

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.





**GROUP - B**

**( Short Answer Type Questions )**

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

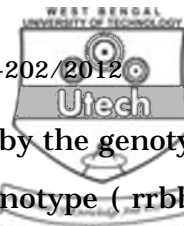
2. Write down the difference between Back cross and Test cross with example.
3. Determine the probability that a plant of genotype CcWw will be produced from the parental plants of the genotype CcWw and Ccww.
4. What is Expressivity and Pleiotropism ?
5. Describe the pattern of uniparental inheritance 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 :  $2 \times 5$
- i) Translocation
  - ii) Position effect variegation
  - iii) Modifying genes.

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