



## INDIAN SCHOOL AL WADI AL KABIR

<b>Class: X</b>	<b>DEPARTMENT: SCIENCE 2020 -2021</b> <b>SUBJECT : BIOLOGY</b>	<b>Date of completion:</b> <b>20.11.2020</b>
<b>Worksheet No: 5</b> <b>With Answers</b>	<b>Chapter: HEREDITY AND EVOLUTION</b>	<b>Note:</b> <b>A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### OBJECTIVE TYPE QUESTIONS

#### MULTIPLE CHOICE QUESTIONS

- The segment of DNA responsible for formation of traits:  
i) nucleotide    ii) nucleoside    iii) gene    iv) chromosome
- The father of genetics is:  
i) Aristotle    ii) Khorana    iii) Morgan    iv) Mendel
- Which among the given ones represent the genetic constitution of a normal sperm cell?  
i) 22A+XX    ii) 22A+Y    iii) 44AA+X    iv) 44AA+Y

#### ASSERTION-REASONING QUESTIONS

For the following questions, two statements are given-one labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the options (i) , (ii), (iii) and (iv) as given below:

- Both A and R are true and R is the correct explanation of the Assertion.
- Both A and R are true but R is not the correct explanation of the Assertion.
- A is true but R is false.
- A is false but R is true.

- Assertion : Sex determination in humans is genetical.  
Reason : Sex chromosomes are the similar in all human ovum.
- Assertion : Traits are inherited independently.  
Reason : Ribosomes are located in DNA.

### ONE MARK QUESTIONS

- What is an allele?
- What is a dihybrid cross phenotypic ratio?

- 3.State the interpretation of dihybrid cross.
- 4.What are sex chromosomes?

### **TWO MARK QUESTIONS**

- 1.What is the significance of a dominant gene?
- 2.What are dominant traits and recessive traits?
- 3.What is the typical monohybrid and dihybrid phenotypic ratio?

### **THREE MARK QUESTIONS**

- 1.Round seeds are dominant over wrinkled seeds.If a cross is carried out between a plant with round seeds and wrinkled seeds.What will be the phenotypes of F1 generation and ratio of round seeded and wrinkled seeded plants in F2 ?
- 2.With the help of an example,explain how traits get expressed.
- 3.Explain the following:
  - i)Monohybrid cross
  - ii)Gene
  - iii)Heredity

### **FIVE MARK QUESTIONS**

- 1.i)With the help of a flow chart explain sex determination in humans.  
ii)Why is sex determination banned by the Government?
2. A pea plant with violet flowers when crossed with white flowered plant produced all violet coloured flowers in F1 generation. On selfing, the plants produced 150 violet flowered and 50 white flowered plants.
  - i)Give the genotypes of the parental plants and the F1 generation plants.
  - ii)What is the phenotypic ratio obtained in F2 generation?
  - iii)Explain the genetic mechanism responsible for the above result.

### **PREVIOUS YEAR BOARD QUESTIONS**

- 1)Name the plant used by Mendel for his experiment. What type of progeny was obtained by Mendel in F1 generation when he crossed tall plant and short plants? (2)
- 2)Sex determination is also controlled by environmental factors.Is this statement true.Justify your answer . (3)
- 3) A Mendelian experiment consisted of breeding pea plants BB, bearing violet flowers with pea plants bb ,bearing white flowers. What will be the result in F1 and F2 progeny ?What will be the percentage of white flowers in F2 generation? (3)
- 4) Mendel, in one of his experiments with pea plants, crossed a variety of pea plant having round seeds with one having wrinkled seeds. All the F1 plants obtained were round seeded.
  - i)Identify the dominant and recessive trait.Give reason for your answer.
  - ii) Also, list any three contrasting characters, other than round seeds of pea plants that round seeds with one having wrinkled seeds. (5)
- 5)(a)“The sex of a newborn child is a matter of chance and none of the parents may be considered responsible for it.” Justify this statement with the help of a flow chart showing sex-determination in human beings.  
(b)Differentiate between dominant trait and recessive trait. (5)



All F1 are Round seeded  
 F1 self pollinated to get F2

	Round seeded	x	Round seeded
	Rr		Rr
Gametes	R		r
R	RR		Rr
r	Rr		rr

Ratio of round seeded to wrinkle seeded is :  
 3:1

2. Gene is the segment of DNA which provides information for synthesis of a protein and this protein is responsible for a trait .For example :The height in plants  
 Plant hormones control the height in plants .If the gene is dominant ,more enzyme will be produced which in turn will help in increasing the hormone production .As a result the plant will be tall.If the gene changes, protein(enzyme) is formed in less quantity ,hormone will be less and in turn the plant will be short.

In this way,genes control traits in organisms.

3.i)Monohybrid cross - A cross which involves a single pair of contrasting traits is called a monohybrid cross.

ii)Gene - Functional segment of DNA that are responsible for traits.

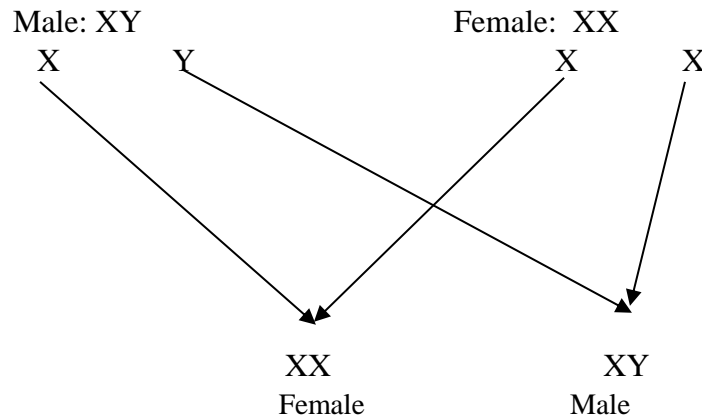
iii)Heredity - The process of transmission of characters from one generation to another

### FIVE MARK QUESTIONS

1. i)Sex in humans is determined at the time of fertilization ,when the male and female gametes fuse together. Humans have 46 chromosomes in their normal cells. 44 of them are called autosomes and are responsible for general body features .The remaining two are called sex chromosomes ,which determine the sex of the offspring.

In males, the two sex chromosomes are dissimilar and represented as X Y.

In females , the two sex chromosomes are similar and represented as X X.



In humans,the sex of the child is determined by the type of sperm that fuses with the ovum.

ii)In many parts of India,on knowing the sex of the foetus abortion is done if it is found to be a girl.So sex determination is banned by the government to reduce female foeticide.

2. i)Parental plants are – violet is RR and white is rr.

F1 all are heterozygous violet.Rr(can use any letter)

ii)The ratio is 150:50 ie,3:1.

iii) As the F<sub>2</sub> ratio is 3:1, it is a Mendelian monohybrid cross. F<sub>1</sub> is represented only by violet flowered plants and so it indicates violet is dominant over white.

### PREVIOUS YEAR BOARD QUESTIONS

1) The plant used by Mendel for his experiments was garden pea plant (*Pisum sativum*).  
All F<sub>1</sub> plants were tall (heterozygous tall)

2) True.

In some reptiles, the temperature at which the fertilised egg is incubated plays a role in determining the sex of the offspring. If the temperature is high in some lizards the egg hatches out to be a male. This shows that sex can be determined by environmental factors also.

3)

	Violet flowers BB	x	white flowers bb
gametes	B	B	
b	Bb	Bb	
b	Bb	Bb	

All the F<sub>1</sub> plants will be violet flowered

F<sub>1</sub> selfed to get F<sub>2</sub>

	Violet Bb	x	Violet Bb
gametes	B	b	
B	BB	Bb	
b	Bb	bb	

In F<sub>2</sub> generation There will be:

3 Violet flowers : 1 white flower

Percentage of white flowered plant is 25% (1/4)

4) i) Round seed is the dominant trait as it is the only trait expressed in F<sub>1</sub> generation and  
Wrinkle seed is the recessive trait as it is not getting expressed in F<sub>1</sub> generation.

ii) Three contrasting characters, other than round seeds of pea plants that Mendel used in his experiments :

Height of the plant-tall and short

Colour of the flower-violet and white

Position of the flower-axial and terminal

5) (a) i) Sex in humans is determined at the time of fertilization, when the male and female

Gametes fuse together. Humans have 46 chromosomes in their normal cells. 44 of them are called autosomes and are responsible for general body features. The remaining two are called sex chromosomes, which determine the sex of the offspring.

In males, the two sex chromosomes are dissimilar and represented as X Y.

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