



INDIAN SCHOOL DARSAIT

DEPARTMENT OF BIOLOGY



Subject : Biology

Topic : Principles of
Inheritance

Date of worksheet : 11- 4-2017

Resource Person: Zehra Fatima

Date of Submission : _____

Name of the Student : _____

Class & Division : XII A &B Roll Number : __

S.No.	Very short Answer Questions	Marks
1	Mention the combination of sex chromosomes in a male and female bird. (CBSE 2017)	1
2	A male honey bee has 16 chromosomes where as its female has 32 chromosomes. Give one reason. (CBSE 2016)	1
3	How many chromosomes do drones of honeybee possess? Name the type of cell division involved in the production of sperms by them. (CBSE 2015)	1
4	Write the Chromosomal defect in individuals affected with Klinefelter's syndrome. (CBSE 2015)	1
5	Mention any two contrasting traits with respect to seeds in pea plant that were studied by Mendel. (CBSE 2015)	1
6	If two genes are located far apart from each other on a chromosome, how the frequency of recombination will get affected? (CBSE 2015)	1
7	State the chromosomal defect in individuals with Turner's syndrome. (CBSE 2015)	1
8	How many chromosomes do drones of honeybee possess? Name the type of cell division involved in the production of sperms by them. (CBSE 2015)	1
9	Write the types of sex determination mechanisms the following crosses show. Give an example of each type i)Female XX with male XO ii)Female ZW with male ZZ (CBSE 2014)	1
10.	Mention any two contrasting flower-related traits studied by Mendel in pea plant experiments. (CBSE 2011, 2014)	1
11	How many kind of phenotypes would you expect in F2 generation in a monohybrid cross. (CBSE 2014)	1
12	Name the respective pattern of inheritance where F1 phenotype i)does not resemble either of the two parents and is in between the two. ii)resembles only one of the two parents. (CBSE 2012)	1

- 13 Write the possible genotypes Mendel got when he crossed F1 tall pea plant with a dwarf pea plant. (CBSE 2012) 1
14. Why in a test cross Mendel cross a tall pea plant with a dwarf pea plant only? (CBSE 2012) 1
- 15 In a dihybrid cross, when would the proportion of parental gene combination be much higher than non-parental types, as experimentally shown by Morgan and his group? (CBSE 2012) 1
- 16 Name the event, during cell division cycle that results in the gain or loss of chromosome. (CBSE 2011) 1
- 17 Mention the type of alleles that expresses itself only in homozygous state in an organism. (CBSE 2011) 1
- 18 Name one autosomal dominant and one autosomal recessive Mendelian disorder in humans. (CBSE 2010) 1
- 19 A human being suffering from Down's syndrome shows Trisomy of 21st chromosome. Mention the cause of this chromosomal abnormality. (CBSE 2010) 1
- 20 Write the percentage of F2 homozygous and heterozygous populations in a typical monohybrid cross. (CBSE 2010) 1
- 21 Why do certain genes tend to be inherited together in a cell at the time of cell division? (CBSE 2008) 1
- 22 What is heterogamety? Give an example of an organism showing it. . (CBSE 2008) 1
- 23 When a tall pea plant was self pollinated one fourth of the progeny were dwarf. Give the genotype of the parent and dwarf progenies. (CBSE 2008) 1
- 24 If the frequency of parental forms is higher than 25% in a dihybrid test-cross, what does that indicate about the two genes involved? (CBSE 2001) 1

Short answer questions

- 25 Explain Co dominance with the help of an example. (CBSE 2017) 2
- 26 How does a test cross help to determine the genotype of an individual? (CBSE 2016) 2
- 27 Differentiate between male and female heterogamety. (CBSE 2016) 2
- 28 a)Why are human females rarely haemophilic? Explain
b)How do haemophilic patients suffer? (CBSE 2013) 2

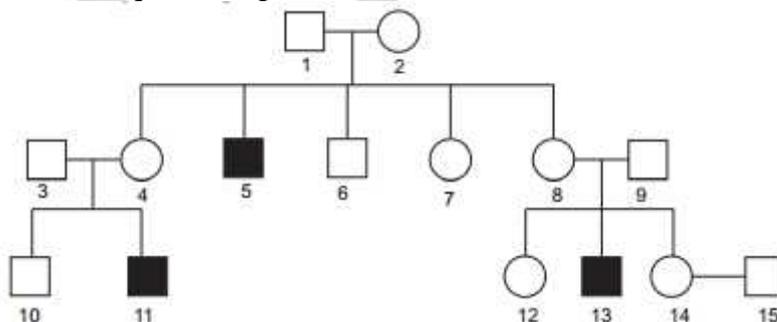
- 29 With the help of a Punnett square, find the percentage of heterozygous individuals in a F₂ population in a cross involving a true breeding pea plant with green pods and a true breeding pea plant with yellow pods respectively. (CBSE 2013) 2
- 30 Name the phenomenon that leads to situation like 'XO' abnormality in humans. How do humans with 'XO' abnormality suffer? Explain. (CBSE 2012) 2
- 31 Name a disorder, give the karyotype and write the symptoms where a human male suffers as a result of an additional X-Chromosome. (CBSE 2011) 2
- 32 During a monohybrid cross involving a tall pea plant with a dwarf pea plant, the offspring populations were tall and dwarf in equal ratio. Work out a cross to show how it is possible. (CBSE 2015) 2
- 33 Explain pleiotropy with the help of an example. (CBSE 2014) 2
- 34 Who proposed chromosomal theory of inheritance? Point out any two similarities in the behavior of Chromosomes and genes. (CBSE 2009) 2
- 35 Why did T. H. Morgan select *Drosophila melanogaster* to study sex linked genes for his lab experiments ? (CBSE 2015) 2
- 36 Write the scientific name of the fruit-fly. Why did Morgan prefer to work with fruit-flies for his experiments ? State any three reasons. (CBSE 2014) 2
- 37 In a dihybrid cross, white eyed, yellow bodied female *Drosophila* was crossed with red eyed, brown bodied male *Drosophila*, produced in F₂ generation are 1.3% recombinants and 98.7% progeny with parental type combinations. This observation of Morgan deviated from Mendelian F₂-phenotypic dihybrid ratio. Explain, giving reasons, Morgan's observations. (CBSE 2011) 2
- 38 Explain mechanism of sex determination in birds. (CBSE 2015) 2
- 39 Name the phenomenon that leads to situations like 'XO' abnormality in humans. How do humans with 'XO' abnormality suffer? Explain. (CBSE 2012) 2
- 40 Give an example of a gene responsible for multiple phenotypic expressions. What are such genes called? State the cause that is responsible for such an effort. (CBSE 2015) 2
- 41 Which chromosome carries the mutated gene causing thalassemia? What are the problems caused by the mutations? (CBSE 2015) 2
- 42 A man with blood group A married a woman with B group. They have a son with AB blood group and a daughter with blood group O. Work out the cross and show the possibility of such inheritance. (CBSE 2008) 2
- 43 The male fruit fly and female fowl are heterogametic while the female fruit fly and the male fowl are homogametic. Why are they called so? (CBSE 2008) 2

- 44 A plant of *Antirrhinum majus* with red flowers was crossed with another plant of the same species with white flowers. The plants of the F₁ generation bore pink flowers. Explain the pattern of inheritance with the help of a cross. (CBSE 2008) 2
- 45 A woman with blood group O married a man with AB group. Show the possible blood groups of the progeny. List the alleles involved in this inheritance. (CBSE 2008) 2
- 46 In a particular plant species, majority of the plants bear purple flowers. Very few plants bear white flowers. No intermediate colours are observed. If you are given a plant with purple flowers, how would you confirm that it is a pure breed for that trait? Explain. (CBSE 2008) 2
- 47 A woman with B blood group married a man with A blood group. They had 2 sons and both had O group. Show the possibility of such an inheritance. List the alleles involved in determining the blood group. (CBSE 2008) 2

Short Answer Question

- 48 Explain the cause of chromosomal disorders in humans. Describe the effect of such disorders with the help of an example each involving
i)Autosomes and
ii)Sex Chromosomes (CBSE 2017) 3
- 49 Human blood group is a good example of multiple allelism and co-dominance. Justify. (CBSE 2016) 3
- 50 Give an example of an autosomal recessive trait in humans. Explain its pattern of inheritance with the help of a cross. (CBSE 2016) 3
- 51 What is a test cross? How can it decipher the heterozygosity of a plant? (CBSE 2016) 3
- 52 A teacher wants his/her students to find the genotype of pea plants bearing purple coloured flowers in their school garden. Name and explain the cross that will make it possible. (CBSE 2015) 3
- 53 During a monohybrid cross involving a tall pea plant with a dwarf pea plant, the offspring populations were tall and dwarf in equal ratio. Work out a cross to show how it is possible. (CBSE 2015) 3
- 54 (a) Explain the phenomena of dominance, multiple allelism and co-dominance taking ABO blood group as an example.
(b) What is the phenotype of the following:
(i) A_i (ii) i_i (CBSE 2009, 2012, 2014) 3
- 55 During his studies on genes in *Drosophila* that were sex-linked T.H. Morgan found F₂ - population phenotypic ratios deviated from expected 9 : 3 : 3 : 1. Explain the conclusion he arrived at. (CBSE 2010) 3

- 56 Work out a cross between true breeding red and white flowered dog-flower plants (snapdragon) up to F₂ progeny. Explain the results of F₁ and F₂ generations. (CBSE 2010) 3
- 57 a) Explain sex determination in humans.
b) How do human males with 'XXY' abnormality suffer? (CBSE 2012) 3
- 58 Explain the sex determination mechanism in humans. How is it different from birds? (CBSE 2010) 3
- 59 Explain the mechanism of sex determination in insects like drosophila and grasshopper. (CBSE 2010) 3
- 60 Differentiate between "ZZ" and "XY" type of sex-determination mechanisms. (CBSE 2015) 3
- 61 What is pedigree analysis? Suggest how such an analysis can be useful. (NCERT) 3
- 62 Explain how does trisomy of 21st chromosome occur in humans. List any four characteristic features in an individual suffering from it. (CBSE 2012) 3
- 63 Name a disorder, give the karyotype and write the symptoms where a human male suffers as a result of an additional X-Chromosome. (CBSE 2011) 3
- 64 Name a disorder, give the karyotype and write the symptoms a human suffers from as a result of monosomy of the sex Chromosome. (CBSE 2011) 3
- 65 (a) Sickle cell anaemia in humans is a result of point mutation. Explain.
(b) Write the genotypes of both the parents who have produced a sickle celled anaemic offspring. (CBSE 2011) 3
- 66 Haemophilia is a sex linked recessive disorder of humans. The pedigree chart given below shows the inheritance of haemophilia in one family. Study the pattern of inheritance and answer the questions given 3

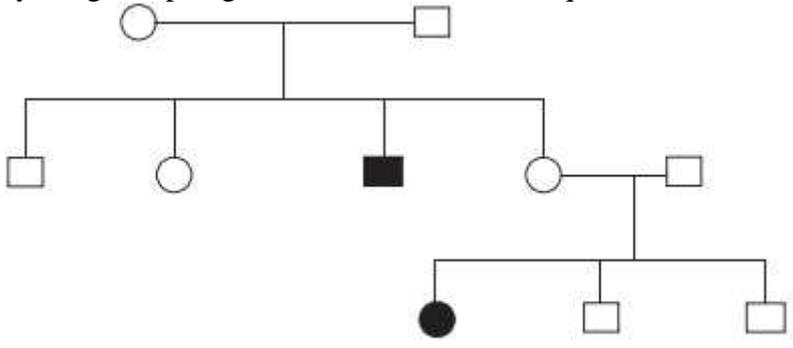


- (a) Give all the possible genotypes of the members 4, 5 and 6 in the pedigree chart.
(b) A blood test shows that the individual 14 is a carrier of haemophilia. The member numbered 15 has recently married the member numbered 14. What is the probability that their first child will be a haemophilic male? (CBSE 2009)

67 Inheritance pattern of ABO blood group in humans shows dominance, co-dominance and multiple allelism. Explain each concept with the help of blood group genotypes. (CBSE 2009) 3

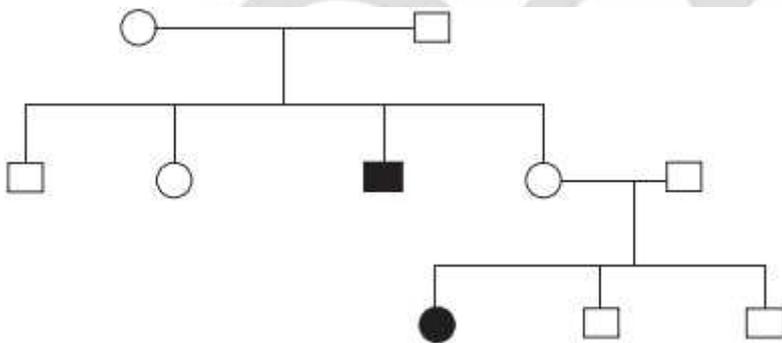
68 Explain the pattern of inheritance of haemophilia in humans. Why is the possibility of a human female becoming a haemophilic extremely rare? Explain. (CBSE 2008) 3

69 Study the given pedigree chart and answer the questions that follow: 3



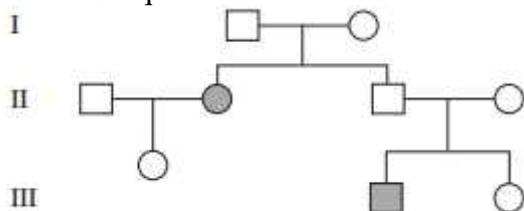
- (a) Is the trait recessive or dominant?
 (b) Is the trait sex-linked or autosomal?
 (c) Give the genotypes of the parents in generation I and of their third and fourth child in generation II. (CBSE 2008)

70 Study the given pedigree chart and answer the questions that follow: 3



- (a) Is the trait recessive or dominant?
 (b) Is the trait sex-linked or autosomal?
 (c) Give the genotypes of the parents shown in generation I and their third child shown in generation II and the first grandchild shown in generation III. (CBSE 2008)

71 Study the pedigree chart given below showing the inheritance pattern of a human trait and answer the questions that follow: 3



- (a) Give the genotype of the parents shown in generation I and of the son and daughter shown in generation II.
 (b) Give the genotype of the daughters shown in generation III.
 (c) Is the trait sex-linked or autosomal? Justify your answer. (CBSE 2008)

Long Answer Question

- 72 Describe the dihybrid cross carried on *Drosophila melanogaster* by Morgan and his group. How did they explain linkage, recombination and gene mapping on the basis of their observations? (CBSE 2017) 5
- 73 a) State the cause and symptoms of colour-blindness in humans. 5
 b) Statistical data has shown that 8 % of the human males are colour-blind whereas only 0.4% of females are colour-blind. Explain giving reasons how is it so. (CBSE 2016)
- 74 Thalassaemia and haemophilia are both Mendelian disorders related to blood. Write the symptoms of the diseases. Explain with the help of crosses the difference in the inheritance pattern of the two diseases. (CBSE 2016) 5
- 75 a) Why are thalassaemia and haemophilia categorized as Mendelian disorders? Write the symptoms of these diseases. Explain their pattern of inheritance in humans. 5
 b) Write the genotypes of the normal parents producing a haemophilic son. (CBSE 2015)
- 76 Describe the mechanism of pattern of inheritance of ABO blood groups in humans. (CBSE 2011) 5
- 77 Write the symptoms of haemophilia and sickle-cell anaemia in humans. Explain how the inheritance pattern of the two diseases differs from each other. (CBSE 2010) 5
- 78 (i) How does a Chromosomal disorder differ from a Mendelian disorder? 5
 (ii) Name any two chromosomal aberration associated disorders.
 (iii) List the characteristics of the disorders mentioned above that help in their diagnosis. (CBSE 2010)
- 79 Explain the causes, inheritance pattern and symptoms of any two Mendelian genetic disorders. (CBSE 2010) 5
- 80 (a) State the law of independent assortment. 5
 (b) Using Punnett Square demonstrate the law of independent assortment in a dihybrid cross involving two heterozygous parents. (CBSE 2010)
- 81 ABO blood grouping in human population exhibits four possible phenotypes from six different genotypes. Explain different mechanisms of inheritance involved in exhibiting the possibility of four phenotypes and six genotypes. (CBSE 2010) 5
- 82 Inheritance pattern of flower colour in garden pea plant and snapdragon differs. Why is this difference observed? Explain showing the crosses up to F₂ generation. (CBSE 2009) 5
- 83 You are given a red flower-bearing pea plant and a red flower-bearing snapdragon plant. How would you find the genotypes of these two plants with respect to the colour of the 5

flower? Explain with the help of crosses. Comment upon the pattern of inheritance seen in these two plants . (CBSE 2009)

84 A particular garden pea plant produces only violet flowers. (a) Is it homozygous dominant for the trait or heterozygous? (b) How would you ensure its genotype? Explain with the help of crosses. (CBSE 2009) 5

85 Inheritance pattern of flower colour in garden pea plant and snapdragon differs. Why is the difference observed? Explain showing the crosses. (CBSE 2009) 5

86 A particular garden pea plant produced only violet flowers. It may or may not be homozygous dominant for the trait. How would you ensure its genotype? Explain with crosses. (CBSE 2009) 5

87 (a) You are given tall pea plants with yellow seeds whose genotypes are unknown. How would you find the genotype of these plants? Explain with the help of cross. (b) Identify a, b and c in the table given below: (CBSE 2009) 5

	Pattern of inheritance	Monohybrid F ₁ phenotypic expression
1.	Codominance	a
2.	b	The progeny resembled only one of the parents
3.	Incomplete dominance	c

88 (a) A true breeding pea plant, homozygous for inflated green pods is crossed with another pea plant with constricted yellow pods (ffgg). What would be the phenotype and genotype of F₁ and F₂ generations? Give the phenotype ratio of F₂ generation. (b) State the generalisation proposed by Mendel on the basis of the above mentioned cross. (CBSE 2008) 5

89 A true breeding pea plant homozygous for axial violet flowers is crossed with another pea plant with terminal white flowers (aavv). (a) What would be the phenotype and genotype of F₁ and F₂ generations? (b) Give the phenotypic ratio of F₂ generation. (c) List the Mendel's generalisations that can be derived from the above cross. (CBSE 2008) 5

90 Tall ness of a pea plant is a dominant trait dwarfness is the alternate recessive trait. A pure tall pea plant is crossed to a dwarf one. Work out the cross to show what fraction of the tall plants in F₂ generation is heterozygous ? (CBSE 2008) 5

91 A homozygous tall pea plant with green seeds is crossed with a dwarf pea plant with yellow seeds: (i) What would be the phenotype and genotype of F₁? (ii) Work out the phenotypic ratio of F₂ generation with the help of a Punnett Square. (CBSE 2008) 5

92 A snapdragon plant homozygous for red flower when crossed with a white flowered plant of the same species produced pink flowers in F₁ generation. 5

- (a) What is this phenotypic expression called?
 (b) Work out the cross to show the F₂ generation when F₁ was self-pollinated. Give the phenotypic and genotypic ratios of F₂ generation.
 (c) How do you compare the F₂ phenotypic and genotypic ratios with those of Mendelian monohybrid F₂ ratios? (CBSE 2008)

- 93 a) A true breeding pea plant homozygous for axial violet flowers is crossed with another pea plant with terminal white flowers (aavv). Work out the cross to show the phenotypes and genotypes of F₁ and F₂ generations along with the ratios. 5
 (b) State the law that Mendel proposed on the basis of such a cross. (CBSE 2008)

- 94 A true breeding pea plant, homozygous for inflated and green pods is crossed with another pea plant with constricted and yellow pods (ffgg). 5
 (i) Work out the cross to show the phenotypes and genotypes of F₁ and F₂ generations. Give the phenotype ratio of F₂ generation.
 (ii) List the laws of Mendel which can be derived from such a cross. (CBSE 2008)

- 95 Given below is a table showing the genotypes and the phenotypes of blood groups in the human population 5

Sr No	Genotype	Phenotype
1.	(W)	A
2.	I ^B I ^O	(Y)
3.	I ^A I ^B	(Z)
4.	(X)	O

- i) Identify the genotypes (W) and (X) and phenotype (Y) and (Z).
 ii) How is Co-dominance different from incomplete dominance?
 iii) Name the pattern of inheritance exhibited by the phenotypes Y and Z in the table. (CBSE 2008)