

**The University of Melbourne**

**Semester 2, 2007 Assessment**

**School of Agriculture and Food Systems  
208275 – Plant Production**

**Reading Time 15 minutes**

**Writing Time 3 hours**

**This paper has four pages**

**Authorised Materials:**

Non programmable Calculators may be used.

No other materials are authorised to be used in this examination.

**Instructions to Invigilators:**

Students will require script books to answer this examination paper.

Students may remove the examination paper from the examination room.

**Instructions to Students:**

Students are required to answer **EIGHT (8)** questions on this examination.

All questions are of equal value.

**Paper to be held by Baillieu Library:**

This paper may be held with the Baillieu and Dookie Libraries.

## ANSWER EIGHT OF THE FOLLOWING QUESTIONS

### Question 1

Explain potential yield of crops and measurements that plant physiologists take to compare the efficiency of different crops in energy conversion, including examples of different crops.

AND

Explain why canola yields are approximately 60% of wheat yields. Canola grains composition is 25% carbohydrate, 23% protein and 48% lipid, wheat grain composition is 82% carbohydrate, 14% protein and 2% lipid. 1g of glucose converts to 0.83g of carbohydrate, 0.38 g protein and 0.31 g of lipid.

(10 + 10=20 marks)

### Question 2

- What are the yield components of a wheat crop?
- Which yield component will be most affected by early weed competition and why?
- Which yield component would be most affected by drought in September?
- Discuss how different yield components in a wheat crop can compensate for each other.
- In a four tonne wheat crop grown at Dookie, what are the expected yield components?

(5 x 4 marks =20 marks)

### Question 3

Explain how sowing time and nitrogen supply affect the yield-anthesis biomass relationship and how this balance is related to the process of haying-off.

(20 marks)

### Question 4

What are the three major effects of diseases on crop production? For each major effect, give examples of at least two diseases, detailing the crops affected and the type of disease organism involved.

(20 marks)

### Question 5

Water is a critical resource for crop production in most of southeastern Australia. Using examples, discuss how growers can use the "French and Schulz model" relating yield to water use where:

Yield (kg/ha) = WUE \* (Seasonal Water Supply - Soil Evaporation).

In addition to the discussion of this model, identify the limitations that such models present and the ways the models can be used by growers.

(20 marks)

### **Question 6**

Herbicides can be classified in various ways. Describe the various herbicide classification groupings, explaining the different classes within each classification, giving examples of herbicides in the different classes.

(20 marks)

### **Question 7**

In preparing for a crop, land managers need to consider various decisions such as crop type, stubble management and cultivation regime. Explain the various options that growers have in these and what factors will influence the decisions.

(20 marks)

### **Question 8**

Explain why resistance to agricultural chemicals occurs (covering both causes and mechanisms), giving a clear indication of difference between different evolutionary biological groups. Also include methods of agricultural chemical resistance management.

(20 marks)

### **Question 9**

Crop inspections as an extension tool to improve crop agronomy. What are the main crop inspections? When, why and what are done at each these inspections times

(20 marks)

### **Question 10**

Diseases are major impediments to crop production. (a) Explain the main effects of diseases on crop production, giving two examples of diseases for each AND describe the major methods of management for each group. In your answer show a clear differentiation between the main types plant resistance.

(20 marks)

### Question 11

Using the information provided, estimate the flowering time for early, mid and late season wheat varieties sown on 1 April, 1 May or 1 June at Longerenong and highest risk of loss.

Cultivar	Thermal Time to ...( $^{\circ}\text{Cd}$ )	
	Heading	Anthesis
Early season type (eg. Ouyen)	700	800
Mid season type (eg. Yitpi)	830	930
Long season type (eg. Kellalac)	950	1050

Month	Average Temperature ( $^{\circ}\text{C}$ )
April	14.7
May	11.5
June	8.9
July	8.2
August	9.5
September	11.4
October	13.8
November	17.9

Date	Average Temperature for Next 10 Days	Frequency of Weather Condition for the Next Ten Days (%)		
		Frost	High Temperatures ( $>30^{\circ}\text{C}$ )	Drought (P/E $< 0.3$ )
<Oct 04	13.2	100	10	10
Oct 5 - Oct 10	13.9	83	8	25
Oct 11 - Oct 15	14.8	73	55	45
Oct 16 - Oct 21	15.3	52	59	71
Oct 22 - Oct 27	16.3	43	74	63
Oct 28 - Nov 02	16.6	25	79	86
> Nov 03	16.7	10	85	88

(20 marks)

**END OF EXAMINATION**