotographic.co.uk

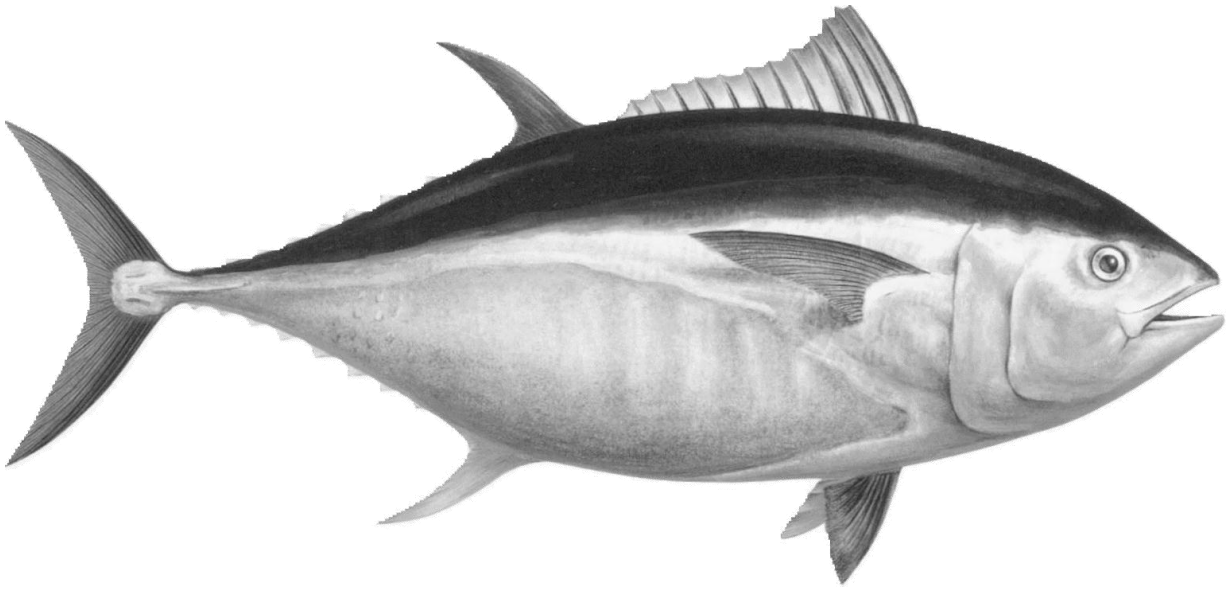

Figure 2 – A Tuna

Image obtained from: https://s-media-cache-ak0.pinimg.com

b. Are the following statements true or false? Circle the correct answer.

i. The skeleton of the tuna is stronger than that of the goldfish.

True or False

ii. The goldfish has small gills because it is a slower swimmer than the tuna and this requires a lower gaseous exchange of oxygen and carbon dioxide.

True or False

iii. The goldfish does not possess a swim bladder whilst the tuna has a swim bladder.

True or False

iv. The brain of the tuna receives more oxygen than that of a goldfish because it is a faster swimmer.

True or False

v. The female tuna has one ovary while the female goldfish has two.

True or False

Question 2 **K2 (4 marks)**

Link the nutrient which describes the specific role it has in fish.

Term	**Definition**
Calcium	Plays a central role in energy and cell metabolism.
Vitamin B	The nutritionally active components are fatty acids.
Vitamin D	Made up of many complexes, including Thiamine which is involved in many body functions, including nervous system and muscle function.
Fat	An essential component of bone and cartilage.
Vitamin K	Plays an essential role in calcium and phosphorus metabolism in animals.
Proteins	Small quantities aid digestion.
Sodium	Required for normal vision.
Phosphorus	Required for the maintenance of normal blood coagulation.
Vitamin C	Plays a vital role in maintaining the integrity of connective tissue, blood vessels, bone tissue, and wound tissue.
Fibre	This nutrient is not particularly widespread in the natural diet, fish are more dependent upon amino acids as precursors to glucose than most other animals.
Vitamin A	Serves as a cofactor in many enzyme systems.
Potassium	Connected with the regulation of osmotic pressure and the maintenance of acid-base balance.
Zinc	Required for glycogen and protein synthesis, and the metabolic breakdown of glucose.
Iron	Necessary for maintenance, growth, reproduction, and for the replacement of depleted tissues.
Carbohydrates	Helps in the building of DNA.
Vitamin E	An essential component of the respiratory pigments haemoglobin and myoglobin.

Question 3 **K4 (4 marks)**

You have four community aquaria which you are monitoring regularly. Lately you have been noticing that the fish in:

- Aquarium 1: are suffering from pop-eye.
- Aquarium 2: have been infected with fish lice.
- Aquarium 3: have lateral line disease.
- Aquarium 4: have been diagnosed with Fin rot

Describe suitable treatments for these aquaria.

Aquarium 1:

_____

_____

_____

Aquarium 2:

_____

_____

_____

Aquarium 3:

_____

_____

_____

Aquarium 4:

_____

_____

_____

Please turn the page.

Question 4 **C3 (6 marks)**

Fill in the blanks by choosing **ONE** from the below to explain how certain factors can be used to control flowering in horticulture. Each word should be used only once.

Artificial-lighting	Photosynthesis	Vernalisation	Necrosis	Heating
Cooling	Greenhouse	Photoperiodism	Blackouts	Leaves

The response of the plant to the absence and presence of light is called _____. Other than flowering, this response in plants includes the growth of stems or roots during certain seasons and the loss of leaves. _____ can be used to induce extra-long days, whilst _____ are used to leave the plant in complete darkness.

In the case of fruit trees, like peaches and grape vines, cold temperature in winter is a vital abiotic factor for the predication of flowers and fruit. This effect of cold temperature on fruit trees is called _____.

Tomato plants growing in greenhouses can suffer from an inadequate air temperature. In summer, _____ is important to avoid flower drop. Cold temperatures may inhibit flowering and therefore _____ would be required.

Question 5 **K6 (4 marks)**

Consider the following image and answer the questions to describe different plant physiological processes:

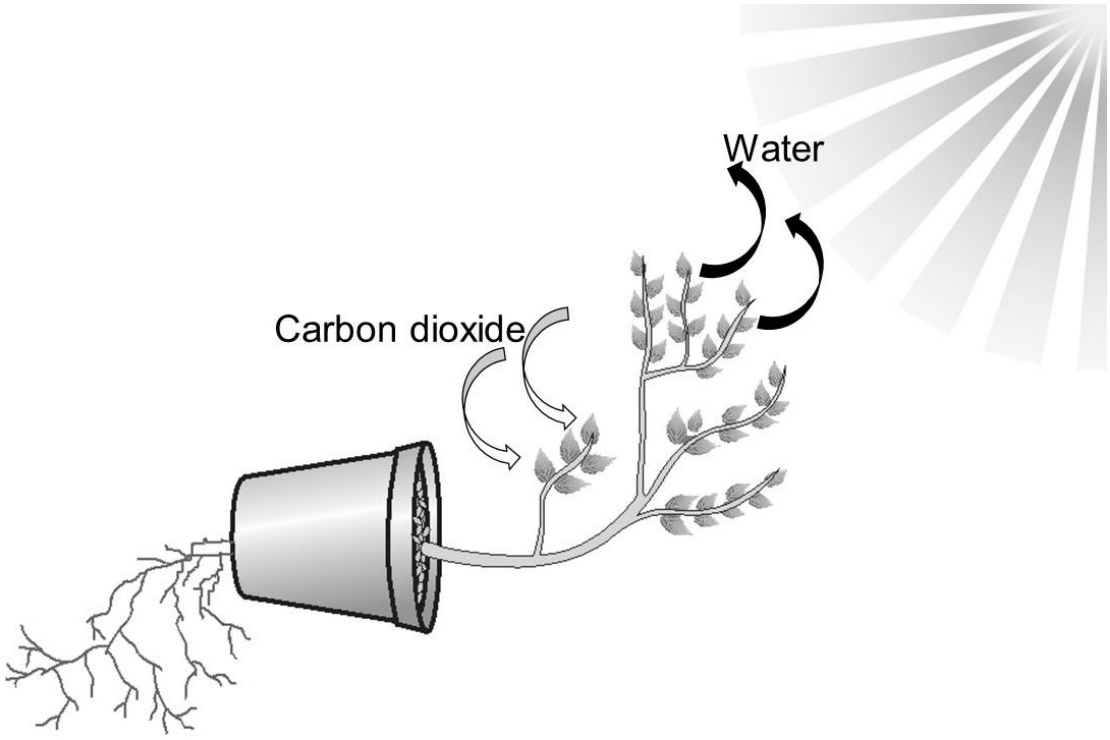

Figure 3 – The different physiological processes in a plant

Image modified from: http://www.ekshiksha.org.in

a. Through which physiological process are the roots moving downwards?

_____

b. Through which physiological process are the shoots moving upwards?

_____

c. Through which physiological process do leaves lose water?

_____

d. Why do the leaves take in carbon dioxide?

_____

e. Through which process does the roots obtain sugars from the leaves?

_____

Question 6 **K8 (4 marks)**

a. Early blight and late blight, two serious diseases of potato, are widely distributed. Both are found everywhere potatoes are grown. The terms "early" and "late" refer to the relative time of their appearance in the field, although both diseases can occur at the same time.

Consider the following symptoms and identify whether they are associated with early blight or late blight. The first one has been done for you as an example.

	Symptoms
~~i.~~	~~Spots start out pale green, usually near the edges of tips of foliage and turn brown to purple-black~~
ii.	In humid conditions, fuzzy mould appears on the underside of the leaves.
iii.	Spots have concentric rings in them and yellow halos around the edge.
iv.	Dark, sunken spots appear on the stem end of fruits.
v.	Brown, leathery spots appear on green fruit on the top and sides of the fruit.

Early blight	Late Blight
	i.

b. Plant nutrition is the practice of providing to the plant the right nutrient, in the right amount, in the right place and at the right time.
You have been conducting an experiment on geranium plants. Three of the plants you are growing are given all nutrients except for nitrogen. Describe **TWO** symptoms that you expect to see in these plants.

_____

_____

_____

_____

Please turn the page.

Question 7 **C4 (6 marks)**

Choose from the following list the measures which need to be considered to control the spreading of diseases and prevent nutritional deficiencies.

Artificial fertiliser	Pesticides	Tillage
Tolerant/resistant	Manure	Field burning
Sterilisation	Biological control	Crop rotation
Inter-cropping	Traps	Solarisation

a. Rather than using a chemical, a pest may be controlled by introducing a natural enemy or predator.

_____

b. Growing of two or more crops together in proximity on the same land. For example, growing broad beans and leafy vegetables so that the leafy vegetables would make use of the nitrogen fixing characteristics of the broad beans.

_____

c. Agitating the soil in preparation for growing crops. This can be digging, stirring, and overturning the soil. This can be used to control weeds.

_____

d. An organic source of nutrients to the crops from animal origin.

_____

e. Sterilisation of the soil using the heat from the sun.

_____

f. Growing of different crops in succession on a piece of land to avoid exhausting the soil and to control weeds, pests, and diseases.

_____

g. Even though it is **not** an organic source of nutrients, it allows the farmer to apply a more accurate amount of the different nutrients.

_____

h. Applying a chemical on plants that can eradicate the spread of a pests.

_____

i. This method removes plants that are already growing and helps the plants that are about to come up. However, care must be taken, because if it is too windy, the fire can escape easily. If the field is too dry it may burn out of control.

_____

j. Crops that have genetic characteristics that make them less susceptible to particular pests and/or diseases.

_____

k. A process by which chemicals are used to render soil living organisms that are capable of destroying plants and causing disease in the soil to be inactive, impotent or unproductive.

_____

l. May be filled with pheromones to catch pests such as the Mediterranean fruit fly.

_____

Question 8 **C5 (6 marks)**

Harvesting time of different vegetables is affected by cultivars and weather conditions. Explain **THREE** factors in which cultivars and weather conditions influence harvesting time.

a. Cultivars

Factor 1:

_____

_____

Factor 2:

_____

_____

Factor 3:

_____

_____

This question continues on the next page.

b. Weather conditions

Factor 1:

_____

_____

Factor 2:

_____

_____

Factor 3:

_____

_____

Question 9 **K10 (4 marks)**

A growing medium is designed to support the growth of different produce based on the different characteristics that the growing medium has and what you are trying to grow, hence the growing objective.

Circle the correct growing media from the following growing objectives.

a. Has good water drainage (only **ONE** answer is correct).

i. Compost ii. Perlite

b. Has good aeration (only **ONE** answer is correct).

i. Coconut fibre ii. Peat

c. Can be considered to be pathogen – and/or pest-free (only **ONE** answer is correct).

i. Soil ii. Vermiculate

d. Allows for adequate nutrient control in hydroponics (**TWO** answers are correct).

i. Rockwool iii. Expanded clay

ii. Compost iv. Soil