Enrollment ID: _____

NAVRACHANA UNIVERSITY
School of Liberal studies and Education
(M.Sc. Program)
End Semester Examination November 2017
SY-M.Sc 1st Semester

Course Title: Genetics (LS 105) **Marks: 40**
Date: 20/11/2017 **Time: 10:30 am to 12:30 pm**

Important Instructions

1. ***All the Questions are Compulsory***
2. ***Please read the questions carefully and answer accordingly***
3. ***Draw a neat and labeled diagram wherever necessary***

Q1. Choose the correct option **(1 × 10= 10 M)**

1. If an organism is diploid and a certain gene found in the organism has 18 known alleles (variants), then any given organism of that species can/must have which of the following?
A) At most, 2 alleles for that gene
B) Up to 18 chromosomes with that gene
C) Up to 18 genes for that trait
D) A haploid number of 9 chromosomes
E) Up to, but not more than, 18 different traits

2. Experiments with cohesions have found that
A) cohesions are protected from destruction throughout meiosis I and II.
B) cohesions are cleaved from chromosomes at the centromere before anaphase I.
C) cohesions are protected from cleavage at the centromere during meiosis I.
D) a protein cleaves cohesions before metaphase I.

3. A tetrad includes which of the following sets of DNA strands?
A) Two single-stranded chromosomes that have synapsed
B) Two sets of sister chromatids that have synapsed
C) Four sets of sister chromatids
D) Four sets of unique chromosomes

4. Pea plants were particularly well suited for use in Mendel's breeding experiments for all of the following reasons *except* that
A) peas show easily observed variations in a number of characters, such as pea shape and flower color.
B) it is possible to control matings between different pea plants.
C) it is possible to obtain large numbers of progeny from any given cross.
D) peas have an unusually long generation time.

5. When crossing an organism that is homozygous recessive for a single trait with a heterozygote, what is the chance of producing an offspring with the homozygous recessive phenotype?
A) 0%
B) 25%
C) 50%
D) 75%

6. An obstetrician knows that one of her patients is a pregnant woman whose fetus is at risk for a serious disorder that is detectable biochemically in fetal cells. The obstetrician would most reasonably offer which of the following procedures to her patient?
A) CVS
B) Ultrasound imaging
C) Amniocentesis
D) Fetoscopy

7. Males are more often affected by sex-linked traits than females because
A) males are hemizygous for the X chromosome.
B) male hormones such as testosterone often alter the effects of mutations on the X chromosome.
C) female hormones such as estrogen often compensate for the effects of mutations on the X.
D) X chromosomes in males generally have more mutations than X chromosomes in females.

8. SRY is best described in which of the following ways?
A) A gene region present on the Y chromosome that triggers male development
B) A gene present on the X chromosome that triggers female development
C) An autosomal gene that is required for the expression of genes on the Y chromosome
D) An autosomal gene that is required for the expression of genes on the X chromosome

9 A Barr body is normally found in the nucleus of which kind of human cell?
A) Unfertilized egg cells only
B) Sperm cells only
C) Somatic cells of a female only
D) Somatic cells of a male only

10. One possible result of chromosomal breakage is for a fragment to join a non homologous chromosome. What is this alteration called?
A) Deletion
B) Disjunction
C) Inversion
D) Translocation

Q2. State True or False and justify: **(1 × 3= 3M)**

1. The severity of genetic diseases decreases as they are passed through the generations.
2. Cytoplasmic inheritance follows Mendelian principles of inheritance
3. Nucleosomes are the core for protecting DNA from mutations

Q3. Define the following **(1× 6= 6M)**

1. Heterochromatin
2. Barr body
3. Q banding
4. Reciprocal translocations
5. Inversions