

UNIVERSITY OF RUHUNA

BACHELOR OF SCIENCE (GENERAL) DEGREE EXAMINATION December 2020

LEVEL I SEMESTER I

COURSE UNIT : BOT 1121 (Scientific Approach and Biometrics)

Time: One hour.

Index No.:.....

Answer two questions including question No 01

1.) i) What do you mean by 'Science'? **(10 marks)**

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ii) State the essential feature of a scientific observation. **(10 marks)**

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iii) Define the following terms; **(10 marks)**

a.) Parameter

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b.) Statistics

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iv.) a.) Briefly explain the term "central tendency". **(10 marks)**

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b.) State 3 different measures of "central tendency". **(6 marks)**

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c.) Which measure of "central tendency" is most affected if one extremely large score is added to a distribution? **(3 marks)**

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v.) a.) Give the meaning of each of the following letters in the given equation. **(12 marks)**

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

χ^2 =

O =

E =

b.) Briefly explain the use of the above equation in biometrics. **(15 marks)**

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vi) Fill in the blanks with the most appropriate word/equation

(14 marks)

a) A correlation measures the between two variables, X and Y.
The relationship is described by the following three characteristics:

- 1.)....., 2.).....,
- 3.).....

b) Hypothesis testing is an inferential procedure that uses the data from a to draw a general conclusion about a

c) Statistical methods can be classified into two broad categories:, which organize and summarize data, and inferential statistics, which use sample data to draw inferences about populations.

vii) Briefly state any four properties of a binomial distribution.

(8 marks)

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b) Give an example for an event which behave according to binomial probability distribution.

(2 marks)

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2) A) Has the Science an unlimited capacity to solve problems? Substantiate your answer with examples. **(30 marks)**

B) An experiment was set up to discover the effect of three different types of fertilizers (A, B, C) on the height of rice plants. Four experimental setups (A,B,C&D) were used in which setup (A) was sprayed with fertilizer A, setup (B) was sprayed with fertilizer (B), setup (C) was sprayed with fertilizer (C) and setup (D) was used as the control and sprayed with de-ionized water.

i) Briefly describe the experimental procedure that you would follow to test whether the application of three different types of fertilizer has a significant effect on the height of the rice plants? **(20 marks)**

ii.) What would be the null hypothesis to be tested? **(10 marks)**

iii.) List the steps of the statistical procedure that you would follow in order to test the stated null hypothesis? **(40 marks)**

(100 Marks)

3.) A) i) Briefly describe the 3 basic measures of variability. **(15 marks)**

ii) Compare and contrast between a normal distribution and a standard normal distribution using the illustration of a diagram. **(40 marks)**

B) i.) What information is provided by the sign (+/-) of a z-score and by the numerical value of the z-score? **(10 marks)**

ii) A normal-shaped distribution with $\mu = 40$ and $\sigma = 8$ is transformed into z-scores.

Describe the shape, the mean, and the standard deviation for the resulting distribution of z-scores. **(15 marks)**

iii.) A distribution of biometrics exam scores has $\mu = 70$ and $\sigma = 4$. A distribution of ecology exam scores has $\mu = 60$ and $\sigma = 20$. For which exam would a score of 78 ($X = 78$) have a higher standing (ranking)? Explain your answer. **(10 marks)**

iv.) What information is provided by the following; **(10 marks)**

a.) the sign (+ or -) of the Pearson correlation?

b.) the numerical value of the Pearson correlation?

(100 MARKS)

UNIVERSITY OF RUHUNA

BACHELOR OF SCIENCE (GENERAL DEGREE) LEVEL I (SEMESTER I)
EXAMINATION – December 2020

SUBJECT: BOTANY
COURSE UNIT: BOT1131 (Plant Anatomy)

Time: One (01) hour

Answer two (02) questions including question No 1

Index No: .

Question No.	Marks
Q1	
Q2	
Q3	
Total	

Use the space given in the question paper for Q1

1. A. State main functions of subterranean part of a typical plant. (10 marks)

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B. Mention three functions of laticifers. (6 marks)

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C. "Plant tissues can be divided into two major types". What are they? (4 marks)

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D. One type of tissue mentioned above is made up of cells or group of cells that have the ability to divide. State main features of that tissue. (10 marks)

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E. The tissue mentioned in Q-D above is categorized based on the position and time of its development.
Name tissues based on the position. (7.5 marks)

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F. Name tissues based on the time of its development. (5 marks)

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G. Briefly explain the main steps in the formation of cells and tissues from a meristem of a plant? (10 marks)

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H. List major differences between monocot and dicot stems. (10 marks)

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I. What are the major cell types found in the ground tissue of a typical plant? (7.5 marks)

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J. Write the main representative cell type and its role in the ground tissue among the above cell types that you mentioned in Q- I. (10 marks)

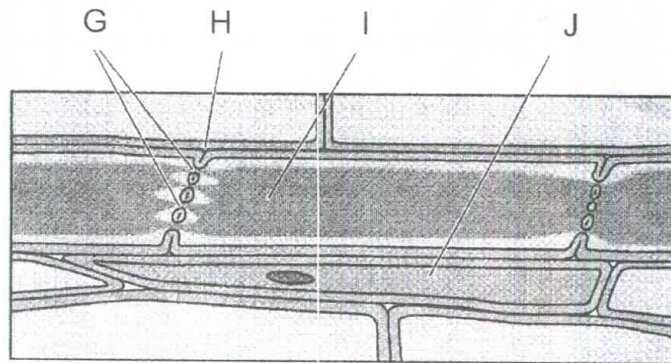
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i. Identify and label the figure given below stating the anatomical features used for the identification. (10 marks)

ii. Mention the main function of **I** and **J**. (10 marks)

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(100 marks)

2. i. Based on the arrangement of neighboring epidermal cells, stomata are categorized into four major types. Explain those four types using suitable diagrams. (40 marks)

ii. "Different cell types in the epidermis are adapted to face the external environment successfully". Name the cell types except guard cells and briefly explain their anatomical adaptations for external environment. (60 marks)

(100 marks)

3. i. List out major areas in which the knowledge in anatomy of higher plants can be applied for practical purposes. (20 marks)

ii. Assume that the floor of your house is cracked due to the penetration by roots of one tree out of the two trees in your home garden. If the two trees are *Mangifera indica* and *Mangifera zeylanica*, give the non-destructive, but scientific, way you would follow to identify the tree responsible for cracks of the floor. (80 marks)

(100 marks)