



FIJI NATIONAL UNIVERSITY

College of Agriculture, Fisheries & Forestry

School of Agricultural sciences

Department of Genetics and plant Breeding

Bachelor of Agriculture- Year II

Trimester III- Final Examination – 2016

GPB 601-PRINCIPLES OF GENETICS

Time Allowed: 3.00 hours plus (10 minutes reading time) Total Marks: 100

INSTRUCTIONS:

1. This paper consists of five pages including one page for Answer Sheet for objective type questions
2. Please check to see that all your paper is complete.
3. Answer all the Objective Type Questions on the Answer Sheet and Descriptive Type Question in the Answer Booklet only.
4. No written or printed material and mobile phones are allowed in the examination hall
5. Marks allocated for each question appears at the side of each question so allocate your time accordingly.
6. This paper is divided into Two Parts. First Part contains Objective Type Questions which is having THREE Sections – A, B, C and D. All questions of this part are compulsory. Second part is Descriptive Type which is having FIVE sections D, E & F.

7.

I. OBJECTIVE TYPE QUESTIONS (30 Marks)

To be answered only on the Answer Sheet Provided.

Section A	:	Choose the best answer.	(5Marks)
Section B	:	Fill in the blanks.	(5 Marks)
Section C	:	State True or False	(5 Marks)
Section D	:	Match the following	(5 Marks)

II. DESCRIPTIVE TYPE QUESTIONS (80 marks)

There are **Seven (7) & Eight (8), Seven (7) , Four (4) and One (1)** descriptive type questions provided on Section D, E , F ,G,H and I please **attempt any Five (5), Five (5) , Four (4), Two (2) and One (1) question respectively** and write on the **Answer Booklet**. Answer every question from a new page to facilitate evaluation.

Section E	:	Definitions	(10 Marks)
Section F	:	Short Answer	(15 Marks)
Section G	:	Descriptive Question	(20 Marks)
Section H	:	Essay Question	(20 Marks)
Section I	:	Work out the Problem	(15 Marks)

I. Objective type questions

Note: Answer only on the Answer Sheet and return 30 minutes after the start of Examination.

Time: 30 Minutes**Total Marks: 20****A. Choose the best answer****(5x 1= 5 Marks)**

A1. ----- formulated the multiple factor hypothesis

- a. Johannsen
- b. Matthias Schleiden and Theodor Schwann
- c. Anton van Leeuwenhoek
- d. Nilsson-Ehle and East

A2. Which of the following is the most likely outcome of a cross between a homozygous tall plant with a homozygous short plant?

- a. 63 tall : 59 short
- b. 76 tall : 23 short
- c. 24 tall : 49 medium : 25 short
- d. 53 tall : 147 short

A3. Which of the following is a testcross?

- a. AABB x AABB
- b. AaBb X AaBb
- c. AaBb x AABB
- d. AaBb X aabb

A4. Which of the following is the longest stage of cell cycle?

- a. G1 phase
- b. S phase
- c. Metaphase
- d. Anaphase

A5. In RNA, which of the following is true

- a. The [G] = [C]
- b. The [A] = [T]
- c. The [G+C] = [A+T]
- d. None of the above are true

B. Fill in the blanks**(5x 1= 5 Marks)**

- B1. In replication, _____ enzyme is necessary for addition of polynucleotides in 3' OH position.
- B2. _____ is the cell division process by which gametes with the same number of chromosomes are produced.

B3. In the genetic code, the length of a codon is _____

B4. The ratio of duplicate gene action is _____

B5. Law of inheritance concept discovered by _____

C. State True or False

(5x 1= 5 Marks)

C1. Double mono somic is represented as $2n-1-1$

C2. The genetic code is the language of genes that translates the information in DNA into the amino acids in a protein.

C3. DNA is found only within the cell nucleus

C4. CIB method is used for the detection of sex linked mutations

C5. Three or more forms of a gene that code for a single trait are called multiple alleles

D. Match the following.

(5x 1= 5 Marks)

D1. An alternative form of gene	-	Heterozygous
D2. Two non- identical alleles for a gene	-	Yield
D3. The actual genetic makeup	-	Shell coiling in snail
D4. The cytoplasmic inheritance	-	Genotype
D5. Polygenic inheritance	-	Allele

II. Descriptive type questions

Time: 2hr: 30 Minutes

Total Marks: 80

E. Definitions - Attempt Any Five Questions

Each question carries two marks

(5 x 2 = 10 Marks)

- E1. Lethal Mutation
- E2. Crossing over
- E3. Law of Independent Assortment
- E4. Nullisomic
- E5. DNA and RNA
- E6. Quantitative inheritance
- E7. Transcription

F. Short Answer - Attempt Any FIVE Questions (1 Page each).

Each question carries Three marks

(5 x 3 = 15 Marks)

- F1. Stages of mitotic cell divisions
- F2. Chromosomal aberrations
- F3. Features of cytoplasmic inheritance
- F4. DNA polymerase
- F5. Differences between DNA and RNA
- F6. Supplementary gene action
- F7. List out the types of physical mutagens with suitable examples
- F8. Fixatives and their importance in cytogenetic studies.

G. Describe the following - Attempt Any Four Questions.*Each question carries Five marks**(4 x 5 = 20 Marks)*

- G1. Briefly describe the primary structure of DNA.
G2. Describe the types of point mutation.
G3. Describe the factors affecting the recombination frequency.
G4. Briefly describe the process of DNA replication
G5. In pea plants, a red flowered pea plant with yellow seeds (RRYY) is crossed with a white plant with green seeds (ttyy). Give the genotype and Phenotype of F₁, gametes produced by F₁, the genotypes and phenotypes of F₂. (Draw Punnet diagram).
G6. Describe the numerical aberrations of chromosome.
G7. Briefly describe linkage and the types of linkage

H. Write an essay (ANY TWO) for the following*Each Question carries Ten marks**(2x10= 20 Marks)*

- H1. Describe each cell organelle and its function.
H2. Differences between mitosis and meiosis
H3. Write an essay about structural aberrations of chromosome
H4. Write an essay on transcription.

I. Work out the problem*Each carries Fifteen marks**(1x15=15 Marks)*

- I1. In a cross between pure breeding, round yellow seeded plant with wrinkled, green seeded plant, he observed that all the F₁s were round yellow seeded and on selfing the F₂ progenies segregated as 304 round yellow, 102 round green, 95 wrinkled yellow and 35 wrinkled green. Depict the cross diagrammatically and give proof for your inference?

The End

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Student I D No.....

Date:

Date:

Marks obtained:

Name:

Student I D No.:

B. Sc. (Agriculture) Trimester-III, Final Examination-2016

Unit Code/Title: GPB 601 –Principles of Genetics

Objective Type Questions - Answer Sheet

Time: 45 Minutes

Total Marks: 20

A.	A1.		
	A2.		
	A3.		
	A4.		
	A5.		
B.	B1		
	B2		
	B3		
	B4		
	B5		
C.	C1		
	C2		
	C3		
	C4		
	C5		
D	D1		
	D2		
	D3		
	D4		
	D5		