Centre Number						Candidate Number				
Surname						Other Names				

Notice to Candidate. The work you submit for assessment must be your own. If you copy from someone else or allow another candidate to copy from you, or if you cheat in any other way, you may be disqualified.

Candidate Declaration. I have read and understood the Notice to Candidate and can confirm that I have produced the attached work without assistance other than that which is acceptable under the scheme of assessment.

Candidate Signature		Date	

For Teacher's Use	
Section	Mark
PSA	
Stage 2 Skills	
Section A	
Section B	
TOTAL (max 50)	

General Certificate of Education
Advanced Level Examination
June 2011

Biology BIO6T/P11/test

Unit 6T A2 Investigative Skills Assignment

For submission by 15 May 2011

For this paper you must have:	**Time allowed**
• the task sheet, your results and your calculations • a ruler with millimetre measurement • a calculator.	• 1 hour 15 minutes
Instructions:	**Information**
• Use black ink or black ball-point pen. • Fill in the boxes at the top of this page. • Answer **all** questions. • You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages. • Do all rough work in this book. Cross through any work you do not want to be marked.	• The marks for questions are shown in brackets. • The maximum mark for this paper is 38. • You will be marked on your ability to: – use good English – organise information clearly – use scientific terminology accurately.

Details of additional assistance (if any). Did the candidate receive any help or information in the production of this work? If you answer yes give the details below or on a separate page.

Yes ☐ No ☐

Teacher Declaration:
I confirm that the candidate's work was conducted under the conditions laid out by the specification. I have authenticated the candidate's work and am satisfied that to the best of my knowledge the work produced is solely that of the candidate.

Signature of teacher ..... Date .....

Section A

These questions relate to your investigation of the effect of ammonium hydroxide on the time taken for chloroplasts to decolourise DCPIP.

Use the task sheet and your results to answer the questions.

Answer **all** questions in the spaces provided.

5 (a) You were told **not** to put the leaf midrib or leaf stalk in the blender (Step 2). Suggest why.

.....

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(1 mark)

5 (b) What was the purpose of using a blender?

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(1 mark)

6 The isolation medium was cold and was also isotonic with the spinach tissue.

6 (a) Explain why it was important that the isolation medium was cold.

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(3 marks)

Extra space .....

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6 (b) Explain why it was important that the isolation medium was isotonic with the spinach tissue.

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(2 marks)

7 There are large pieces of tissue and other organelles in your chloroplast suspension. Describe how you could isolate the chloroplasts from the other components in the suspension.

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(3 marks)

Extra space .....

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Turn over for the next question

8 You were told to wrap tube **A** in aluminium foil (step 8). Explain why.

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(1 mark)

9 Tube **B** was a control experiment (step 8). Explain how the results in this tube acted as a control experiment.

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(2 marks)

10 In your investigation, the colour change in DCPIP was caused by the transfer of electrons from chlorophyll. Name the part of a chloroplast where this transfer of electrons takes place.

.....

(1 mark)

11 DCPIP is decolourised more slowly when ammonium hydroxide is added. Use your knowledge of the light-dependent reaction to suggest a reason why.

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(2 marks)

12 Some weed killers are substances that accept electrons during photosynthesis.

12 (a) Suggest how these substances kill weeds.

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(2 marks)

12 (b) Suggest **one** disadvantage of using these weed killers on weeds growing in a crop. Explain your answer.

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(2 marks)

20

Resource Sheet

Resource A

The Harvest Index is the percentage of dry biomass that is harvested and used.

Barley is a cereal. It is grown for its grain. Researchers collected data to calculate the Harvest Index of barley growing in a small field. They obtained their measurements from quadrats at different places in the field. Their results are shown in **Figure 1**.

Figure 1

Quadrat number	Dry biomass of barley plants / g m^{-2}	Dry biomass of barley grain harvested / g m^{-2}
1	80	42
2	75	37
3	82	41
4	93	39

Resource B

Herbicides are substances that kill weeds. Three farmers wanted to know which herbicide to use to control weeds in fields of barley. They chose eleven fields of barley and used a different herbicide in each field. Four weeks later they collected, counted and weighed the weeds in each field. Their results are shown in **Figure 2** and **Figure 3**.

Figure 2

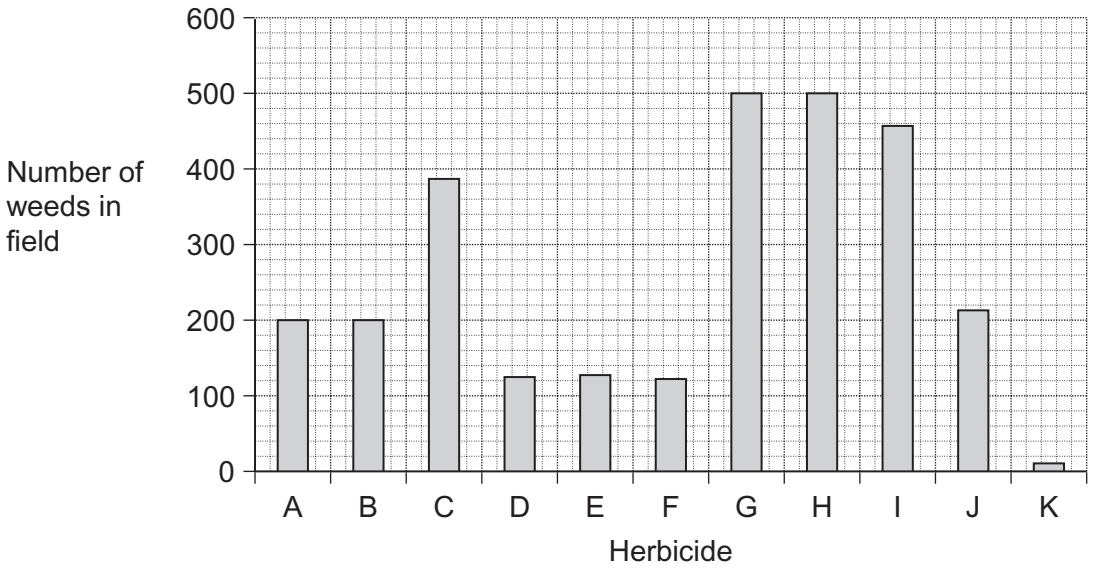
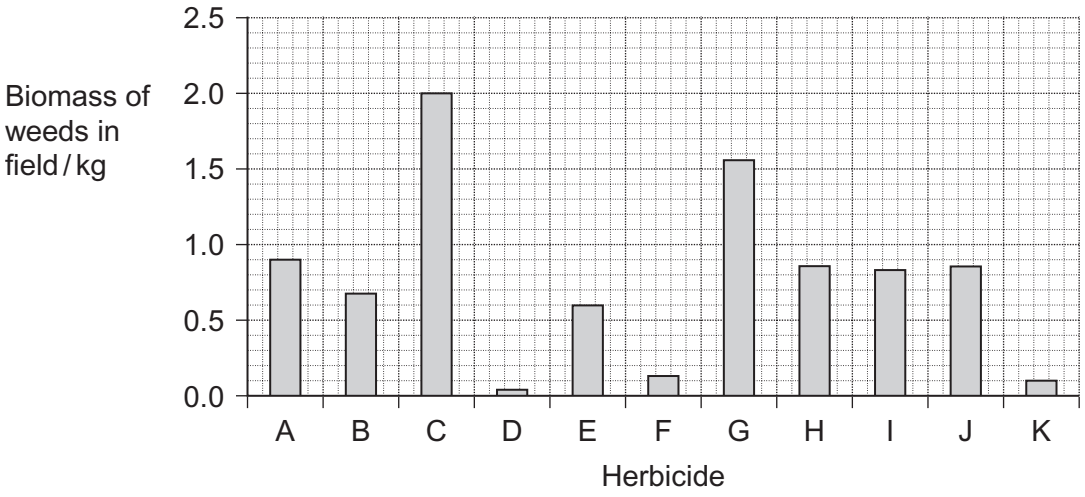


Figure 3



Section B

Use the information in the **Resource Sheet** to answer the questions.

Answer **all** questions in the spaces provided.

Use the information provided in **Resource A** to answer Questions **13** to **16**.

13 Use the data for quadrat number **4** in **Figure 1** to calculate the Harvest Index for barley. Show your working.

Harvest Index = ...

(2 marks)

14 Plant breeders are trying to produce barley plants with shorter stems.
Explain how this would increase the Harvest Index.

.....

.....

(1 mark)

15 The values for the biomass of the barley plants are different in each quadrat.
Suggest an explanation for this difference.

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(2 marks)

16 The researchers measured the dry biomass of the barley plants and the barley grain.
What is the advantage of using dry biomass for these measurements?

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(2 marks)

Turn over ▶

Use the information provided in **Resource B** to answer Questions **17** to **20**.

17 Describe the difference in biomass of **each** of the weed plants in fields treated with herbicides **G** and **H**. Explain how you arrived at your answer.

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(2 marks)

18 The farmers decided that **K** would be the best herbicide to use.
Explain why herbicide **K** would give a higher crop yield.

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(2 marks)

19 The farmers carried out their investigation during the summer.
Suggest **one** advantage and **one** disadvantage of carrying out this investigation during the summer.

Advantage .....

.....

Disadvantage .....

.....

(2 marks)

20 One of the farmers told a local newspaper reporter of their findings. The newspaper published an article with the following headline: "Local farmers show scientists the way to bigger crop yields." Was this headline justified? Explain your answer.

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(5 marks)

Extra space .....

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18

END OF QUESTIONS

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