Ravi Maths Tuition

Heredity

10th Standard

Science

Multiple Choice Question 59 x 1 = 59

1) A mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers, but almost half of them were short. This suggests that the genetic make-up of the tall parent can be depicted as

(a) TTWW (b) TTww (c) TtWW (d) TtWw

2) An example of homologous organs is

(a) Our arm and a dog's fore-leg (b) Our teeth and an elephant's tusks.

(c) Potato and runners of grass. (d) all of the above

3) In evolutionary terms, we have more in common with

(a) A Chinese school-boy. (b) A chimpanzee (c) A spider (d) A bacterium

4) Exchange of genetic material takes place in

(a) vegetative reproduction (b) asexual reproduction (c) sexual reproduction (d) budding

5) Two pink coloured flowers on crossing resulted in 1 red, 2 pink and 1 white flower progeny. The nature of the cross will be

(a) double fertilisation (b) self pollination (c) cross fertilisation (d) no fertilisation

6) A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because

(a) tallness is the dominant trait (b) shortness is the dominant trait (c) tallness is the recessive trait

(d) height of pea plant is not governed by gene 'T' or 't'

7) Which of the following statement is incorrect?

(a) For every hormone there is a gene (b) For every protein there is a gene

(c) For production of every enzyme there is a gene. (d) For every molecule of fat there is a gene.

8) If a round, green seeded pea plant (RR yy) is crossed with wrinkled, yellow seeded pea plant, (rr YY) the seeds produced in FI generation are

(a) round and yellow (b) round and green (c) wrinkled and green (d) wrinkled and yellow

9) In human males all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are.

(i) large chromosome

(ii) small chromosome

(iii) Y - chromosome

(iv) X - chromosome

(a) (i) and (ii) (b) (iii) only (c) (iii) and (iv) (d) (ii) and (iv)

10) The maleness of a child is determined by

(a) the X chromosome in the zygote (b) the Y chromosome in zygote

(c) the cytoplasm of germ cell which determines the sex. (d) sex is determined by chance

11) A zygote which has an X - chromosome inherited from the father will develop into a

(a) boy (b) girl (c) X - chromosome does not determine the sex of a child (d) either boy or girl

12) Select the incorrect statement

(a) Frequency of certain genes in a population change over several generations resulting in evolution.

(b) Reduction in weight of the organism due to starvation is genetically controlled.

(c) Low weight parents can have heavy weight progeny

(d) Traits which are not inherited over generations do not cause evolution.

13) New species may be formed if
(i) DNA undergoes significant changes in germ cells
(ii) chromosome number changes in the gamete
(iii) there is no change in the genetic material
(iv) mating does not take place

(a) (i) and (ii) (b) (i) and (iii) (c) (ii), (iii) and (iv) (d) (i), (ii) and (iii)

14) Two pea plants one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds produce F_1 progeny that have round, yellow (RrYy) seeds. When F_1 plants are selfed, the F_2 progeny will have new combination of characters. Choose the new combination from the following:
(i) Round, yellow
(ii) Round, green
(iii) Wrinkled, yellow
(iv) Wrinkled, green

(a) (i) and (ii) (b) (i) and (iv) (c) (ii) and (iii) (d) (i) and (iii)

15) A basket of vegetables contains carrot, potato, radish and tomato. Which of them represent the correct homologous structures?

(a) Carrot and potato (b) Carrot and tomato (c) radish and carrot (d) radish and potato

16) Select the correct statement

(a) Tendril of a pea plant and phylloclade of Opuntia are homologous.

(b) Tendril of a pea plant and phylloclade of Opuntia are analogous

(c) Wings of birds and limbs of lizards are analogous

(d) Wings of birds and wings of bat are homologous

17) From the list given below, select the character which can be acquired but not inherited

(a) colour of eye (b) colour of skin (c) size of body (d) nature of hair

18) The two versions of a trait (character) which are brought in by the male and female gametes are situated on

(a) copies of the same chromosome (b) two different chromosomes (c) sex chromosomes

(d) any chromosome

19) Select the statements that describe characteristics of genes
(i) genes are specific sequence of bases in a DNA molecule
(ii) a gene does not code for proteins
(iii) in individuals of a given species, a specific gene located on a particular chromosome
(iv) each chromosome has only one gene.

(a) (i) and (ii) (b) (i) and (iii) (c) (i) and (iv) (d) (ii) and (iv)

20) In peas, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in F_2 is

(a) 1 : 3 (b) 3 : 1 (c) 1 : 1 (d) 2 : 1

21) The number of pair (s) of sex chromosomes in the zygote of humans is

(a) one (b) two (c) three (d) four

22) The theory of evolution of species by natural selection was given by

(a) Mendel (b) Darwin (c) Morgan (d) Lamarck

23) Some dinosaurs had feathers although they could not fly but birds have feathers that help them to fly. In the context of evolution this means that

(a) reptiles have evolved from birds

(b) there is no evolutionary connection between reptiles and birds

(c) feathers are homologous structures in both the organisms (d) birds have evolved from reptiles.

24) Which one of the following is not one of the direct conclusions that can be drawn from Mendel's experiment?

(a) Only one parental trait is expressed

(b) Two copies of each trait is inherited in sexually reproducing orgainsm

(c) For recessive trait to be expressed, both copies should be identical

(d) Natural selection can alter frequency of an inherited trait

25) Which one is a possible progeny in F_2 generation of pure breed tall plant with round seed and short plant with wrinkled seeds?

(a) Tall plant with round seeds (b) Tall plant with wrinkled seeds (c) Short plant with round seed

(d) All of the above

26) A section of DNA providing information for one protein is called

(a) Nucleus (b) Chromosomes (c) Trait (d) Gene

27) Which of the following is a totally impossible outcome of Mendel's Experiment (cross breeding pure breed tall and short pea plants)

(a) 3 tall 1 short plant (b) 24 tall and 8 short plants (c) 8 tall and 0 short plants

(d) 4 tall plants and 1 medium-height plant.

28) Which of the following is controlled by genes?
(i) Weight of a person (ii) Height of a person

(a) only 1 (i) (b) only (ii) (c) both (i) and (ii) (d) Sometimes (i) and sometimes (ii)

29) Which one of the following is present in the nucleus?

(a) Gene (b) DNA (c) Chromosomes (d) All of these

30) Amongst which of the following animals, sex of the off springs not genetically determined

(a) Humans (b) Snails (c) Birds (d) Dogs

31) What is the probability that a human progeny will be a boy

(a) 50% (b) 56% (c) 47.34% (d) It varies

32) Who have a perfect pair of sex chromosomes

(a) Girls only (b) Boys only (c) Both girls and boys (d) It depends on many other factors

33) There is an inbuilt tendency of variation during reproduction because of-
(i) Errors in DNA copying (ii) Sexual reproduction

(a) only (i) (b) only (ii) (c) both (i) and (ii) (d) none of them

34) Which one of the following gives a survival advantage and thus alters frequency of inherited trait.
(i) natural selection (ii) genetic drift

(a) only (i) (b) only (ii) (c) both (i) and (ii) (d) none of these

35) If we breed a group of squirrels and surgically remove their tails, then amongst the progeny of these tailless squirrels

(a) All have no tail (b) All have a tail (c) Some of them have tails (d) Cannot be determined

36) With whom we associate theory of evolution

(a) Charles Darwin (b) Mendel. (c) Stanley Miller (d) Harold Urey

37) Formation of 2 independent species due to genetic drift, geographical isolation, natural selection is specifically referred as-

(a) Evolution (b) Classification (c) Speciation (d) Reproduction

38) Which of the following can be called a characteristic?

(a) Plants can photosynthesise (b) We have 2 eyes (c) Mango tree is multicellular (d) All of these

39) If A and B have n characteristics common while A and C have n/2 characteristics common, then which of the two organisms are more closely related?

(a) A and C (b) A and B (c) Characteristics need to be known (d) None of these

40) Homologous organs have

(a) Same structure, same function (b) Different structure, different function
(c) Same structure, different function (d) Same function, different structure

41) Analogous organs have

(a) Same structure, same function (b) Different structure, different function
(c) Same structure, different function (d) Same function, different structure

42) Fossils helps

(a) To study evolution (b) To understand climatic conditions in past
(c) For a hierarchy of organisms (classification (d) They help in all the above

43) How can we know how old fossils are:

(a) Fossils found closer to surface are recent than those found much below
(b) Detecting ratios of isotopes (c) Studying its characteristics (d) All of these

44) Which one of the following strongly indicates that bird and dinosaurs are closely related?

(a) They both have feathers (b) They both respire (c) They both reproduce (d) They both have eyes

45) Wild cabbage is being cultivated for thousands of years and humans have generated broccoli, cauliflower, kala etc. from it. This is an example of

(a) Natural selection (b) Genetic drift (c) Geographic isolation (d) Artificial selection

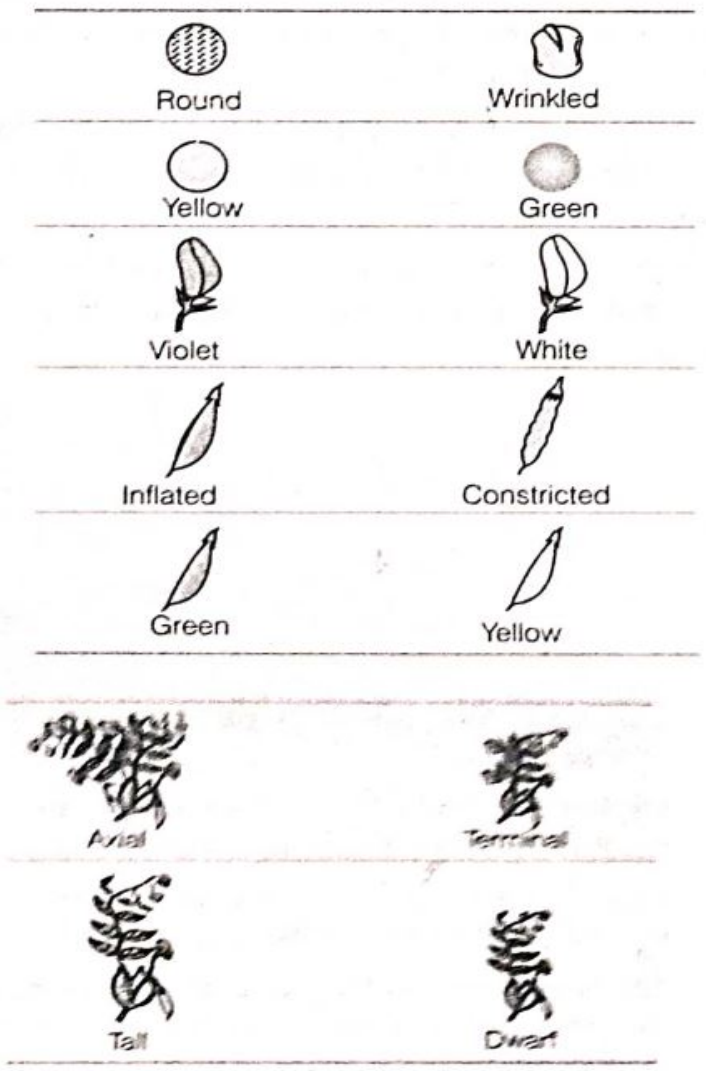
46) Organism A recently carne into existence while B was formed millions of years ago. What does this indicate?
(i) A is more efficient than B (ii) A is more complex than B.

(a) Only (i) (b) Only (ii) (c) Both (i) and (ii) (d) Either (i) or (ii)

47) Which of the following statements is not true with respect to variation?

(a) All variations in a species have equal chance of survival
(b) Change in genetic composition results in variation
(c) Selection of variants by environmental factors forms the basis of evolutionary processes
(d) Variation is minimum in asexual reproduction

48) The below given figure gives details about different contrasting pairs of characters selected by Mendel for his experiments to observe carefully and select the number of traits related to flower pod and seed, respectively.



(a) 2, 2, 2 (b) 2, 2, 1 (c) 1, 1, 2 (d) 1, 1, 1

49) Consider the following two statements
(i) The trait that expresses itself in F_1-generation.
(ii) The trait that keeps on passing from one generation to another.
The appropriate terms for the statements (i) and (ii) respectively are

(a)

(i)	(ii)
Recessive trait,	Dominant trait

(b)

(i)	(ii)
Dominant trait,	Recessive trait

(c)

(i)	(ii)
Dominant trait,	Inherited trait

(d)

(i)	(ii)
Recessive trait,	Inherited trait

50) A cross between pea plant with white flowers (vv) and pea plant with violet flowers (VV) resulted in F_2-progeny in which ratio of violet (VV) and white (vv) flowers will be

(a) 1 : 1 (b) 2 : 1 (c) 3 : 1 (d) 1 : 3

51) If a tall pea plant is crossed with a pure dwarf pea plant then, what percentage of F_1 and F_2-generation respectively will be tall?

(a) 25%, 25% (b) 50%, 50% (c) 75%, 100% (d) 100%, 75%

52) A cross between two tall pea plants resulted in offsprings having a few dwarf plants. The gene-combination of the parental plants must be

(a) Tt and Tt (b) Tt and tt (c) TT and tt (d) TT and Tt

53) A homozygous dominant guinea pig with black fur is crossed with a homozygous guinea pig with white fur. The F_1-generation is crossed with itself.
What percentage of F_2 - generation is expected to show white fur coat?

(a) 25% (b) 50% (c) 75% (d) 100%

54) The statement that correctly describes the characteristic of a gene is

(a) in individuals of a given species, a specific gene is located on a particular chromosome

(b) a gene is not the information source for making proteins in the cell

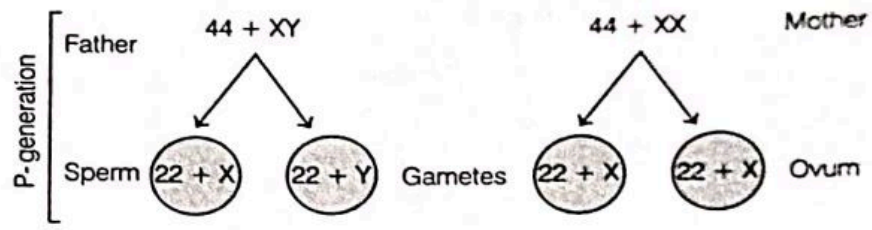
(c) each chromosome has only one gene located all along its length

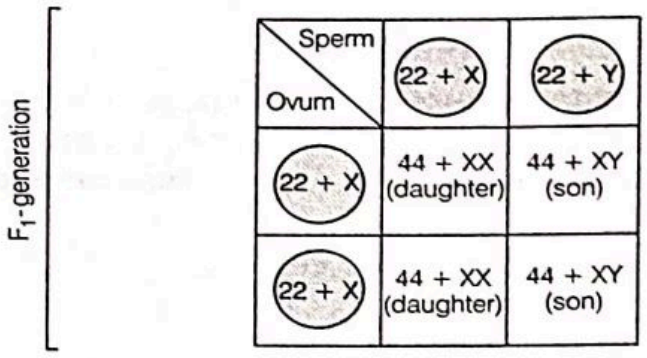
(d) all the inherited traits in human beings are not controlled by genes

55) Which pair of sex chromosome will determine a male ?

(a) XO (b) XX (c) XY (d) YY

56) Below given is the pattern of sex-determination in human beings. Study the same and choose the correct statement.





(a) Both mother and father have 22 pairs of chromosomes including sex chromosomes

(b) The gametes of both mother and father are haploid (n) in nature

(c) It is Y-chromosome that decides the sex of a child (d) Both (b) and (c)

57) Which Mendelian law states that inheritance of one character is always independent to the inheritance of other character within the same individual?

(a) Law of dominance (b) Law of segregation (c) Law of independent assortment

(d) Both (b) and (c)

58) A homozygous cross between a pea plant having purple flowers is done with the homozygous pea plant having white flower. What will be the phenotypic ratio of the offspring obtained is F_2-generation

(a) 2 : 1 (b) 1 : 1 (c) 1 : 2 : 2 (d) 3 : 1

59) Sex determination depends upon the environment in

(a) birds (b) amphibians (c) reptiles (d) fishes

Assertion and reason 34 x 1 = 34

60) **Assertion:** Every germ cell will take one chromosome from each pair of parents.

Reason: These chromosomes may be either from maternal or paternal origin.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

61) **Assertion:** Women has perfect pairs of chromosomes

Reason: Men has mismatched pair of chromosomes.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

62) **Assertion:** Natural selection in a population of organisms leads to variation.

Reason: It results in adaptations in the population of organisms to fit their environment better.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

63) **Assertion:** The beetles reduced in size due to starvation for many generations.

Reason: This leads to evolution of beetles.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

64) **Assertion:** Evolution took place due to natural selection

Reason: This also leads to variations which is seen in the species.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

65) **Assertion:** Darwin's theory of evolution tells us how life evolved from simple to more complex forms.

Reason: Mendel's experiments give us the mechanism for the inheritance of traits from one generation to the next.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

66) **Assertion:** A DNA can change the number of chromosomes in it.

Reason: Two cells with different number of nucleus cannot fuse.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

67) **Assertion**: A green beetle cannot reproduce with the red beetle.

Reason: .The beetles of different colours have different number of chromosomes

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

68) **Assertion**: In humans, height is a trait which shows variation.

Reason: Some humans are very tall, some have medium height whereas others are short heighted.

Codes:

(a) Both A and R are true and R is correct explanation of the assertion

(b) Both A and R are true but R is not the correct explanation of the assertion

(c) A is true but R is false

(d) A is false but R is true.

69) **Assertion:** Accumulation of variation in a species increases the chances of its survival in changing environment.
Reason: Accumulation of heat resistance in some bacteria ensure their survival even when temperature in environment rises too much.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

70) **Assertion:** Traits like tallness and dwarfness in pea plant are inherited independently.
Reason: When a homozygous tall pea plant is crossed with dwarf pea plant, medium sized pea plant is obtained in F_1 generation.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

71) **Assertion**: Pea plant is considered ideal for hybridisation experiments.
Reason: Pea is self pollinating plant with short life cycle and bears visible contrasting traits.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

72) **Assertion:** Monohybrid cross deals with inheritance of one pair of contrasting characters.
Reason: Dihybrid cross deals with inheritance of two pairs of contrasting characters.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

73) **Assertion:** When pea plants (pureline) having round yellow seeds are crossed with pureline plants having wrinkled green seeds, then all pea plants obtained in F_1 generation bear wrinkled green seeds.
Reason: Round and yellow seeds are dominant to wrinkled and green seeds.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

74) **Assertion:** If blood group of both mother and father is 'O' then the blood group of children will also be O.
Reason: Blood group in humans is determined by many alleles of a gene viz. I^A, I^B, I^O.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

75) **Assertion:** In some reptiles, the temperature at which fertilised egg is incubated before hatching plays a role in determining sex of offspring.
Reason: In turtle, high incubation temperature above 33°C leads to development of female offspring whereas in lizards high incubation temperature results in male offspring. **Codes:**
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

76) **Assertion:** In humans, male (or father) is responsible for sex of the baby which is born.
Reason: Y chromosomes are present in only male gametes or sperms.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

77) **Assertion:** If mother is homozygous for black hair and father has red hair then their child can inherit black hair.
Reason: Gene for black hair is recessive to gene for red hair in humans.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

78) **Assertion:** Selfing of a plant for several generations helps plant breeders to obtain pure breeding varieties.
Reason: Pure breeding plants are heterozygous for many traits.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

79) **Assertion:** A tall plant which always produces tall offsprings is considered heterozygous for height and is represented by genotype (Tt).
Reason: A tall plant which always produces tall offspring is homozygous dominant and will always produce only one type of gamete (T).
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

80) **Assertion:** A geneticist crossed two plants and got 50% tall and 50% dwarf progenies.
Reason: This cross follows Mendelian law as one of the parent plant might be heterozygous.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

81) **Assertion:** A heterozygous tall plant when crossed with homozygous dwarf plant will produce tall and dwarf plants in the ratio of 3 : 1.
Reason: A heterozygous tall plant will produce two types of gametes, i.e., one with T and other with t whereas homozygous dwarf plant produce all gametes with t only.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

82) **Assertion:** In human males all the chromosomes are perfectly paired except X and Y chromosomes.
Reason: X and Y are sex chromosomes.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

83) **Assertion:** A child which has inherited X chromosome from father will develop into a girl child.
Reason: Girl child inherits X chromosome from father and Y chromosome from mother.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

84) **Assertion:** Genes present in every cell of an organism control the traits of the organisms.
Reason: Gene is specific segment of DNA occupying specific position on a chromosome.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

85) **Assertion:** In grasshoppers, females are heterogametic and males are homogametic.
Reason: In grasshoppers, male has only one sex chromosome (XO) whereas the female has sex chromosomes (XX).
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

86) **Assertion:** Round green seeds in pea can be represented by RRyy of Rryy.
Reason: Round yellow seeds and green wrinkled seeds are parental combinations whereas round green and wrinkled yellow are recombinants.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

87) **Assertion:** If mother has two dominant alleles for black hair and father has two recessive alleles for blonde hair then their child will inherit one dominant allele from mother and one recessive allele from father and will have black hair.
Reason: Progeny inherits one genes for each trait from its parents but the trait shown by progeny depends on inherited alleles.
Codes:
(a) Both A and R are true and R is correct explanation of the assertion
(b) Both A and R are true but R is not the correct explanation of the assertion
(c) A is true but R is false
(d) A is false but R is true.

88) **Assertion (A)** Human populations show a great deal of variations in traits.
Reason (R) All variations in a species have equal chances of surviving in the environment in which they live.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true, but R is not the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

89) **Assertion (A)** Dominant allele is an allele whose phenotype expresses even in the presence of another allele of that gene.
Reason (R) It is represented by a capital letter, e.g. T.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true, but R is not the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

90) **Assertion (A)** A geneticist crossed a pea plant having violet flowers with a pea plant having white flowers, he got all violet flowers in first generation.
Reason (R) White colour gene is not passed on to next generation.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true, but R is not the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

91) **Assertion (A)** In humans, if gene (B) is responsible for black eyes and gene (b) is responsible for brown eyes, then the colour of eyes of the progeny having gene combination Bb, bb or BB will be black only.
Reason (R) The black colour of the eyes is a dominant trait.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true, but R is not the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

92) **Assertion (A)** Height in pea plants is controlled by efficiency of enzymes and is thus genetically controlled.
Reason (R) Cellular DNA is the information source for making proteins in the cell.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true, but R is not the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

93) **Assertion (A)** In human beings, males have 'XX' sex chromosomes and females have 'XY' sex chromosomes.
Reason (R) Sex of the child is determined at the time of fertilisation when male and female gamete fuse to form a zygote.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true, but R is not the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

Passage Based Questions 1 x 1 = 1

94) In human being, the sex of the individual 'is largely genetically determined. In other words, the genes inherited from our parents decide whether we will be boys or girls. Bilt so far, we have assured that similar gene sets are inherited from both parents. Most human chromosomes have a maternal and a paternal copy, and we have 22 such pairs. But one pair, called the sex chromosomes, is odd in not always being a perfect pair. Women have a perfect pair of sex chromosomes, both called X. But men have a mismatched pair in which one is a normal-sized X white the other is a short one called Y. So women are XX, while men are XY.
In some animals the temperature at which the eggs are kept decides the gender.
Answer the following questions based on the above information
(a) In which animal, male has two different sex chromosomes unlike the female?
(b) What is the name given to set of unpaired chromosomes of an organism?
(c) Give an example where sex determination is regulated by environmental factors.
(d) A pregnant woman has an equal chance of her baby being blood group A or blood group AB. What is the possible genotype of woman and father of the child?

2 Marks 162 x 2 = 324

95) How does the creation of variations in a species promote survival?

96) If a trait A exists in 10% of a population of an asexually reproducing species and a trait B exists in 60% of the same population, which trait is likely to have arisen earlier?

97) How do Mendel's experiments show that traits may be dominant or recessive?

98) Only variations that confer an advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

99) Sheela found the fossils of three organisms A, B and C in the museum. The fossil of organism A was an arthropods which was common around 500 - 700 million years ago. The fossil of organism B was an invertebrate animals with flat, coiled, spiral shell was common around 180 million years ago. The fossil of organism C was carnivorous or herbivorous reptiles which lived in earth around 250 million years ago. Identify the organisms A, B and C.

100) A population of blue beetles lived in green bushes in my garden. During the process of breeding, a green beetle was produced.
(a) Will the production of green coloured beetles involve a change in genetic material?
(b) Is the change in the colour of the beetle a process of evolution?
(c) What will be the advantage of the green beetle?

101) Ganesh lives in a colony having lots of mosquitoes. One day the local health body sprayed insecticide to check the mosquito menace. However even after that some mosquitoes survived and grew. What explanation you can give for this fact?
(a) Mosquitoes become immune to insecticides as some are more healthy.
(b) Some mosquitoes are capable of metabolising insecticides.
(c) What other reason you can suggest?

102) Mala is four-month pregnant and is worried whether the child is male or female. One day she reads an advertisement regarding a medicine which of taken for 3 months results in birth of male child. What should she do?
(a) Get the medicine and take it regularly.
(b) Visit a doctor and discuss the problem with him/her.
(c) What, in your opinion, are the chances of having a male child?

103) After reading about mendel's experiment on sweat pea Kala wanted to repeat the same in his kitchen garden. She bought sweet pea seeds and sowed them. After few months when the plants started flowering she observed that all the plants were tall.
(a) Why all plants were tall?
(b) Under which condition she could have observed both tall and dwarf plants?
(c) If she collects seeds from her garden and sows them, what type of plants she is expected to get?

104) In Ram's class, routine blood test was done to know the blood group of each student so that it could be entered in their Identity cards. Ram was told that his blood group is O^+ . He already knew the blood group of his father is B type and that of mother of A type. He got confused why his blood group is O.
(a) Is it possible that parents having A and B blood group can have children with O type blood group?
(b) What could be the possible blood group of Ram's siblings?
(c) Do you see any other' symbols along with your blood test report?

105) Reena who is four months pregnant, went to a doctor for a routine check. The doctor asked her to get an ultrasound done. Reena asked the doctor after the ultrasound was done whether the sex of baby can be known by this test.
(i) What will be the reply of the doctor?
(ii) If he says yes, whether he should tell the couple about the sex of the baby?
(iii) Why should the doctor not disclose the sex of the baby to the parents?

106) A new born has an XX pair of chromosomes. What is the sex of the new born baby?

107) What will be the colour of the hair of a person if he inherits a gene for red hair from his mother and a gene for black hair from his father provided the gene for red hair is recessive to the gene for black hair?

108) What is the genotype of dwarf plants whose parental cross always produced tall offspring?

109) In F_2 generation, progeny having different traits are produced in the ratio of 3 : 1. Is it a monohybrid cross or dihybrid cross?

110) If a normal human cell has 46 chromosomes, then how many chromosomes will be there in a human zygote?

111) Does genetic combination of mother play a significant role in determining the sex of new born baby?

112) What is the genotype of tall plants which always produced tall offspring?

113) How is the sex of a newborn determined in humans?

114) Do genetic combination of mothers play a significant role in determining the sex of a new born?

115) Mention three important features of fossils which help in the study of evolution.

116) Why do all the gametes formed in human females have an X chromosome?

117) In human beings, the statistical probability of getting either a male or female child is 50 : 50. Give a suitable explanation.

118) A very small population of a species faces a greater threat of extinction than a larger population. Provide a suitable genetic explanation.

119) What are homologous structures? Give an example. Is it necessary that homologous structures always have a common ancestor?

120) Does the occurrence of diversity of animals on earth suggest their diverse ancestry also? Discuss this point in the light of evolution.

121) Give the pair of contrasting traits of the following characters in pea plant and mention which is dominant and recessive (i) yellow seed (ii) round seed

122) Why did Mendal choose pea plant for his experiments?

123) A woman has only daughters. Analyze the situation genetically and provide a suitable explanation.

124) Bacteria have a simpler body plan when compared with human beings. Does it mean that human beings are more evolved than bacteria? Provide a suitable explanation.

125) Give reasons why acquired characters are not inherited.

126) Evolution has exhibited a greater stability of molecular structure when compared with morphological structures. Comment on the statement and justify your opinion.

127) In the following crosses write the characteristics of the progeny

Cross		Progeny
(a)	RR YY × RR YY	.....
Round, yellow Round yellow		.....
(b)	Rr Yy × Re Yy	.....
Round, yellow Round,		.....
(c)	rr yy × rr yy	.....
Wrinkled, green wrinkled, green		.....
(d)	RR YY × rr yy	.....
Round, yellow wrinkled green		.....

128) Study the following cross and showing self-pollination in F1, fill in the blank answer the question that follows

$$\underset{Round,yellow}{RRYY} \times \underset{Wrinkled,green}{rryy} \quad F1 - \underset{Round,yellow}{Rr \quad Yy} \times$$

129) (a) In question 8, what are the combinations of character in the F_2 progeny?
(b) What are their ratios?

130) Give reasons for the appearance of new combinations of characters in the F_2 progeny.

131) Can geographical isolation lead to speciation? How?

132) What will be the blood groups of offspring's produced by the parents having following genotype?

133) Give the respective scientific terms used for studying :
(i) The mechanism by which variations are created and inherited.
(ii) The development of new type of organisms from the existing ones.

134) Feather imprints were preserved along the dinosaur's bones but dinosaurs could not fly. What was the significance of feathers in reptiles and later on for other species?

135) Wild cabbage was converted into number of variants like cauliflower, broccoli and cabbage by man. What is this process known as?

136) What is speciation?

137) What is heredity?

138) What will be the sex of a baby if sperm carrying X chromosome fertilizes egg in human beings? Why?

139) A woman with blonde curly hair married a man with black soft hair. All of their children in first generation had black soft hair but in next generation children had different combinations in the ratio of 9 : 3 : 3 : 1. State the law that governs this expression.

140) What happened when Mendel crossed two traits of a character in a pea plant?

141) Who provided experimental evidence to support theory of origin of life from inanimate matter?

142) If the sperm bearing Y - Chromosome fertilizes an egg, the child born will not be entirely like his father? Why?

143) A normal pea plant bearing coloured flowers suddenly start producing white flowers. What could be the possible cause?

144) Mention any two recessive traits of garden pea.

145) Mention the characteristics on the basis of which duck - billed platypus is considered as a link between reptiles and mammals.

146) Why are the small numbers of surviving tigers a cause of worry from the point of view of genetics?

147) Is it true that when a new species is emerged, the old species will be eliminated? Why?

148) What will be the percentage of 'ab' gametes produced by AaBb parent?

149) Mendel crossed a pure white recessive pea plant with a dominant pure red flowered plant. What will be the first generation of hybrids?

150) In evolutionary terms, can we say which among bacteria, spiders, fish and chimpanzees have a better body design? Why or why not?

151) What is an offspring?

152) Name the chemicals which were essential for origin of life.

153) Why males are called heterogametic?

154) What is the percentage possibility a couple of having daughters?

155) Name two organisms in which sex determination is regulated by environmental factors.

156) What are inherited traits? Give an example.

157) When Mendel crossed a tall plant with a dwarf plant, no medium height plants were obtained in F_1 generation. Why?

158) The human hand, cat paw and horse foot when studied showed the same structure of bones and point towards a common origin.
(a) What do you conclude from this?
(b) What is the term given to such structures?

159) How do we know the age of fossils?

160) Do you agree with the statement: " Only variation that confer and advantage to an individual organism will survive in population.".

161) Explain the role of artificial selection in organic evolution.

162) What is the main difference between sperms and eggs of humans? Write the importance of this difference.

163) How are variant genotypes produced?

164) What are homologous organs? Can the wings of a butterfly and the wings of a bat be regarded as homologous?Why?

165) Give an example of a body characteristics used to determine how close two species are in terms of evolution and explain it.

166) If we cross pure-bred tall (dominant) pea plant with pure-bred dwarf (recessive) pea plant we will get pea plants of F_1 generation. if we now self-cross the pea plants of F_2 generation.
(a) What do the plants F_1 generation look like?
(b) State the ratio of tall plants to dwarf plants F_2 generation.
(c) State the type of plants not found in F_1 generation, but appeared in F_2 generation mentioning the reason for the same.

167) Explain with the help of suitable examples why certain traits cannot be passed onto the next generation? what are such traits called?

168) With the help of suitable examples, explain why certain traits cannot be passed onto the next generation. what are such traits called?

169) (a) " The sex of the children is determined by what they inherit from their father and not their mother." Justify.
(b) Give an example where environmental factors like temperature determines the sex of the offspring.

170) " The father is responsible for the sex of the child. not the mother." Justify this statement.

171) A pea plant with blue colour flower denoted by BB is cross-bred with a pea plant with white flower denoted by ww.
(a) What is the expected colour of the flowers in their F_4 progeny?
(b) What will be the percentage of plants bearing white flower in F_2 generation, when the flowers of F_4 plants were selfed?
(c) State the expected ratio of the genotype BB and Bw in the F_2 progeny.

172) How are fossils formed? Describe in brief two methods of determining the age of fossils.

173) How are fossils formed? State two methods of determining the age of fossils.

174) What are fossils? How are they formed? Describe in brief two methods of determining the age of fossils. State anyone role of fossils in the study of the process of evolution

175) State the importance of chromosomal difference between sperms and eggs of humans.

176) Explain the terms :
(i) Speciation
(ii) Natural selection

177) List two differences in tabular form between dominant trait and recessive traits. What percentage/proportion of the plant in the F_2 generation/progeny were round, in Mendel's cross between round and wrinkled pea plants?

178) List three factors that provide evidences in favour of evolution in organisms and state the role of each in brief.

179) "A trait may be inherited, but may not be expressed." Justify this statement with the help of a suitable example.

180) With the help of an example, justify the following statement: " A trait may be inherited, but may not be expressed".

181) "It is possible that a trait is inherited, but may not be expressed." Give a suitable example to justify this statement.

182) Explain with an example for each, how the following provides evidences in favour of evolution in organisms :
(i) Homologous organs
(ii) Analogous organs
(iii) Fossils.

183) What is meant by speciation? List four factors that could lead to speciation. Which of these cannot be a major factor in the speciation of a self-pollinating plant species. Give reason to justify your answer

184) List three main factors responsible for the speciation and briefly describe each one of them.

185) Tabulate two distinguishing features between acquired and inherited traits with one example of each

186) List three distinguishing features in tabular form between acquired trait and inherited trait.

187) List in tabular form, two distinguishing features between acquired trait and inherited trait.

188) (a) Name any four varieties of vegetables which have been produced from 'wild cabbage' by the process of artificial selection.
(b) Give one example of an evolutionary change produced in an organism for one purpose which later on becomes more useful for a different function.

189) Explain the various stages of evolution.

190) "Two areas of study namely 'evolution' and 'classification' are interlinked." Justify this statement.

191) "We cannot pass on to our progeny the experiences and qualifications earned during our life time." Justify the statement giving reason and examples.

192) Describe any three ways in which individuals with a particular trait may increase in population.

193) Define heredity.

194) Define variations

195) What is a trait?

196) Name two human traits that show variations

197) What is adaptation?

198) Which of the two sperm or egg-decides the sex of the child

199) The forelimbs of frog, reptiles, birds and arms of man show the same basic design. What kind of organs are these?

200) What is microevolutions?

201) What is a gene?

202) Who is known as the "father of Genetics"?

203) What is evolution?

204) What type of reproduction gives rise to more number of successful variations?

205) What are fossils?

206) What are the uses of fossils

207) Name the scientist who put forth the theory of natural selection

208) What is artificial selection?

209) How can we trace evolutionary relationships?

210) What is phylogeny and molecular phylogeny?

211) What is environmental selection?

212) What term did Mendel use for genes? Where are the genes located?

213) How many pairs of chromosomes do human beings have, specify the types of chromosomes also?

214) What are homologous organs? Explain with an example.

215) What are analogous organs? Explain with an example.

216) What is the significance of studying homologous and analogous organs?

217) Which of the following combinations of sex chromosomes produces a male or a female child-XX or XY?

218) Which of the following are homologous and analogous organs?
(a) Wings of birds and insects.
(b) Flippers of whale and fins of fish.
(c) Flippers of whale and wings of bat.
(d) Our teeth and elephants tusks.
(e) Potato and runners of grass.

219) How do traits or characters get expressed?

220) Define variation in relation to a species: Why is variation beneficial is the species?

221) What is genetic drift?

222) Which is gene flow?

223) How do we know how old fossils are?

224) What is speciation? How does it occur?

225) State Mendel's first law

226) What are alleles?

227) State the second law of Mendel.

228) State the result of Mendel's experiment.

229) What is classification?

230) State the importance of variations.

231) What is the effect of DNA copying Which is not perfectly accurate on the reproduction process

232) "Variations that confer an advantage to an individual organism only will survive in population". Justify

233) Distinguish between homologous organs and analogous organs. In which category would you place wings of a bird and wings of a bat? Justify your answer giving a suitable reason.

234) With the help of an example explain how "Genes control characteristics or traits"?

235) Dead remains of two species A and B were buried. Later only Xs body was found to be a fossil but not B's given reason

236) Species A shares -ten characteristics with species B, species C share fifteen characteristics with D which of the two pairs share closer relation.

237) After the death of two insects, one of the insect was burried in hot mud and the other in usually found mud. Which of the two is more likely to be preserved better and why?

238) Green and red coloured seeds are recessive and dominant trait respectively. Out of F_1 and F_2, in which generation will the green seed appear, if both parents are not hybrid.

239) What are the different ways in which individuals with a particular trait may increase in a population

240) Why are traits acquired during the life-time of an individual not inherited

241) What factors could lead to the rise of a new species?

242) Will geographical isolation be a major factor in the speciation of a self-pollinating plant species. Why or why not?

243) Will geographical isolation be a major factor in the speciation of an organism that reproduces asexually? Why or why not?

244) Give an example of characteristics being used to determine how close two species are in evolutionary terms.

245) Can the wing of a butterfly and the wing of a bat be considered homologous organ? Why or why not?

246) Why are human beings who look so different from each other in terms of size, colour and looks said to belong to the same species?

247) Explain the terms analogous and homologous organs with examples

248) Explain the analogous organs and homologous organs. Identify the analogous and homologous organ amongst the following: Wings of an insect, wings of a bat, forelimbs of frog, forelimbs of human.

249) Define the principal focus of a concave mirror .

250) Reproduction leads to variation. How?

251) In any population, no two individuals are absolutely similar. Why?

252) List any two pairs of visible contrasting characters of garden pea plant used by Mendel for his experiments stating the dominant and recessive characters in each pair.

253) A Mendelian experiment consisted of breeding pea plants bearing violet flowers with pea plants bearing white flowers. What will be the result in F_1 progeny?

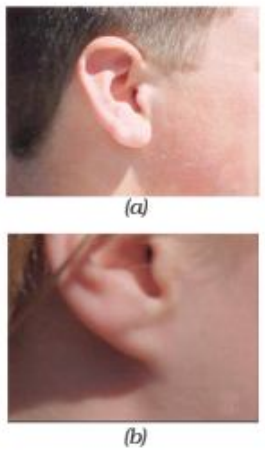
254) Why is the progeny always tall, when a tall pea plant is crossed with a short pea plant?

255) In human beings, the probability of getting a male or a female child is 50%, Explain with the help of a flow diagram only.

256) Which among the males and females are homogametic?

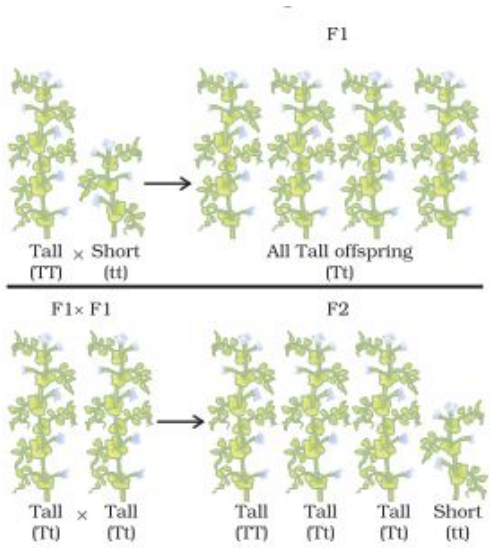
Activity Based Questions 2 x 2 = 4

257) Observe the ears of all the students in the class. Prepare a list of students having free or attached earlobes and calculate the percentage of students having each (Fig below).



Find out about the earlobes of the parents of each student in the class. Correlate the earlobe type of each student with that of their parents. Based on this evidence, suggest a possible rule for the inheritance of earlobe types.

258) In Fig.



what experiment would we do to confirm that the F2 generation did in fact have a 1:2:1 ratio of TT, Tt and tt trait combinations?

3 Marks 37 x 3 = 111

259) How is the equal genetic contribution of male and female parents ensured in the progeny?

260) How is the sex of the child determined in human beings?

261) A man with blood group A marries a woman with blood group O and their daughter has blood group O. Is this information enough to tell you which of the traits - blood group A or O - is dominant? Why or why not?

262) How do Mendel's experiments show that traits are inherited independently?

263) State the meaning of inherited and acquired traits. Which of the two is not passed onto the next generation? Explain with the example.

264) What are fossils? What do they tell about the process of evolution?

265) A true breeding tall plant is crossed with a true breeding short plant. All the off springs of the F_1 generation are tall. Of these two characters which one is dominant and which is recessive.

266) The tall plant of the F_1 generation is selfed. What is the out come or ratio of the F_2 progeny?

267) What is natural selection?

268) Define Genetics. What did Mendel's contribution to genetics?

269) Explain the Monohybrid Cross.

270) Discuss how the variation is seen/accumulated during different types of reproduction

271) List down the reasons for the choice of pea plant by Mendel for his experiment.

272) What is meant by the term speciation? List four factors which could lead to speciation.

273) Define the term 'evolution'. "Evolution cannot be equated with progress". Justify this statement

274) "An individual cannot pass on to its progeny the experiences of its lifetime." Justify the statement with the help of an example and also give reason for the same

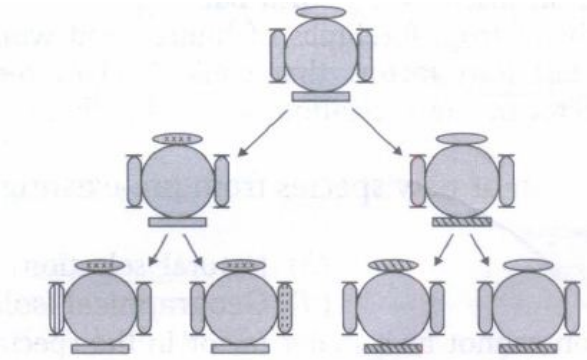
275) "We cannot pass on to our progeny the expenences and qualifications earned during our life time". Justify the statement giving reason and examples.

276) "It is possible that a trait is inherited but may not be expressed." Give a suitable example to justify this statement.

277) Explain the following:
(a) Speciation (b) Natural Selection

278) In one of his experiments with pea plants Mendel observed that when a pure tall pea plant is crossed with a pure dwarf pea plant, in the first generation, F_1 only tall plants appear.
(a) What happens to the traits of the dwarf plants in this case?
(b) When the F_1 generation plants were self-fertilised, he observed that in the plants of second generation, F_2 both tall plants and dwarf plants were present. Why did it happen? Explain briefly.

279) Study the given diagram and answer the questions.



Creation of diversity over succeeding generations. The original organism at the top will give rise to, say, two individuals, similar in body design, but with subtle differences. Each of them, in turn, will give rise to two individuals in the next generation. Each of the four individuals in the bottom row will be different from each other. While some of these differences will be unique, others will be inherited from their respective parents, who were different from each other.
(i) Why do we find all bottom row individuals different from each other?
(ii) What is similar in all the individuals

280) Male individual has 23 pairs of chromosomes, female individual has 23 pairs of chromosomes Then why don't an offspring have 46 pairs of chromosomes which is obtained by the fusion of these two eggs.

281) What evidence do we have for the origin of life from inanimate matter?

282) Define Genotype and Phenotype.

283) Why evolution should not be equated with progress?

284) In an asexually reproducing species, if a trait X exists in 5% of a population and trait Y exists in 70% of the same population, which of the two trait is likely to have arisen earlier? Give reason.

285) Name the plant Mendel used for his experiments. What type of progeny was obtained by Mendel in F_1 and F_2 generations when he crossed the tall and short plants? Write the ratio he obtained Iin F_2-generation plants.

286) A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other.
(i) List your observations regarding
(a) Colour of stem in their F_1 progeny.
(b) Percentage of brown stemmed plants in F_2 progony, if F_1 plants are self-pollinated.
(c) Ratio of GG and Gg in the F_2 progeny.
(ii) Based on the findings of this cross, what conclusion can be drawn?

287) (i) Why is the F_1-progeny always tall, when a tall pea plant is crossed with a short pea plant?
(ii) How is F_2-progeny obtained by self-pollination of F_1-progeny different from F_1-progeny? Give reason for this observation.
(iii) State a conclusion that can be drawn on the basis of this observation.

288) In a cross between red coloured and white coloured flowers, when plants with red coloured flowers of F_1- generation were self-pollinated, plants of F_2 - generation were obtained in which 75% of plants were with red flowers and 25% plants were with white flowers.
Explain the inheritance of traits in the above cross with the help of a flowchart only along with the ratio of plants obtained.

289) Study the following cross and showing self-polination in F_1, fill in the blank and answer the questions that follow.
RRYY × rryy Parents
(Round yellow) (Wrinkled green)
RrYy × ..... F_1-generation
(Round yellow)
(i) ln above question, what is the combination of characters in the F_2-progeny? What are the ratios?
(ii) Give reasons for the appearance of new combination of characters in the F_1-progeny.

290) Two pea plants - one with round yellow seeds (RRYY) and another with wrinkled green (rryy) seeds produce F_1-progeny that have round, yellow (RrYy) seeds. When F_1-progony plants are self-pollinated, which new combination of characters is expected in F_2-progeny? How many seeds with those new combinations of characters will be produced when a total 160 seeds are produced in F_2-generation? Explain with reason.

291) After self-pollination in pea plants with round, yellow seeds, following types of seeds were obtained by Mendel:

Seeds	**Numbers**
Round yellow	630
Round green	216
Wrinkled yellow	202
Wrinkled greed	64

Analyse the result and describe the mechanism of inheritance which explains these results.

292) In humans, there is a 50% probability of the birth of a boy and 50% probability that a girl will be born. Justify the statement on the basis of the mechanism of sex determination in human beings.

293) Using height (tallness/dwarfness) of a plant as an example, show that genes control the characteristics or traits in an organism.

294) An animal(guinea pig) having black colour is crossed with guinea pig having same colour.
They produced 100 offspring, out of which 75 were black and 25 were white.
(i) What is the possible genotype?
(ii) Which trait is dominant and which is recessive?

295) A cross was made between pure breeding pea plants one with round and green seeds and the other with wrinkled and yellow seeds.
(i) Write the phenotype of F_1-progeny. Give reason for your answer.
(ii) Write the different types of F_2-progeny obtained along with their ratio when F_1 progeny was selfed.

Case Study Questions 14 x 4 = 56

296) Sex determination is the method by which distinction between males and females is established in a species. The sex of an individual is determined by specific chromosomes. These chromosomes are called sex chromosomes or allosomes. X and Y chromosomes are called sex chromosomes. The normal chromosomes other than the sex chromosomes of an individual are known as autosomes.

(i) In XX-XO type of sex determination

(a) females produce two different types of gametes

(b) males produce two different types of gametes

(c) females produce gametes with Y chromosome

(d) males produce gametes with Y chromosome.

(ii) A couple has six daughters. What is the possibility of their having a girl next time?

(a) 10% **(b) 50%**

(c) 90% **(d) 100%**

(iii) Number of autosomes present in liver cells of a human female is

(a) 22 autosomes **(b) 22 pairs**

(c) 23 autosomes **(d) 23 pairs.**

(iv) XX-XO type of sex determination and XX-XY type of sex determination are the examples of

(a) male heterogamety **(b) female heterogamety**

(c) male homogamety **(d) both (b) and (c).**

(v) Select the incorrect statement.

(a) In male grasshoppers, 50% of sperms have no sex chromosome

(b) Female fruitfly is heterogametic

(c) Human male produces two types of sperms 50% having X chromosome and 50% having Y chromosomes

(d) In turtle, sex determination is regulated by environmental factors.

297) Gregor Mendel conducted hybridisation experiments on garden peas for seven years and proposed the laws of inheritance in living organisms. He investigated characters in the garden pea plant that were manifested as two opposing traits, e.g., tall or dwarf plants, yellow and green seeds, etc.

(i) Among the seven pairs of contrasting traits in pea plant as studied by Mendel, the number of traits related
to flower, pod and seed respectively were

(a) 2,2,2 **(b) 2,2,1**

(c) 1,2,2 **(d) 1,1,2.**

(ii) The colour based contrasting traits in seven contrasting pairs, studied by Mendel in pea plant were

(a) 1 **(b) 2**

(c) 3 **(d) 4.**

(iii) Refer to the given table of contrasting traits in pea plants studied by Mendel.

Character	Dominant trait	Recessive trait
(i) Seed colour	 Yellow	 Green
(ii) Flower colour	 Violet	 White
(iii) Pod shape	 Full	 Constricted
(iv) Flower position	 Axial	 Terminal

Which of the given traits is correctly placed?

(a) (i), (ii) and (iii) only

(b) (ii), (iii) and (iv) only

(c) (ii) and (iii) only

(d) (i), (ii), (iii) and (iv)

(iv) Some of the dominant traits studied by Mendel were

(a) round seed shape, green seed colour and axial flower position

(b) terminal flower position, green pod colour and inflated pod shape

(c) violet flower colour, green pod colour and round seed shape

(d) wrinkled seed shape, yellow pod colour and axial flower position.

(v) Which of the following characters was not chosen by Mendel?

(a) Pod shape **(b) Pod colour**

(c) Position of flower **(d) Position of pod**

298) Mendel crossed tall and dwarf pea plants to study the inheritance of one gene. He collected the seeds produced as a result of this cross and grew them to generate plants of the first hybrid generation which is called the first filial progeny or F_1: Mendel then self pollinated the tall F_1 plants and he obtained F_2 generation.

(i) In garden pea, round shape of seeds is dominant over wrinkled shape. A pea plant heterozygous for round shape of seed is selfed and 1600 seeds produced during the cross are subsequently germinated. How many seedlings would have non-parental phenotype?

(a) 1600 **(b) 1200**

(c) 400 **(d) 800**

(ii) If 'A' represents the dominant gene and 'a' represents its recessive allele, which of the following would be the most likely result in the first generation offspring when Aa is crossed with aa ?

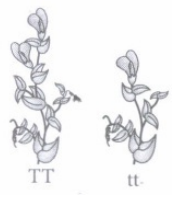
(a) All will exhibit dominant phenotype.

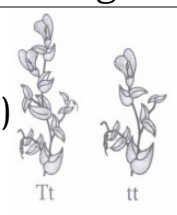
(b) All will exhibit recessive phenotype.

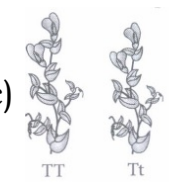
(c) Dominant and recessive phenotypes will be 50% each.

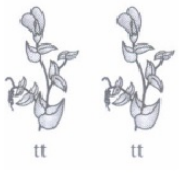
(d) Dominant phenotype will be 75%.

(iii) Which of the following crosses will give tall and dwarf pea plants in same proportions?

A) 

B) 

c) 

D) 

(iv) What result Mendel would have got, if he self pollinated a homozygous tall F_2 plant?

(a) TT and Tt

(b) All Tt

(c) All TT

(d) All tt

(v) In plant, tall phenotype is dominant over dwarf phenotype, and the alleles are designated as T and t, respectively. Upon crossing one tall and one dwarf plant, total 250 plants were obtained, out of which 124 displayed tall phenotype and rest were dwarf. Thus, the genotype of the parent plants were

(a) TT x TT

(b) TT x tt

(c) Tt x Tt

d) Tt x tt.

299) The cross that include the inheritance of two pairs of contrasting characters simultaneously is referred as dihybrid cross. Mendel chose pure breeding plants for yellow and green seeds and round and wrinkled shape of seeds. He cross pollinated the plant having yellow round seeds with plant having green wrinkled seeds. All the plants produced in F_1 generation were having, yellow round seeds. The plants raised from these seeds were self pollinated, that resulted in production of plants having four phenotypically different types of seeds.

(i) When a cross is made between a yellow round seeded plant (YyRr) and a yellow wrinkled seeded plant (Yyrr), what is true regarding the proportions of phenotypes of the offsprings in F_1 generation?

	Proportion of yellow wrinkled seeds	**Proportion of green wrinkled seeds**
(a)	**3/8**	**1/8**
(b)	**2/8**	**1/8**
(c)	**1/8**	**3/8**
(d)	**2/8**	**2/8**

(ii) How many types of gametes can be produced by YYrr?

(a) 1 **(b) 2**
(c) 3 **(d) 4**

(iii) In Mendelian dihybrid cross, when heterozygous tall plant with green seeds are self crossed the progenies are

(a) TtYy, TtYY, TTYy **(b) Ttyy, TTyy, ttyy**
(c) ttYy, ttyy **(d) Ttyy, TTyy**

(iv) When round yellow seeded heterozygous pea plants are self fertilised, the frequency of occurrence of RrYY genotype among the offsprings is

(a) 9/16 **(b) 3/16**
(c) 2/16 **(d) 1/16.**

(v) The percentage of yr gamete produced by YyRr parent will be

(a) 25% **(b) 50%**
(c) 75% **(d) 12.5%.**

300) In human, the allele for brown eyes (B) is dominant over that for blue eyes (b). A brown eyed woman marries a blue eyed man, and they have six children. Four of the children are brown eyed and two of them are blue eyed.

(i) What is the genotype of blue eyed offspring?

(a) BB (b) Bb
(c) bb (d) Cannot be determined

(ii) What is the woman's genotype?

(a) BB (b) Bb
(c) bb (d) Cannot be determined

(iii) The ovum, produced by the mother carries the gene regarding eye colour is

(a) BB **(b) Bb**
(c) B or b **(d) B only.**

(iv) The ratio of brown eyed children to blue eyed children in this family is 2 : 1, which deviates from typical phenotypic ratios for monohybrid inheritance. What might be the reason?

(a) Gametes carrying the brown eyed allele are more viable then those with the blue eyed allele.
(b) A different pattern of inheritance other than monohybrid inheritance is involved.
(c) Not all of their babies survived childbirth, thus causing a distortion in the actual ratio.
(d) The actual ratio differs from the expected ratio because the sample size is too small.

(v) What is the gene carried by of the man's sperm regarding the eye colour?

(a) BB **(b) Bb**
(c) b only **(d) b or B.**

301) Purebred pea plant with smooth seeds (dominated characteristic) were crossed with purebred pea plant with wrinkled seeds (recessive characteristic). The F_1 generation was self pollinated to give rise to the F_2 generation.

(i) What is the expected observation of the F_1 generation of plants?

(a) 1/2 of them have smooth seeds and 1/2 of the have wrinkled seeds.

(b) 1/4 of them have wrinkled seeds and 3/4 of them have smooth seeds.

(c) 3/4 of them have wrinkled seeds and 1/4 of them have smooth seeds.

(d) All of them have smooth seeds.

(ii) What is the expected observation of the F_2 generation of plants?

(a) 1/2 of them have smooth seeds and 1/2 of them have wrinkled seeds.

(b) 1/4 of them have wrinkled seeds and 3/4 of them have smooth seeds.

(c) 3/4 of them have wrinkled seeds and 1/4 of them have smooth seeds.

(d) All of them have smooth seeds.

(iii) If a genotype consists of different types of alleles, it is called

(a) homozygous **(b) heterozygous**

(c) monoallelic **(d) uniallelic**

(iv) The alternative form of gene is called

(a) dominant character **(b) recessive character**

(c) alternative genes **(d) allele.**

(v) Which of the following will be the genotypic ratio of given F_2 generation?

(a) 1: 3 **(b) 3: 1**

(c) 1: 2 : 1 **(d) 1: 1 : 1**

302) In fruittlies, the gene for wing shape has two alleles, an unusual allele for curled wings (c) and the normal allele for straight wings (C). The given phenotypes are observed for each genotype.

Genotype	**Phenotype**
CC	Normal, straight wings
Cc	Wings curled up at the ends, has difficulty flying
cc	Unable to hatch from egg

(i) Which of the following crosses would produce live offspring from 50% of the eggs?

(a) CC x Cc **(b) CC x CC**

(c) CC x cc **(d) Cc x cc**

(i) (d)

(ii) (a)

(iii) (a): 25% of the total number of eggs will not hatch (genotype cc). 50% of the offspring will be curlywinged (Cc) and 25% of the offspring are straightwinged (CC).

(iv) (c)

(v) (b) (ii) Which of the following crosses would be able to produce offspring that would fly normally from 50% of the egg?

(a) CC x Cc **(b) Cc x Cc**

(c) CC x cc **(d) Cc x cc**

(iii) Two curly winged flies are crossed, and they produce 150 eggs. What is the proportion of straight-winged flies expected among the live offspring?

(a) 25% **(b) 33%**

(c) 50% **(d) 75%**

(iv) Normal straight winged flies are self crossed and they produce 120 eggs. What is the proportion of curly winged flies expected among the live offspring?

(a) 25% **(b) 75%**

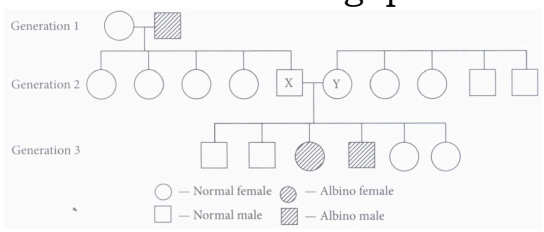
(c) 0% **(d) 100%**

(v) Which of the following crosses would be able to produce offspring that has curled wings only?

(a) CC x Cc **(b) CC x cc**

(c) Cc x Cc **(d) Cc x cc**

303) Refer to the schematic representation of the albinism that is an inherited condition caused by recessive allele (a). 'A' is the dominant allele for the normal condition. The inheritance of certain genetic traits for two or more generations is represented in a pedigree or family tree. Study the given pedigree chart and answer the following questions.



(i) Which of the following could be the genotypes of X and Y?

X	**Y**
(a) AA	**AA**
(b) AA	**Aa**
(c) Aa	**Aa**
(d) aa	**aa**

(ii) Which of the following could be the genotype of generation - 1 male and female?

Male	**Female**
(a) AA	**aa**
(b) aa	**AA**
(c) Aa	**aa**
(d) AA	**AA**

(iii) If X married an albino female, then what is the probability that their children would be albino?

(a) 0 **(b) 0.125**
(c) 0.25 **(d) 0.5**

(iv) If Y married a normal homozygous male, then what is the probability that their children would be albino?

(a) 0 **(b) 0.125**
(c) 0.25 **(d) 0.5**

(v) Which of the following could be the genotype of offsprings produced by cross of X and Y?

(a) AA, Aa, aa **(b) aa, aa**
(c) Aa, Aa **(d) AA, AA**

304) Refer to the given table regarding results of F2 generation of Mendelian cross.

Plants with round and yellow coloured seeds (P)	315
Plants with round and green coloured seeds (Q)	108
Plants with wrinkled and yellow coloured seeds (R)	101
Plants with wrinkled and green coloured seeds (S)	32

(i) Which of the following would be the phenotype of F_1 generation regarding given data of F_2 generation?

(a) Plants with round and yellow coloured seeds

(b) Plants with round and green coloured seeds

(c) Plants with wrinkled and yellow coloured seeds

(d) Plants with wrinkled and green coloured seeds.

(ii) Which of the following would be the genotype of parental generation regarding given result of F_2 generation?

(a) YYRR and yyrr **(b) YYRR and YYRR**

(c) YYRR and YyRr **(d) YyRr and YyRr**

(iii) If plant with wrinkled and green coloured seeds (S) is crossed with plant having wrinkled and yellow coloured seeds (R), what will be the probable phenotype of offsprings?

(a) All plants with wrinkled and yellow coloured seeds

(b) 50% plants with wrinkled and yellow coloured seeds and 50% plants with wrinkled and green coloured seeds

(c) All plants with wrinkled and green coloured seeds

(d) Both (a) and (b).

(iv) Which of the following will result when plant YyRr is self-pollinated?

(a) 9: 3 : 3 : 1 ratio of phenotypes only

(b) 9: 3 : 3 : 1 ratio of genotypes only

(c) 1-: 1 : 1 : 1 ratio of phenotypes only

(d) 1: 1 : 1 : 1 ratio of phenotypes and genotypes

(v) The percentage of yR gamete produced by YyRR parent will be

(a) 25% **(b) 50%**

(c) 75% **(d) 12.5%**

305) Pea plants can have smooth seeds or wrinkled seeds. One of the phenotypes is completely dominant over the other. A farmer decides to pollinate one flower of a plant with smooth seeds using pollen from plant with wrinkled seeds. The resulting pea pod has all smooth seeds.

(i) Which of the following conclusions can be drawn?

1. The allele for smooth seeds is dominated over that of wrinkled seeds.
2. The plant with smooth seeds is heterozygous.
3. The plant with wrinkled seeds is homozygous.

(a) 1 only **(b) 1 and 2 only**

(c) 1 and 3 only **(d) 1, 2 and 3**

(ii) Which of the following crosses will give smooth and wrinkled seeds in same proportion?

(a) RR x rr **(b) Rr x rr**

(c) RR x Rr **(d) rr x rr**

(iii) Which of the following cross can be used to determine the genotype of a plant with dominant phenotype?

(a) RR x RR **(b) Rr x Rr**

(c) Rr x RR **(d) RR x rr**

(iv) On crossing of two heterozygous smooth seeded plants (Rr), a total of 1000 plants were obtained in F_1 generation. What will be the respective number of smooth and wrinkled seeds obtained in F_1 generation?

(a) 750,250 **(b) 500,500**

(c) 800,200 **(d) 950,50**

(v) The characters which appear in the first filial generation are called

(a) recessive characters **(b) dominant characters**

(c) lethal characters **(d) non-mendelian characters**

306) Answer the questions on the basis of your understanding of the following table and related studied concepts.

Pooja has green eyes while her parents and brother have black eyes. Pooja's husband Ravi has black eyes while his mother has green eyes and father has black eyes.

(i) On the basis of the above given information, is the green eye colour a dominant or recessive trait? Justify your answer.

(ii) What is the possible genetic makeup of Pooja's brother's eye colour?

(iii) What is the probability that the offspring of Pooja and Ravi will have green eyes? Also, show the