Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF APPLIED SCIENCE

B.Sc., Summer 2017-18 Examination

Semester: 2, 4 **Date: 16-05-2018**
Subject Code: 11102151 **Time: 02:00PM to 04:30PM**
Subject Name: Molecular Genetics **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Brief note (4x2) (Each of 04 marks) **(08)**

(a) Describe "Mendel's law of Independent Assortment" with example.

(b) Plumage colour in mallard ducks is dependent upon a set of three alleles: MR for restricted mallard pattern, M for mallard, and m dusky mallard. The dominance hierarchy is M^R >M> m. Determine the phenotypic ratios expected in the F1 from the following crosses : (a) $M^RM^R \times M^RM$, (b) $M^Rm \times M^Rm$

Q.1. B) Answer the following questions (Any two)

(a) Short answer question (Each of 02 marks) **(04)**

1. A hypothetical series of 8 multiple alleles is known for a certain locus. How many genotypic classes are possible?
2. How many different kinds of gametes could be produced by an individual with the genotype BBFF.

(b) Write a short note on "Genetic maternal effect". **(04)**

(c) Differentiate "Incomplete dominance" and "Co-dominance". **(04)**

Q.2. A) Answer the following questions.

(a) Fill in the blanks. (Each of 02 marks) **(04)**

1. Linkage groups in the (a) human male _____(b) human female_____
2. When a carrier female for red-green colour-blindness is crossed with a diseased male, _____ percent of the male offspring are colour-blind.

(b) Describe the different ways of crossing over with the help of diagram. **(04)**

Q.2. B) Answer the following questions (Any two)

(a) Short note/ Multiple choice questions. (Each of 01 marks) **(03)**

1. Mitotic cell division results in two cells that have:

A. n chromosomes and are genetically identical
B. n chromosomes and are genetically different
C. 2n chromosomes and are genetically identical
D. 2n chromosomes and are genetically different

2. Long radishes crossed with round radishes result in all oval radishes. This type of inheritance is:

A. Multiple alleles
B. Complete dominance
C. Co-dominance
D. Incomplete dominance.

3. A pedigree chart shows:

A. The genotypic ratios of the offspring
B. The types of gametes produced by the parents
C. Which genes are co-dominant
D. The pattern of inheritance of a specific gene

(b) A woman of blood group A marries a man of blood group O. There are three children in the family. The children's blood types are O, A and AB. Which child was definitely adopted? Explain. **(03)**

(c)Write a short note on "Pleiotropy". **(03)**

Q.3. A) Describe structural changes in chromosomes with the help of diagram. **(08)**

Q.3. B) Answer the following questions (Any two)

(a) Brief note (Each of 02 marks) **(04)**

1. Gene Pool
2. C value

(b) Define "Linkage" and its types? **(04)**

(c) Describe "Aneuploidy" with proper examples. **(04)**

Q.4. A) Answer the following questions.

(a) Brief note (2x2) (Each of 02 marks) **(04)**

1. Enlist the causing agents of evolution.
2. Give one example of each: X-linked trait and Y-linked trait

(b) Discuss the three different modes of "Natural Selection" **(04)**

Q.4. B) Answer the following questions (Any two)

(a) Short note/ Multiple choice questions. (Each of 01 marks) **(03)**

1. Pleiotropism is the condition of

a. a single gene having multiple effects
b. interaction of multiple alleles
c. multiple gene inheritance
d. a single gene being influenced by several traits

2. In the F1 generation of a monohybrid cross, the phenotypic ratio would be:

a. 3:1
b. 1:2:1
c. 9:3:3:1
d. 2:1

3. Down syndrome is a _____.

a. Monosomy
b. Trisomy
c. Tetrasomy
d. Disomy

(b) Describe Hardy-Weinberg equilibrium in any population? **(03)**

(c) Describe the stages of "Mitosis" diagrammatically only. **(03)**