Catholic University Institute of Buea (CUIB)

2018/2019 ACADEMIC YEAR

Second Semester Examinations 2019

EoC

School	Agriculture and Natural Resources (SANR)				
Course Code	AGR 118	Course Title	Principles of Genetics and Molecular Biology		
Status	C	Credit Value	6	Time	11:30-2:30
Date	12/07/2019	Venue	LH1	Duration	3 hours
Course Master(s)		Dr. Tonfack Djikeng Fabrice			

REPUBLIC OF CAMEROON
Department of Academic Affairs
UNIVERSITY OF BUEA

ANSWER ALL QUESTIONS

Part I: Principles of Genetics (25 marks)

Question 1 (10 marks)

a) Define the following terms: (5 marks)

i. Gene
ii. Punnett square
iii. Dominance
iv. Genotype
v. Crossing over

b) State the Hardy Weinberg principle. (3 marks)

c) Give 04 causes of gene mutation (2 marks)

Question 2 (15 marks)

a) In a garden of 1000 peas plants, 860 might have red peas and 160 blue peas. We do not know how many are homozygous dominant (KK) or heterozygous (Kk), but we know that 160 of them are homozygous recessive (kk).
Calculate the frequency of homozygous dominant and heterozygous plants. (5 marks)

b) In summer squash, white fruit is dominant over yellow fruit while disc is dominant over sphere shape. A plant which homozygous for white fruit and sphere shape is cross-pollinated with one which is homozygous for yellow fruit color and disc shape.
i. What will be the genotype and phenotype of the F1? (2.5 marks)
ii. What is the phenotypic ratio of the F2 generation? (5 marks)
iii. What is the expected phenotypic ratio of the F2 generation if many of these breeding took place? (2.5 marks)

$p^2 + 2pq + q^2 = 1$

$p + q = 1$ $\quad (p+q)^2 = p^2 + 2pq + q^2 = 1$

Part 2: Principles of Molecular Biology (25 marks)

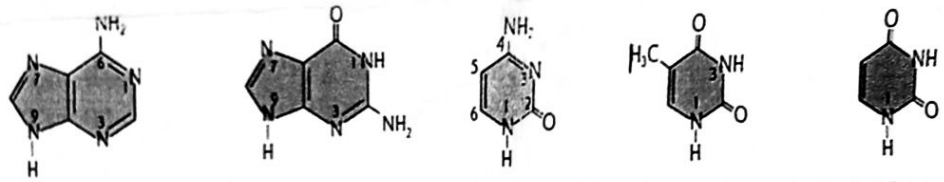
Question 1 (10 marks)

a) Define the following terms: (5 marks)
   i. DNA replication
   ii. Deoxyribonucleic acid
   iii. Primer
   iv. Replication fork
   v. Gene translation

b) Differentiate between the following: (5 marks)
   i. DNA and RNA
   ii. Leading and lagging strand
   iii. Nucleotide and nucleoside
   iv. Exon and intron
   v. Activator and repressor

Question 2 (15 marks)

a) Name the following Nitrogenous bases and classify them as *purine and pyrimidine.* (5 marks)



A B C D E

b) What is the significance of 5' and 3' in the structure of DNA or RNA? (4 marks)
c) Give the role of the following enzymes in DNA replication: (4 marks)
   i. Ligase
   ii. Helicase
   iii. DNA polymerase
   iv. Primase
d) Name two unusual DNA secondary structures. (2 marks)

Good luck