Answer only **FOUR** questions
Use the given answer book to answer questions.
Only non-programmable calculators are permitted.
All questions carry equal marks.

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1. (a) Critically explain the statement of "The Precision Agriculture is helping to ensure profitability, Sustainability and protection of the environment".

    (30 marks)

    (b) Describe the application of followings technologies in Precision Agriculture with suitable examples.

    (i). Global Positioning System (GPS)

    (ii). Remote Sensing (RS)

    (iii). Global Information System (GIS)

    (45 marks)

    (c) You are asked to apply Precision Agricultural concepts to develop paddy fields in the Farm of the Faculty of Agriculture, Mapalana. What are the main steps to be followed to achieve this target?

    (25 marks)

2. (a) A recent outbreak of Fall Armyworm (*Spodoptera frugiperda*) caused a substantial yield loss in corn in Sri Lanka. What are the main components required to prepare the map of the pesticide application to control this outbreak?

    (25 marks)

    (b) The larvae of the fall armyworm cause damage by feeding on all plant parts. Briefly explain the working principle of the sensors which can be used to measure the damage.

    (25 marks)

    (c) Wood ash is recommended to reduce the pest population. A three-row chemical applicator at 1 m row spacing recorded the following information for the previous second on a wood ash distribution monitoring system.

    - Wood ash flow sensor recorded: 150 g of wood ash/sec
    - Speed sensor recorded: 4 km/h speed of chemical applicator.

    Calculate the wood ash application rate for the previous second in ton/ha.

    (State your all assumption)

    (50 marks)

3. (a) (i) List out different sensor technologies which can be used in precision agriculture.

(20 marks)

    (ii) Differentiate the followings

        a. Biosensors and transducers.

        b. Active sensors and passive sensors

(40 marks)

  (b) (i) Differentiate the map-based and sensor based variable rate application techniques.

(20 marks)

    (ii) Compare the different controller types used in variable rate technology

(20 marks)

4. (a) (i) Discuss the representing Data with Raster and Vector Models in precision agriculture.

(30 marks)

    (ii) What are the different ways of data manipulation in GIS?

(20 marks)

  (b) (i) What are the requirements for remotely sensed image-base precision farming?

(30 marks)

    (ii) Briefly discuss the followings.

        a. Ratio vegetation index (RVI)

        b. Normalized Difference vegetative index (NDVI)

(20 marks)

5. (a) (i) What are the main segments and their components in GPS?

(30 marks)

    (ii) What are the factors affected on accuracy of the GPS?

(20 marks)

  (b) (i) What are the main sub systems and their components in yield monitoring system?

(30 marks) ·

    (ii) What are the techniques that are used to measure the followings in yield mapping system?

        a. Crop flow measurement

        b. Moisture measurement

(20 marks)

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