



**FIJI NATIONAL UNIVERSITY**  
**College of Agriculture, Fisheries & Forestry**  
**Department of Crop production**  
**Bachelor of Agriculture - Year II**  
**Trimester III- Final Examination - 2017**

**GPB 601: Principles of Genetics**

**Time Allowed: 3.00 hours**

**Total Marks: 100**

**INSTRUCTIONS:**

1. This paper consists of six pages including two pages Answer Sheet.
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. The Answer sheet of the objective Type Questions should be tied with the main sheet.
5. No written or printed material and mobile phones are allowed in the examination hall
6. Marks allocated for each question appears at the side of each question so allocate your time accordingly.
7. This paper is divided into Two Parts. First Part contains Objective Type Questions which is having three Sections – A, B & C. All questions of this part are compulsory. Second part is Descriptive Type which is having three sections D, E & F.

**I. OBJECTIVE TYPE QUESTIONS (40 Marks)**

To be answered only on the Answer Sheet Provided.

- |                  |                           |            |
|------------------|---------------------------|------------|
| <b>Section A</b> | : Choose the best answer. | (15 Marks) |
| <b>Section B</b> | : Fill in the blanks.     | (15 Marks) |
| <b>Section C</b> | : Match the following.    | (10 Marks) |

**II. DESCRIPTIVE TYPE QUESTIONS (60 marks)**

There are Six (6), Five (5) & Three (3), descriptive type questions provided on Section D, E & F, then attempt any Five (5), Four (4) and Two (2) questions respectively. In Section G, two (2) questions are to be attended compulsorily. Write all "II" question-answers on the Answer Booklet.

- |                  |                         |            |
|------------------|-------------------------|------------|
| <b>Section D</b> | : Define the following. | (08 Marks) |
| <b>Section E</b> | : Short Description.    | (20 Marks) |
| <b>Section F</b> | : Essay question.       | (20 Marks) |
| <b>Section G</b> | : Compulsory question.  | (12 Marks) |

**I. OBJECTIVE TYPE QUESTIONS****Note: To be answered only on the ANSWER SHEET provided with QUESTION PAPER.****A. Fill in the blanks.****(15 x 1 = 15 Marks)**

1. \_\_\_\_\_ is the similarity between progenitors and progeny.
2. A genotype is an individual's collection of \_\_\_\_\_.
3. The \_\_\_\_\_ in humans is a good example of multiple alleles.
4. Milk production in cattle is controlled by the \_\_\_\_\_ gene.
5. \_\_\_\_\_ is the control center for the cell.
6. \_\_\_\_\_ are found in the cytoplasm of animal cells not in plant cells.
7. \_\_\_\_\_ are the most numerous organelles in the cell.
8. Chromosomes appear as threadlike coils called \_\_\_\_\_.
9. Meiosis in females is called \_\_\_\_\_.
10. Each chromosome is bounded by a membrane called \_\_\_\_\_.
11. A \_\_\_\_\_ is simply a picture of a person's chromosomes
12. \_\_\_\_\_ genes are called Altered genes.
13. A \_\_\_\_\_ mutation is one that does not lead to a change in the amino acid sequence of a protein.
14. Crossing over occurs during \_\_\_\_\_.
15. Alteration in the structure of individual chromosome is called \_\_\_\_\_.

**B. Multiple choice questions****(15 x 1 = 15 Marks)**

16. \_\_\_\_\_ is the difference between generations and individuals of the same species.
  - a. Heredity
  - b. Inheritance
  - c. Verification
  - d. Variation
17. \_\_\_\_\_ traits do not exhibit complete dominance.
  - a. Polygenic
  - b. Non-Polygenic
  - c. Pleotropic
  - d. Non- Pleotropic
18. \_\_\_\_\_ inheritance refers to inheritance patterns involving genetic material outside the nucleus
  - a. Nuclear
  - b. Chromosomal
  - c. Extranuclear
  - d. Parental
19. \_\_\_\_\_ & \_\_\_\_\_ proposed cell theory
  - a. Schwann & Schleiden
  - b. Watson & Crick
  - c. Paul Berg & Schwann
  - d. Both b & c
20. \_\_\_\_\_ made of 80% water and 20% salts & protein
  - a. Chloroplast
  - b. Protoplasm
  - c. Chromosome
  - d. Cytoplasm
21. \_\_\_\_\_ are responsible for making proteins and RNA.
  - a. Ribosomes
  - b. Mitochondria
  - c. Chloroplast
  - d. Cell wall
22. Nuclear envelope disappears in \_\_\_\_\_ stage
  - a. Prophase
  - b. Metaphase
  - c. Anaphase
  - d. Telophase
23. \_\_\_\_\_ is the last phase in which two daughter cells are formed
  - a. Prophase
  - b. Metaphase
  - c. Anaphase
  - d. Telophase

24. \_\_\_\_\_ is a process of asexual reproduction in plants  
 a. Binary fission                      b. Mitosis  
 c. Meiosis                                d. Both a & b
25. \_\_\_\_\_ code for proteins.  
 a. Auxin                                    b. Cytokinin  
 c. Gibberellin                            d. Ethylene
26. In Chromosomes- the primary constriction is \_\_\_\_\_ and secondary constriction is \_\_\_\_\_  
 a. Centromere; Satellite                b. Centromere; Kinetochore  
 c. Kinetochore; Satellite                d. Centromere; Telomere
27. Genes located between \_\_\_\_\_ & \_\_\_\_\_  
 a. Centromere & Satellite                b. Centromere & Kinetochore  
 c. Kinetochore & Satellite                d. Centromere & Telomere
28. \_\_\_\_\_ coined the term mutation "Mutation"  
 a. Paul Berg                                b. Hugo de Vries  
 c. Gregor Mendel                            d. None of the above
29. \_\_\_\_\_ caused due to natural mutagen sunlight  
 a. Ploidy                                      b. Xeroderma pigmentosum  
 c. Polydactyl                                d. Mental Disorder
30. \_\_\_\_\_ are the organisms which have one or both sexes.  
 a. Heterozygous                            b. Hermaphrodites  
 c. Diploid                                      d. Dioecious

C. Match the following:

(10 x 1 = 10 Marks)

PART - A

PART-B

- |                     |                                     |
|---------------------|-------------------------------------|
| 31. Heterozygous    | A. Theory of crossing over          |
| 32. Co-dominance    | B. Promotes errors in DNA           |
| 33. Proteins        | C. Coined term chromosome           |
| 34. Golgi apparatus | D. Individual with two alleles      |
| 35. Interphase      | E. Growth and repair of the body    |
| 36. Mitosis         | F. Flattened sacs with convex shape |
| 37. Waldeyer        | G. Movement of chromosomes          |
| 38. Kinetochore     | H. Cell Replicates its DNA          |
| 39. Mutagens        | I. Both alleles are expressed       |
| 40. T. H. Morgan    | J. Transporters and receptors       |

II. DESCRIPTIVE TYPE QUESTIONS

Note: To be answered only in the ANSWER BOOKLET.

D. Attempt Any **FOUR** Questions

(4 x 2 = 8 Marks)

Compare the terms in each question:

41. Alleles (Heterozygous and Homozygous)
42. Epigenetic and Extranuclear inheritance
43. Amphipathic molecule
44. Euchromatin and heterochromatin
45. Parthenogenesis and Hermaphrodites

**E. Attempt Any FOUR Questions (1 Page each).****(4 x 5 = 20 Marks)****Apply the knowledge and generate answers for the following:**

46. The process of Chromosomal Crossing Over.
47. Mendel's Law of inheritance.
48. The Cell theory.
49. Mitosis- a complicated division and Binary fission-a simple division.
50. The four types of Chromosomes depending on the position of Centromere with suitable diagram

**F. Essay - Attempt Any TWO Questions (2 Pages each).****(2 x 10 = 20 Marks)****Demonstrate and generate information on the following**

51. Prophase I of reduction division with suitable diagram.
52. the morphology of chromosomes
53. Any 6 (Six) cell organelles and its function with suitable diagram.

**G. Compulsory questions****(12 Marks)****Apply the knowledge and evaluate ratios by the Punnett Square**

54. In Mendel's "Experiment 1," true-breeding pea plants with spherical seeds were crossed with true-breeding plants with dented seeds. (Spherical seeds are the dominant characteristic.) Mendel collected the seeds from this cross, grew F1-generation plants, let them self-pollinate to form a second generation, and analyzed the seeds of the resulting F2 generation. Draw Punnett square and represent the F1 and F2 genotypes and the ratio for F2 generation. **(1x 4 = 4 Marks)**
55. In tomatoes, yellow fruit and dwarfed vine are due to recessive alleles of genes which produce the more common red fruit and tall vine. If pollen from the pure-line dwarf plant bearing red fruit is placed on the pistil of a pure-line tall plant bearing yellow fruit, what type of plant and fruit would be expected in the F1? If 16<sup>th</sup> Individual of F1 Phenotype is crossed with tall plant bearing red fruit, what results would be expected on F2? **(1x 8 = 8 Marks)**

**The End****XXXXXXXXXXXXXX**

**BSc. Agriculture/Education Trimester-III, Final Examination-2017**  
**Unit Code & Name: GPB 601 – Principles of Genetics**

**I. Objective Type Questions - Answer Sheet**

**Total Marks: 40**

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|-----------|-----|--|--|
| <b>A.</b> | 1.  |  |  |
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|           | 14. |  |  |
|           | 15. |  |  |

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| <b>B.</b> | 16. |  |  |
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|           | 18. |  |  |
|           | 19. |  |  |
|           | 20. |  |  |
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|-----------|-----|--|--|
| <b>C.</b> | 31. |  |  |
|           | 32. |  |  |
|           | 33. |  |  |
|           | 34. |  |  |
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|           | 40. |  |  |

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