



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES
SCHOOL OF AGRICULTURE AND NATURAL RESOURCES SCIENCES
DEPARTMENT OF AGRICULTURAL SCIENCES AND AGRIBUSINESS**

QUALIFICATION: BACHELOR OF SCIENCE IN HORTICULTURE	
QUALIFICATION CODE: 07BHOR	LEVEL: 7
COURSE CODE: PPN610S	COURSE NAME: PLANT PROTECTION
SESSION: JUNE 2023	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Dr Norman Muzhinji
MODERATOR:	Dr Edgar Mowa

INSTRUCTIONS
<ol style="list-style-type: none">1. Answer ALL the questions.2. Write clearly and neatly.3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. Examination question paper
2. Answering book

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page)

Section A: Multiple choice questions (10 marks)

1. Which of the following organisms can be used as a biocontrol agent for aphids:
 - A. Fruit fly
 - B. Lacewing
 - C. Whitefly
 - D. Thrips

2. Which group of chemical products are used to control weeds in the field
 - A. Bactericides
 - B. Fungicides
 - C. Herbicides
 - D. Tutacides

3. Any cultivation will damage the crop to some extent and should be avoided when the crop is wet. Which group of pathogens (s) will be spread most readily if a crop is cultivated under wet conditions?
 - A. Bacteria
 - B. Viruses
 - C. Fungi
 - D. Nematodes

4. Which of the following pieces of information is not usually found on a pesticide label?
 - A. Active ingredient
 - B. Product name
 - C. Cost
 - D. Directions for use

5. Which of the following is not a feature of annual weeds?
 - A. Rapid growth
 - B. Short life cycle
 - C. High seed output
 - D. They have storage organs

6. Which of the following pathogens belongs to the oomycete group?
 - A. *Pythium myriotylum*
 - B. *Rhizoctonia solani*
 - C. *Colletotrichum coccodes*
 - D. Tobacco Mosaic virus

7. What are the stages of complete metamorphosis in insects?
 - A. Eggs, larva, pupa, adult

- B. Eggs, nymph, adult, larva
 - C. Pupa, nymph, adult, moth
 - D. Eggs, Pupa, adult, Larva
8. A weed with a long narrow leaf, parallel veins; round hollow stem and leaves are aligned up and down the stem in two rows is called
- A. Broadleaves
 - B. Grass
 - C. Sedges
 - D. Herbaceous
9. Which of the following is a plant disease that tends to produce only one infection cycle per host cycle?
- A. Soil-borne disease
 - B. Foliar diseases caused by fungi
 - C. Fruit diseases
 - D. Stem diseases
10. Which of the following is not a biotic cause of diseases
- A. Bacteria
 - B. Insects
 - C. Nematodes
 - D. Nitrogen deficiency

Section B: Answer all questions (90 MARKS)

1. Define or explain the following terms used in plant protection with examples.
 - i. Sign [2]
 - ii. Pathogen [2]
 - iii. Annual weed [2]
2. a. Explain the difference between disease severity and disease incidence. [2]
b. Show how you will calculate disease incidence. [2]
3. List six (6) major factors to consider when planning an integrated insect control program. [6]
4. In March 2023, Ndonga Linena Green Scheme Irrigation, located in Rundu started to see an increase in the number of cucumber plants with stunted growth followed by wilting. Suppose you are the horticulturalist at Ndonga Linena Green Scheme responsible for ensuring good production of horticultural crops;
 - a. List four (4) probable causes of cucumber wilting at the green scheme and explain how you can identify (diagnose) each of the causes. [8]
 - b. Describe the disease pentahedron and how it can be targeted to control root-knot nematodes on tomato crops. Illustrate with a diagram. [10]
 - c. Explain the difference between sedentary and migratory nematodes with examples? [2]
- 5.a Describe the difference between epidemic and pandemic diseases giving examples of each. [4]
b. Explain the four (4) host factors that affect disease epidemics [8]
6. Explain how weeds are classified according to life cycle, giving an example of each class. [8]
7. Design an Integrated Weed Management (IWM) strategy for controlling broadleaf weeds on irrigated cabbages. [8]
8. What is the difference between monocyclic and polycyclic disease cycles? Giving examples. [4]
9. Let's say in February 2023, there was an outbreak of disease Y, at Shaddy Kongolo irrigation scheme that destroyed the whole crop in the field. Suppose you have just been appointed as a horticulturalist responsible for overseeing production of horticultural crops at Shaddy Kongolo and you are told disease Y is caused by either a fungus and/or a

bacteria. You have now been assigned the responsibility of identifying the actual causative agent of the disease.

Briefly, describe with aid of diagrams, an experiment that you would carry out to demonstrate that disease Y is indeed caused by a fungus and/or bacteria. [8]

Hints:

1. Use any crop of your choice commonly grown in Namibia
 2. Identify a disease that commonly occur on that crop
 3. Name the causative agent of that disease
 4. Detail the experiment you would do to identify the causative agent and if indeed it's the cause
10. Explain some of the causes of insect outbreaks in a crop field. [3]
11. Sonop farm is involved in intensive production of horticultural, and ornamental plants. Sonop farms does not have a horticulturalist and therefore has little knowledge on crop production especially plant and crop diseases. They have approached you as a consulting Horticulturalist with knowledge in plant diseases to investigate diseases occurring at its farm. You discovered upon investigation that the plants are infected with *Phytophthora infestans*, the causative agent of late blight on tomatoes.

Describe;

- a. The disease cycle [3]
- b. Epidemiology of disease [8]

THE END