

Name :

Roll No. :

Invigilator's Signature :

CS/B.Sc (H)/GENET/BT/MOL.BIO/MICRO.BIO/SEM-2/PTG-202/2012

2012

PRINCIPLES OF TRANSMISSION GENETICS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :
 $10 \times 1 = 10$
- i) If we cross a pea plant that is homozygous dominant for tallness and that is heterozygous, what will be the genotypes of the offspring that are tall ? (D and d represent the alleles for height in pea plants)
 - a) All will DD
 - b) Dd in most cases
 - c) Dd only
 - d) DD or Dd.
 - ii) Which is the correct indication for Mendel's Law of Segregation ?
 - a) A cross between parents pure for a certain trait will produce hybrids
 - b) Chromosomes move apart during anaphase II of meiosis
 - c) For genes that are not on the same chromosome, alleles assort independently of one another into gametes
 - d) Alleles of gene are sorted into separate sex cells and then recombine with another alleles at fertilization.



- iii) How many linkage groups are present in *Drosophila* ?
a) 8
b) 4
c) 6
d) 2.
- iv) The ratio for dominant epistasis action is
a) 9 : 7
b) 9 : 3 : 4
c) 12 : 3 : 1
d) 15 : 3.
- v) A mother of blood group 'O' has a group 'O' child. The father could be
a) A or B or O
b) O only
c) A or B
d) AB only.
- vi) Genetic causes of Down syndrome is
a) Tetrasomy
b) Trisomy
c) Nullisomy
d) Monosomy.
- vii) Idiogram is the graphical representation of
a) chromosome structure
b) No. of chromosome
c) No. of gene
d) No. of DNA.
- viii) Humans normally have 46 chromosomes in body cells. How many autosomes would be expected in liver cells ?
a) 46
b) 23
c) 44
d) 22.
- ix) Klinefelter's syndrome is the example of
a) deletion
b) non-disjunction
c) trisomy
d) aneuploidy.
- x) Amphidiploidy is a type of
a) Aneuploidy
b) Trisomy
c) Polyploidy
d) Translocation.
- xi) 1 cM is
a) 1 centimorgan
b) 1 centromere
c) 1 centimetre
d) none of these.



GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

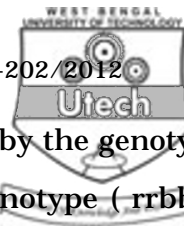
2. Write down the difference between Back cross and Test cross with example.
3. Determine the probability that a plant of genotype CcWw will be produced from the parental plants of the genotype CcWw and Ccww.
4. What is Expressivity and Pleiotropism ?
5. Describe the pattern of uniparental inheritance in chlamydomonas.
6. In what respect does multiple allele differ from pseudoallele ?

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. What is reciprocal crosses ? Briefly describe Incomplete and Codominance. What is Bombay Phenotype ? What is Erythroblastosis fetalis ? $3 + 3 + 3 + 3 + 3$
8. a) The dihybrid parent have dominant and recessive alleles at one gene locus and codominant alleles at second gene locus, the F_2 $9 : 3 : 3 : 1$ phenotype ratio becomes $3 : 6 : 3 : 1 : 2 : 1$. Explain with an example.
b) What is Penetrance ? Explain with example.
c) What is epistasis ? Give one example of Dominant epistasis. $5 + 5 + 5$



9. a) Red colour in wheat kernel is produced by the genotype $R_B_$, white by the double recessive genotype ($rrbb$). The genotype R_bb and $rrB_$ produce brown kernels. A homozygous red variety is crossed to a white variety. What phenotypic results are expected in the F_1 and F_2 ?
- b) Explain the mechanism of crossing over.
- c) Briefly describe Linkage. $6 + 4\frac{1}{2} + 4\frac{1}{2}$
10. What is euploidy? How are euploids classified? Discuss the meiotic segregation pattern of aneuploids in plants. What is nullisomy? $2 + 4 + 7 + 2$
11. a) For a population which has an allelic frequency of $p = 0.8$, calculate the Hardy-Weinberg equilibrium frequencies of genotypes for that population. 5
- b) Write short notes on any two of the following : 2×5
- i) Translocation
 - ii) Position effect variegation
 - iii) Modifying genes.

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