Assess Yourself

Q. 1. What will be the sex of a child who inherits Y chromosome from his/her father?

Answer: Male

Explanation: a male has one X and one Y chromosomes which means half the male gametes i.e. sperms have X and the other half will have Y chromosome, whereas in females both the chromosomes are X thus all the females gametes will have one X chromosome. In humans the sex of the child depends on what happens at fertilization. If Y chromosome is inherited by the offspring then it will surely be a male because the child will have XY combination of sex chromosomes.





(a) Filler of whale (b) foreleg of horse

(c) Front leg of frog (d) wings of housefly

Answer: (d) wings of housefly

Analogous organs are the organs which have same functions but their origin is different. Accordingly, wings of parrot and wings of housefly have the same function of flying but their origin is different. The wings of parrot are mesodermal whereas housefly's wings are ectodermal and supported by chitin.

Q. 3. "Genes and chromosomes have similar behaviour." Justify.

Answer: The following statement can be justified as:

•Chromosomes are thread like structure formed of DNA which carries genes which control characteristics of the offspring.

•Both genes and chromosomes carry hereditary information to the offspring.

•They both are an integral part of one another.

•Both occur in pairs.

•Both are found inside nucleus.

Q. 4. Name the scientific terms used to represent the following:

(a) The branch of biology which studies heredity and variation.

(b) The transmission of traits from parents to offspring.

(c) Differences in a trait in human beings.

(d) A recognisable feature of an organism.

Answer: (a) Genetics

- (b) Hereditary
- (c) Variation
- (d) Character

Q. 5. How does DNA help in defining evolutionary relationship?

Answer: All life forms have contained DNA and use the same four nitrogenous basesadenine, thymine, cytosine and guanine in their genetic code to synthesize proteins. DNA helps in defining the evolutionary relationship "utilizing a sequence of DNA "the connection between the living beings is dictated by their DNA sequence. The arrangement of the nucleotides in DNA of the life forms are particular and are controlled by the researcher who utilizes this data and looks at the arrangement and discovers the similitudes in this manner helping in the characterizing the advancement relationship of living beings. These data likewise used to characterizes the distinction between organisms. Researcher likewise utilized the sequence to find it.

Q. 6. Explain with an example how variation took place due to inheritance.

Answer: In sexual proliferation gametes experience meiosis which presents variation by crossing over, fertilization of gametes additionally presents variation. Offsprings hereditary material differs from the parents and along these lines legacy of qualities in sexual generation presents variation in species.

Q. 7. Explain Mendel's experiment with peas on inheritance of traits considering two visible contrasting characters.

Answer: Mendel crossed a pea plant that was homozygous and prevailing for round (RR), yellow (YY) seeds with a pea plant that was homozygous and latent for wrinkled (rr), green (yy) seeds, spoke to by the accompanying documentation:

RRYY x rryy

Living beings in this underlying cross are known as the parental, or P age. The offsprings of the RRYY x rryy cross, which is known as the F1 age, were all heterozygous plants with round, yellow seeds and the genotype RrYy.

Next, Mendel crossed two plants from the F1 age. This progression is the dihybrid cross, and it is spoken to as:

RrYy x RrYy

Mendel observed that the F2 descendants of his dihybrid cross had a 9:3:3:1 proportion and created nine plants with round, yellow seeds, three plants with round, green seeds, three plants with wrinkled, yellow seeds and one plant with wrinkled, green seeds. From his analysis, Mendel watched that the sets of attributes in the parental age arranged autonomously from each other, starting with one age then onto the next.



Dihybrid cross

Q. 8. Explain with an example how traits get expressed.

Answer: Hereditary information which must be carried on to offsprings is stuffed in the core of the cell i.e. nucleus. It contains the hereditary material of the cell as chromosomes. A chromosome is a structure of DNA and protein found in cells.

Chromosome is a solitary bit of coiled DNA containing genes. Chromosomes are thought to be the vehicles of heredity as they convey genes. Genes control characteristics. Proteins formed from RNA are in charge of the traits. These traits can be expressed as phenotype {appearance} or genotypes {genetic make-up}.



The central dogma of life.

Q. 9. On the basis of the possibilities of combination of the sex chromosomes, what percentage probability does a couple have of having a son or a daughter? Show the same by making a cross.

Answer: A male has one X and one Y chromosomes which means half the male gametes i.e. sperms have X and the other half will have Y chromosome, whereas in females both the chromosomes are X thus all the females gametes will have one X chromosome. In humans the sex of the child depends on what happens at fertilization. If Y chromosome is inherited by the offspring from male then it will surely be a male because the child will have XY combination of sex chromosomes. If X from both the parents then the offspring will be a female having XX combination.





Possibilities for the sex of offspring.

Q. 10. 'Non-living material must have given rise to life'. Describe with an example.

Answer: This can be demonstrated with help of Miller and Urey experiment:

They took a blend of alkali, hydrogen sulphide and methane and water and gave it a temperature of just underneath 100 degree Celsius and presented it to 25000 V electric sparkles to take after the lightning. Following 8-10 days 15% of carbon from methane had been changed over into organic compounds such as carbohydrates, proteins, fatty acids etc. which could react to form complex compounds. So fundamentally life originated from lifeless issue.



Q. 11. What role does sexual reproduction play in evolution?

Answer: In sexual proliferation gametes experience meiosis which presents variation by crossing over, fertilization of gametes additionally presents variation. Offsprings hereditary material differs from the parents and along these lines legacy of qualities in sexual generation presents variation in species.

Q. 12. Explain with example how characteristics of a population changes over the years for the following situations-

- (a) To gain survival advantage
- (b) Due to accidental survival
- (c) Temporary change of characteristics.

Answer: Characteristics of a population changes over the years for their survival in nature. This can be justified with these examples:

(a) To gain survival advantage: the best example is provided by the peppered moth in order to survive these moths then changed their colour to grey and now blended perfectly with soot coated trees.

(b) Due to accidental survival: Beetles are of two colour either red or blue. It was seen that elephants crushed all the red coloured beetle but not blue hence this example shows accidental survival.

(c) Temporary change of characteristics: Speciation of any plant or animal to the modern one is an example of temporary change of characteristics so as to bring about a finally best-suited species.

Q. 13. While playing near a sugarcane field, Mohan noticed that the plants are almost similar to one another. At the same time, he noticed the mango trees in the next plot of land which are not similar to one another. Mohan's brother told Mohan that sugarcane reproduces asexually, hence there is little variation, Mango reproduces sexually, and hence there is larger variation.

(a) Why sugarcane cannot reproduce sexually?

(b) Can mango reproduce asexually?

(c)If a person wants to have a flower garden, what type of plants should he grow?

Answer: (a) flowers are absent in sugarcane which implies lack of pollen grains and anthers thus lacking sexual reproduction.

(b) Yes by means of grafting or layering.

(c) If a person wants to have a flower garden then he should grow plants obtained from vegetative propagation.