UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
DISCIPLINE OF CROP SCIENCE
FINAL EXAMINATION: NOVEMBER 2014
SUBJECT, COURSE & CODE: CROP PROTECTION, AGPS 308

DURATION: 3 HOURS **TOTAL MARKS: 180**

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NOTE: THIS PAPER CONSISTS OF TWO (2) PAGES AND SEVEN (7) QUESTIONS. PLEASE SEE THAT YOU HAVE THEM ALL. YOU MUST ANWER SIX (6) QUESTIONS. YOU HAVE A CHOICE BETWEEN QUESTIONS 4 AND 5 ONLY. ALL OTHER QUESTIONS ARE COMPULSORY.

QUESTION 1 [30]

(a) List and explain the different Plant-feeding strategies of pests stating the characteristic of the pests that deploy these strategies. (20)

(b) Insect pests are grouped according to origin; based on your knowledge these pests, give account of their origins explaining how they ended up being pests (10)

QUESTION 2 (30)

(a) Name and discuss three (3) behaviour modifying compounds that are commonly used insect pest control (15)

(b) From what you have learned about Integrated Pest Management, what are the 5 common sense principles of IPM (15)

QUESTION 3 [30]

(a) A good farmer (Farmer X) removes infected potato debris from the previous crop. His neighbor does not (Farmer Y). *Phytopthora infestans* is a polycyclic disease of potatoes which develops from inoculum in debris. Given that: *P. infestans* has an r value of 0.23 per unit per day; Farmer X practices sanitation at 90% and Farmer Y at 50%.

(i) What is the sanitation ratio for each farmer? (4)

(ii) How many days are saved by each farmer at the level of sanitation practiced? (6)

(b) Discuss the development of disease in the natural/wild and the crop pathosystems. Include diagrams to illustrate your answer. (10)

(c) Define the following terms:

(i) Maximum residue level, in relation to pesticide safety (1)

(ii) Sanitation, as used in plant disease control (1)

(iii) LD_{50} concept (acute lethal dose), in relation to the toxicity of agrochemicals (1)

(iv) Antibiosis, in relation to bio-control (1)

(v) Conditions of sale, in relation to agrochemical product labeling (1)

(d) List the dangers of deviating from recommendations on agrochemical product labels. (5)

(NB: ANSWER QUESTION 4 OR 5)

QUESTION 4 [30]

Discuss the various stages in a generalized plant pathogen's life cycle.

QUESTION 5 [30]

(a) Describe the TWO (2) types of resistance to fungicides, including diagrams to illustrate your answer. (10)
(b) Explain how to dispose of agrochemical containers safely. (12)
(c) Define the mechanism of action of mycoparasitism/hyperparasitism of the biological control of plant pathogens, explaining the various processes that this mechanism of action employs. (6)
(d) Name ONE (1) practice that reduces initial inoculum via eradication, and give a brief description of the practice. (2)

QUESTION 6 [44]

(a) Summarise the concept of weed persistence. Include an illustration (5)
(b) Discuss the concept of weed competition using illustrations. (15)
(c) Herbicides classification involves grouping by activity or classification by mode of action. Expand on this statement giving four (4) specific classifications in each case. (4)
(d) Discuss the concept of herbicide resistance in details, using simple illustrations. Your answer must also include management strategies for avoiding and managing herbicide resistant weeds. (15)
(e) A weed becomes a problem in the introduced range because its population density fluctuates around an equilibrium that is above a threshold at which the weed begins to affect the economic or ecological sustainability of the ecosystem. Use a labelled illustration ONLY to show that you understand this statement. (5)

QUESTION 7 [16]

What is integrated weed management? Answer this question from agronomic, ecological and economic perspectives.