FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
DEPARTMENT OF PLANT BIOLOGY
FIRST SEMESTER BTECH EXAMINATION, 2017/2018 SESSION

COURSE CODE: BIO 211
COURSE TITLE: GENETICS
COURSE UNIT: 3
TIME ALLOWED: 2 HOURS

INSTRUCTION: ***ANSWER ANY FOUR (4) QUESTIONS IN ALL; ONE (1) QUESTION FROM EACH SECTION.***

SECTION A (COMPULSORY)

1. a. On the basis of position of centromere, outline the types of chromosome
   b. Briefly explain the following term: i. Monoploidy ii. Aneuploidy iii polyploidy
   c. List the sub-stages of prophase

SECTION B

2.

In Smileys, eye shape can be circular, starred or a circle with a star as seen in the above diagram.

a. What case of dominance is this with regards to deviations from Mendelian principles?
b. Write the genotypes for the pictured phenotypes
c. Using Punnet square show the genotypes and the phenotypes between
   i. the star eyed and a circled eye ii. two circle- star eyes
   iii a circle-star eyes and a circled eye iv a circle-star eyes and a star eye

3 a. A cross between two varieties of beans AB x ab gave rise to the following offspring.

Genotypes	Number of offspring
AB	16
Ab	112
Ab	108
Ab	14

i. How many offspring have the parental genotypes?
ii. How many offspring have the recombinant genotypes?
iii. Is this case of a linked gene or an unlinked gene?
iv. Calculate a. The cross over value (C.O.V)
   b. The percentage Chiasmata

3 b. Answer true or false for the following statements
   i. Individuals with blood group O are universal recipients
   ii. A father can pass a sex linked allele to his son
   iii. Far more males have sex linked disorders than females
   iv. Linked genes have fewer recombinant offspring than parental offspring
   v. Unlinked genes have more parental offspring than recombinant offspring
   vi. Andalusian chickens exhibit in-complete dominance.

SECTION C

4 a. Explain the following:
i. Alleles ii. Heterozygotes iii. Hybrid iv. Dominant traits v. chromosomes
b. Using a punnet square, demonstrate concurrent inheritance pattern of named pair of trait (dihybrid) in a garden pea plant as observed by Mendel

5 a. With the aid of an annotated diagrams, describe the different stages of mitosis in a cell.
b. Outline the significance of meiosis in reproduction.

SECTION D

6 a. Use an annotated diagram to explain the following types of aneuploidy in a diploid cell (2n = 8)
i. Trisomy number ii. Nullisomy number iii. Monosomy number
b. Write out the formula for each of the cases in 6ai, ii and iii above

7 a. In a tabular form differentiate between intra and inter allelic genetic interaction
b. Explain the following:
i. Dominance ii. Epistasis iii. Penetrance iv. Inhibitory factor v. Pleiotropy