RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
Third year – Semester I Examination – November/December 2016

BOT 3104 – PLANT PATHOLOGY

Time: One n half (1 ½) hours

Part A – Multiple choice questions.
Answer all questions. Underline the correct option on the script itself.

1. Which of the following would be an example of Horizontal Resistance?
   (a) Momentary resistance
   (b) Single gene resistance
   (c) Race specific resistance
   (d) Polygenic resistance

2. Abiotic diseases include,
   (a) Brown rot of nectarines
   (b) Leaf scorch caused by drought
   (c) Phomopsis tip blight caused by *Phomopsis* sp.
   (d) Both the answers (a) and (b)

3. Pectyolitic enzymes of plant pathogens play a major role during pathogenesis in diseases such as,
   (a) rusts
   (b) downy mildews
   (c) powdery mildews
   (d) wilts and rots

4. Which of the following would produce aflatoxins?
   (a) *Aspergillus flavus*
   (b) *Penicillium notatum*
   (c) *Albugo candida*
   (d) *Trichoderma viridae*

5. Which gene combination of a host-pathogen system correctly illustrates the incompatible reaction that would **NOT** lead to an infection?

Consider:	**Pathogen**	**Host**
	'A' (avirulent) dominant	**'R' (resistant) dominant**
	'a' (avirulent) recessive	**'r' (susceptible) recessive**

(a) Ar
(b) AR
(c) ar
(d) aR

6. The feedback effect occurs when,

(a) a plant produces glucose to counteract the effect of an enzyme or toxin produced by a pathogen
(b) enzymes released by the pathogen breakdown plant substances and that triggers a large increase in production of the enzyme
(c) pathogens that have penetrated the surface of the plants send signals to the pathogens still on the surface
(d) a plant signals to neighbouring plants that it is under attack

7. All of the following are examples of pre-penetration phenomena except,

(a) entry in to the plant by an insect vectored virus
(b) growth of a germ tube after fungal spore germination
(c) hatching of nematode eggs
(d) formation of the appresorium

8. Optimum temperature for development of the disease black root rot of tobacco is 17 to 23°C. Optimum temperature for the development of *Thielaviopsis basicola*, the fungus that causes the disease, is 22 to 28°C. Optimum temperature for tobacco growth is 28 to 29°C. Given these facts, which of the following is true?

(a) The pathogen and the host grow poorly at 17 to 23°C
(b) The temperature is so detrimental to the growth of the plant that even a weakened pathogen can escape the disease
(c) Both (a) and (b) are correct
(d) Neither (a) nor (b) is correct

9. Respiration of a plant is affected soon after it is attacked by a microbe. Which of the following statements is true?

   (a) Respiration increases shortly after infection, remains high during multiplication and sporulation of the pathogen, then declines to normal or below-normal levels
   (b) Respiration decreases when infection occurs, slowly increases during the infection process, then increases rapidly when the pathogen produces reproductive structures
   (c) Respiration increases more rapidly in resistant varieties
   (d) Both (a) and (c) are true

10. *Agrobacterium tumefaciens* forces plant cells to produce a compound that can be used as a food source, considering the organism possesses certain enzymes to breakdown the compound. What would be the compound?

   (a) Auxins
   (b) Agrocin 84
   (c) Opines
   (d) Cytokinins

(2x10=20 marks)

Part B – Structured essay question.
Answer all (two) sections. Use the provided spaces on the script.

1. a) Briefly describe the effect of Horizontal and Vertical resistance on disease progress. Illustrate your answer.

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b) When a pathogen is discovered, a sequence of steps is followed to confirm that the pathogen is the causal organism of the disease. Name the sequence and list the steps.

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(10x2=20 marks)

Part C – Essay Questions.
Answer any <u>two (02)</u> of your choice. Use the booklet provided.

1. a) State the concept of a disease cycle and explain the primary events that would occur during a disease cycle.

(10 marks)

b) Providing examples, write an account on the enzymatic degradation of cell wall substances of the host plant by pathogens.

(20 marks)

2. a) What is meant by 'Apparent Resistance'? Briefly explain this phenomenon using two (02) examples.

(10 marks)

b) Describe in detail how the general and specialized mechanisms of variability in pathogens have aided them in disease development in host plants.

(20 marks)

3. a) *Agrobacterium tumefaciens* is a bacterium that infects a wide range of broad leaf plants. Write a concise note about the infection process of the bacterium of interest in development of crown gall disease.

(10 marks)

b) "Molecular diagnosis of plant diseases is rather promising than any conventional approach". What is your standpoint of this statement?

(20 marks)

(30x2=60 marks)

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