

**UNIVERSITY OF RUHUNA**  
**BACHELOR OF SCIENCE (GENERAL DEGREE) LEVEL I (SEMESTER II)**  
**EXAMINATION – February 2018**

SUBJECT: BOTANY  
COURSE UNIT: BOT1212 (GENETICS)

Time: 1.5 hour

Answer three (03) questions including question No 1

Question No.	Marks
Q1	
Q2	
Q3	
Total	

1. i. What do you mean by the following terms?

a. Hybrid.....  
.....  
.....  
.....

b. Purebred.....  
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.....  
.....

c. Homozygous genotype.....  
.....  
.....  
.....

d. Allele.....  
.....  
.....  
.....

e. Locus.....  
.....  
.....  
.....

f. Dominant allele.....  
 .....  
 .....

g. Homologues.....  
 .....  
 .....

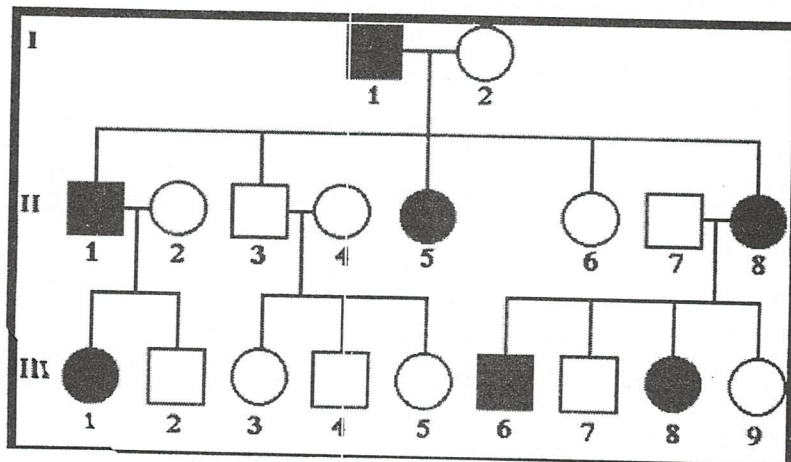
h. Punnett squares .....  
 .....  
 .....

ii. Describe the replica plating method for indirect mutant selection  
 (30 minutes)

2. a. Describe the Ames *Salmonella* test stating the importance of the test.

b. What are the advantages of using pedigree analysis compares to Mendel's experimental approach to study inheritance pattern in humans?

c. Following pedigree chart shows the inheritance of a genetic disorder.



i. Determine the inheritance pattern of the disorder.  
 Is this disorder inherited as a recessive or a dominant trait?

ii. Give genotypes for all individuals in the pedigree.

(30 minutes)

3. Write short notes on,

- i) Maternal inheritance
- ii) The original transformation experiment
- iii) Penicillin enrichment for mutant selection
- iv) Epistasis

(30 minutes)

4. a. Explain polygenic inheritance by giving examples.

b. The Punnett square given below shows the F<sub>2</sub> generation of a dihybrid cross. Comment on the below experimental results.

P<sub>1</sub> First white variety  $AAbb$  × Second white variety  $aaBB$

F<sub>1</sub> Purple  $AaBb$  × Self

F <sub>2</sub>	AB	Ab	aB	ab
AB	$AABB$	$AABb$	$AaBB$	$AaBb$
Ab	$AABb$	$AAbb$	$AaBb$	$Aabb$
aB	$AaBB$	$AaBb$	$aaBB$	$aaBb$
ab	$AaBb$	$Aabb$	$aaBb$	$aabb$

F<sub>2</sub> Summary Purple : White  
9 : 7

c. What do you mean by pleiotrophism in genetic studies?

d. Give a brief introduction on mutations of chromosomal structure.

(30 minutes)