BIOLOGY

Worksheet-17

STEP

A PROJECT BY PUNJAB GROUP

Worksheet-17 (i)

(Genetics)

Q.1 Hemophiliac's blood fails to clot properly after an injury, because of the following reasons, EXCEPT:

A) A reduction of blood clotting factors

B) A malfunction of blood clotting factors

C) A complete absence of blood clotting factors

D) A reduction in hemopoitic stem cells

Q.2 Hemophilia is a serious:

A) Hereditary disease

B) Cardiovascular disease

C) Physiological disease

D) Immunodeficiency

Q.3 A hemophiliac may:

A) Suffer from immune deficiency

B) Suffer from respiratory infection

C) Bleed to death

D) Suffer from hypertension

Q.4 Hemophilia is of:

A) Two types C) Four types

B) Three types D) One types

Q.5 Pick up the odd pair:

A) Hemophilia – A, Factor VIII

B) Hemophilia – C, Factor XI

C) Hemophilia – B, Factor XI

D) Hemophilia – B, Factor IX

Q.6 Pick up the choice not true with respect to both hemophilia A and hemophilia-B:

A) Non – allelic C) Allelic

B) Recessive D) Sex linked

Q.7 The percentage of hemophiliacs suffering from type – B of hemophilia is:

A) 10% C) 20%

B) 80% D) 30%

Q.8 The percentage of Hemophiliac patients suffering from type – C is:

A) Negligible C) 20%

B) 80% D) 30%

Q.9 Pick up the one that affects more men as compared to women:

A) Hemophilia – A

B) Both Hemophilia A and B

C) Hemophilia – B

D) Hemophilia – C

Q.10 Type of Hemophilia which affects the both men and women equally is:

A) Hemophilia – A

B) Both Hemophilia – A and Hemophilia – B

C) Hemophilia – B

D) Hemophilia – C

Q.11 Chances for a man to be affected by Hemophilia – A and B are:

A) Greater than a woman

B) Equal to a woman

C) Less than a woman

D) Variable as compared to woman

Q.12 A woman can suffer from Hemophilia A or B only when she is:

A) Homozygous dominant

B) Heterozygous dominant

C) Homozygous recessive

D) Homozygous dominant

Q.13 Pick up the disorder that occurs by one recessive allele in man but by two recessive alleles in woman:

A) Hemophilia – A

B) Hemophilia – C

C) Hemophilia – B

D) Hemophilia – A and B

Q.14 It zigzags from maternal grandfather through a carrier daughter to a grandson:

A) Hemophilia – A

B) Hemophilia – C

C) Hemophilia – B

D) Hemophilia – A and B

Q.15 Hemophilia A and B always pass from:

A) Father to son

B) Maternal grandfather to grandson

C) Father to daughter

D) Paternal grandfather to grandson

Q.16 A hemophiliac father passes his 'h' gene directly to his:

A) Son C) Daughter

B) Son's son D) Daughter's son

Q.17 A hemophiliac man receive 'X^h' indirectly from his:

A) Father's father

B) Mother's father

C) Grandfather's father

D) Grandmother's father

Q.18 The single recessive allele for hemophilia is expressed successfully in the:

A) Hemizygous daughter

B) Homozygous son

C) Hemizygous son

D) Heterozygous son

Q.19 A son of a carrier daughter will be affected by hemophilia if he inherits X chromosome of:

A) Maternal grandmother or paternal grandmother

B) Maternal grandfather or maternal grandmother

C) Paternal grandmother or paternal grandfather

D) Paternal grandfather, maternal grandfather

Q.20 Queen Victoria's hemophiliac son was prince:

A) Prince Nicholas C) Rupert

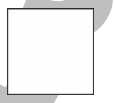
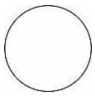
B) Leopold D) Charles

Q.21 The pedigree of Queen Victoria's family shows hemophilic sons in generation no.:

A) II C) IV

B) III D) II, III and IV all

Q.22 Pick up the sign denoting carrier daughter:

A)  C) 

B)  D) 

Q.23 Three primary colors associated with normal trichromatic vision are:

A) Orange, green and blue

B) Red, green and blue

C) Red, green and yellow

D) Red, green and purple

Q.24 Mutations in opsin genes cause _____ types of colorblindness.

A) One C) Three

B) Two D) Four

Q.25 Red blindness is called:

A) Protanopia C) Tritanopia

B) Deuteranopia D) Dichromacy

Q.26 Deuteranopia is:

A) Blue blindness C) Red blindness

B) Green blindness D) Colors blindness

Q.27 Blue blindness is called:

A) Protanopia C) Tritanopia

B) Deuteranopia D) Protanomaly

Q.28 Blue cone monochromacy is an:

A) X – linked recessive trait

B) Autosomal trait

C) X – linked dominant trait

D) Y – linked trait

Q.29 A person suffering from blue cone monochromacy will be:

A) Red blind

B) Green blend

C) Blue blind

D) Red and Green blind

Q.30 The type of color blindness which inherits equally in men and women is called:

A) Blue blindness

B) Green blindness

C) Red blindness

D) Red and Green blindness

Q.31 A normal woman, whose father was red blind marries a red blind man, what proportion of their children can have normal color vision?

A) 100% C) 25%

B) 33% D) 50%

Q.32 The cause of testicular feminization syndrome is:

A) A recessive gene on X – chromosome

B) A recessive gene on Y – chromosome

C) A dominant gene on X – chromosome

D) A dominant gene on Y – chromosome

Q.33 Following are the symptoms of testicular feminization syndrome EXCEPT:

A) Female genitalia

B) No breast

C) Blind vagina

D) Degenerated testes

Q.34 "Such persons are happily married as female but are sterile", because they suffer from:

A) Down's syndrome

B) Turner's syndrome

C) Testicular feminization syndrome

D) Klinefelter's syndrome

Q.35 All daughters of an affected father, but none of his sons are affected in case of:

A) X – linked dominant traits

B) Y – linked dominant traits

C) X – linked recessive traits

D) Y – linked recessive traits

Q.36 The example of X – linked dominant trait is:

A) Color blindness

B) Pattern boldness

C) Hemophilia

D) Hypophosphatemic rickets

Q.37 It cannot be cured by taking vitamin D:

A) Dietary rickets

B) Hypophosphatemic rickets

C) Osteomalacia

D) Weakness of bones

Q.38 It does not result from vitamin – D deficiency:

A) Dietary rickets

B) Hypophosphatemic rickets

C) Osteomalacia

D) Weakness of bones

Q.39 Its cause is genetic communication failure at molecular level:

A) Dietary rickets

B) Hypophosphatemic rickets

C) Osteomalacia

D)Weakness of bones

Q.40 Gene for hypophosphatemic rickets is:

A) d C) H

B) D D) h

Q.41 Maleness is a:

A) X – linked trait

B) Y – linked trait

C) XY – linked trait

D) XX – linked trait

Q.42 Maleness passes through:

A) Y – chromosome from father to son only

B) X – chromosome from father to son only

C) Y – chromosome from mother to son only

D) X – chromosome from mother to son only

Q.43 All sons of an affected father will be affected in case of:

A) X – linked recessive traits

B) Y – linked traits

C) X – linked dominant traits

D) X X linked traits

Q.44 _____ gene on Y chromosome determines maleness in man.

A) tfm C) SRY

B) D D) H

Q.45 It is a male sex switch which triggers developmental process towards maleness after six week pregnancy:

A) SRY gene C) D gene

B) tfm gene D) H gene

Q.46 Such traits affect a structure or function of the body part and occur only in males or only in females:

A) Sex – linked traits

B) Sex limited traits

C) Sex influenced traits

D) X – linked traits

Q.47 Pick up the one not true about a woman:

A) She does not grow a beard herself

B) She cannot have a gene for beard

C) She can have a gene for beard

D) She can pass the genes specifying heavy beard growth to her sons

Q.48 A trait that can occur in both male and female but it is more common in one sex, cannot be:

A) X linked recessive trait

B) Sex influenced trait

C) Sex limited trait

D) X linked dominant trait

Q.49 It is controlled by an allele which is dominant in one sex but recessive in other:

A) Sex – limited trait

B) Sex – influenced trait

C) Y – linked trait

D) X – linked trait

Q.50 Pattern baldness is a:

A) Sex – limited trait

B) Sex – influenced trait

C) Y – linked trait

D) X – linked trait

Q.51 Gregor John Mendel laid down the foundation of:

A) Modern genetics
B) Classical genetics
C) Population genetics
D) Phylogenetics

Q.52 Mendel performed series of breeding experiments on garden pea:

A) In his farmhouse garden
B) In his monastery garden
C) In a public park garden
D) In his school garden

Q.53 Pick up the dominant one among the following traits of Pisum sativum:
A) Yellow pod
B) Constricted pod
C) Green colored seed
D) Round shaped seed

Q.54 As a result of monohybrid cross Mendel got:
A) 25% round C) 75% round
B) 50% round D) 100% round

Q.55 Punnet square indicates that _____ of F_2 progeny would have been homozygous round _____ heterozygous round and _____ wrinkled, respectively:
A) 1/4, 2/4, 1/4 C) 2/4, 1/4, 1/4
B) 1/4, 1/4, 2/4 D) 2/4, 1/4, 2/4

Q.56 Mendel devised a cross called test cross, which is used to test the _____ of an individual showing a dominant _____:
A) Genotype, phenotype
B) Phenotype, genotype
C) Vigor, phenotype
D) Vigor, genotype

Q.57 _____ could be homozygous (RR) or heterozygous (Rr):
A) A genotypically round seed
B) A phenotypically round seed
C) A genotypically wrinkled seed
D) A phenotypically wrinkled seed

Q.58 Wrinkled seed plant is:
A) Always heterozygous recessive
B) Always heterozygous dominant
C) Always homozygous recessive
D) Always homozygous dominant

Q.59 What is depicted from the results of test cross given here below?
Round = 50%
Wrinkled = 50%
A) The tested individual was heterozygous dominant
B) The tested individual was heterozygous recessive
C) The tested individual was homozygous dominant
D) The tested individual was homozygous recessive

Q.60 What was the ratio of new phenotypic combination in F_2 of Mendel's dihybrid?
A) 3/16 C) 9/16
B) 1/16 D) 6/16

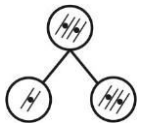
Q.61 What type of gametes will be formed by a plant with RrYy genotype?
A) RR, YY, rr, yy C) RY, Ry, rY, ry
B) RR, yy, Rr, Yy D) Rr, Yy, rr, yy

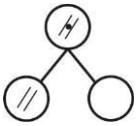
Q.62 In F_2 offspring of a monohybrid cross the independent chance for a pea seed to be round is:
A) 3/4 C) 4/4
B) 1/4 D) 2/4

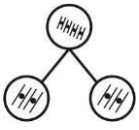
Q.63 Independent assortment of _____ depends upon independent assortment of their _____, respectively:
A) Genes, chromosomes
B) Chromosomes, genes
C) Genes, nucleotide sequence
D) Genes, cells

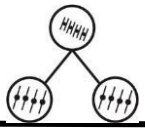
Q.64 Mendel's work was rediscovered and acknowledged after:
A) Sixteen years of his death
B) Twenty years of his death
C) Twenty-four years of his death
D) Thirty-four years of his death

Q.65 Which one of the following exhibits segregation?

A) 

B) 

C) 

D) 

Q.66 Genes for color blindness, hemophilia and gout form a linkage group on:
A) Sex chromosome
B) Autosome
C) X – chromosome
D) Y – chromosome

Q.67 In F_2 of dihybrid cross Mendel obtained ____% parental types:
A) 37.5 C) 66.5
B) 62.5 D) 33.5

Q.68 In P_1 of test cross, one parent will always be:
A) Homozygous dominant
B) Homozygous recessive
C) Heterozygous dominant
D) Heterozygous recessive

Q.69 Gene linkage means:
A) Linkage of a gene with male
B) Linkage of a gene with female
C) Linkage of a gene with particular gender
D) Linkage of a gene with a particular gene

Q.70 Linked genes can be separated by:
A) Meiosis C) Mitosis
B) Crossing over D) Gametogenesis

ANSWER KEY (Worksheet-17(i))							
1	D	21	D	41	B	61	C
2	A	22	D	42	A	62	A
3	C	23	B	43	B	63	A
4	B	24	C	44	C	64	A
5	C	25	A	45	A	65	D
6	C	26	B	46	B	66	C
7	C	27	C	47	B	67	B
8	A	28	A	48	C	68	B
9	B	29	D	49	B	69	D
10	D	30	A	50	B	70	B
11	A	31	D	51	B	71	
12	C	32	A	52	B	72	
13	D	33	B	53	D	73	
14	D	34	C	54	C	74	
15	B	35	A	55	A	75	
16	C	36	D	56	B	76	
17	B	37	B	57	B	77	
18	C	38	B	58	C	78	
19	B	39	B	59	A	79	
20	B	40	B	60	D	80	

EXPLANATION

Q.1 Answer is "A reduction in hemopoitic stem cells"

Explanation: Hemopoisis is associated with formation of new blood cells. It is not associated with blood clotting. However deficiency of blood clotting factors, malfunction of blood clotting factors and a complete absence of blood clotting factors may cause hemophilia of different types.

Q.2 Answer is "Hereditary disease"

Explanation: Hemophilia A, B and C are exclusively inherited and most prevalent types of hemophilia, however, hemophilia A and B are sex-linked recessive traits, whereas hemophilia C is autosomal.

Parahemophilia is a type of hemophilia which may be inherited or acquired. Acquired hemophilia (caused by autoantibodies against factor VIII) is non-inherited. So majority of the types of hemophilia are inherited

Q.3 Answer is "Bleed to death"

Explanation: As there is some deficiency or complete absence of clotting factors, in case of an injury bleeding will not stop.

Q.4 Answer is "Three types"

Explanation: There are three major inherited types of hemophilia i.e. A, B and C which have been mentioned in textbook of Biology. However there are two other types of hemophilia as well i.e. **parahemophilia** and **acquired hemophilia.** But according to textbook three is correct answer.

Q.5 Answer is "Hemophilia B, factor XI"

Explanation: Hemophilia B is due to disturbance in factor IX. Whereas factor XI is associated with hemophilia C

Q.6 Answer is "Allelic"

Explanation: Hemophilia A and Hemophilia B are non-allelic recessive sex linked traits because they exhibit discriminative inheritance.

Q.7 Answer is "20%"

Explanation:

Type	Percentage of Sufferers
1. Hemophilia -A	80%
2. Hemophilia-B	20%
3. Hemophilia-C	Less than 1%

Q.8 Answer is "Negligible"

Explanation: The frequency of Hemophilia-C in human population is less than 1 percent.

Q.9 Answer is "Hemophilia A and B"

Explanation: Hemophilia A and B being sex linked (X-linked) recessive traits

occurs 17% more in men as compared to women.

Q.10 Answer is "Hemophilia - C"

Explanation: As it is autosomal.

Q.11 Answer is "Greater than a woman"

Explanation: The gene of sex linked (X-linked) traits is located on X-chromosome. In such traits female (having homologous pair of X-chromosome) is diallelic and can have three types of genotypes i.e. X^HX^H or X^HX^h or X^hX^h. Out of these three types of genotypes only X^hX^h will cause hemophilia i.e. 1/3 or 33%.

On the other hand male having single X chromosome is monoallelic and as a result only two types of genotypes are possible X^HY or X^hY : X^hY will be hemophilic which represents ½ or 50% subtracting 33 from 50 we get 17. Thus sex-linked (X-linked) recessive traits appear 17% more in male as compared to female.

Q.12 Answer is "Homozygous recessive"

Explanation: Female will suffer from hemophilia by being homozygous recessive X^hX^h only.

Q.13 Answer is "Hemophilia A and B"

Explanation: All X-linked traits including Hemophilia A and B are monoallelic in male (X^hY) because their genes are located on X chromosome and male have single X-chromosome however female will be diallelic (having two X chromosomes).

Q.14 Answer is "Hemophilia A and B"

Explanation: All X-linked recessive traits exhibit zigzag inheritance. An affected male will transfer his single X chromosome (X^h) to his daughter and other X chromosome will be contributed by mother (X^H). Thus daughter will be carrier (X^HX^h). Now she will produce two types of gametes i.e. 50% X^H and 50% X^h. Her son getting X^h from mother will be hemophiliac. Thus the gene of disorder of maternal grandfather after passing through female gender in next generation appears again in male gender in third generation.

Q.15 Answer is "Maternal grandfather to grandson"

Explanation: Hemophilia A and B are X-linked recessive traits and their genes are located on X-chromosome. For a son X-chromosome is always contributed by mother.

Q.16 Answer is "Daughter"

Explanation: A father always contribute Y-chromosome to son and X-chromosome to daughter. Gene for hemophilia (H or h) is carried by X chromosome. So father will transfer it to his daughters, not to sons.

Q.17 Answer is "Mother's father"

Explanation: X^h is inherited by a male directly from his affected or carrier mother. However, the mother have inherited it from her father or mother. Thus the male will inherit it indirectly from mother's father or mother's mother.

Q.18 Answer is "Hemizygous son"

Explanation: In sex linked (X-linked) traits male cannot be homozygous because the genes for such traits are located on X-chromosomes and male have single X-chromosome. Thus male will be hemizygous dominant X^H (Normal) or hemizygous recessive X^h (hemophiliac).

Q.19 Answer is "Maternal grandfather or maternal grandmother"

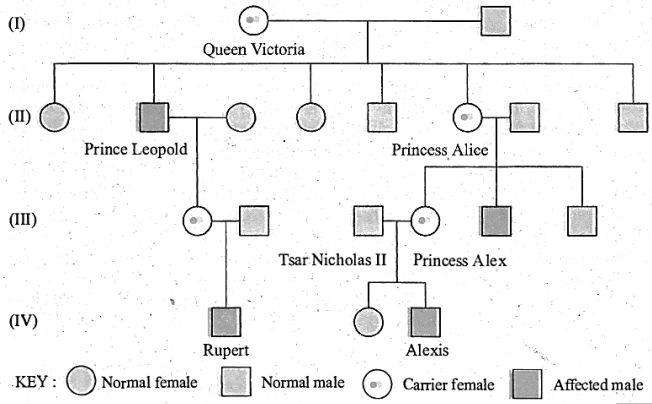
Explanation: X^h is inherited by a male directly from his affected or carrier mother. However, the mother have inherited it from her father or mother. Thus the male will inherit it indirectly from mother's father or mother's mother.

Q.20 Answer is "Leopold"

Explanation: See pedigree of British Royal family given at page 194 of textbook of biology book part II.

Q.21 Answer is "II, III and IV all"

Explanation: Except generation-I, all the rest of the generations shown in figure 22.28 of Textbook of biology have hemophiliac sons.



Q.22 Answer is "D"

Explanation: A circle with dot in centre indicates carrier daughter.

Q.23 Answer is "Red, green and blue"

Explanation: These represent three opsins found in the cone cells of a person with normal trichromatic vision.

Q.24 Answer is "Three"

Explanation: There are three types of opsins in the cone cells of our eyes which are associated with normal trichromatic vision. These three types of opsins are controlled by three different types of genes. Thus mutation in these three genes can cause three types of color blindness.

Q.25 Answer is "Protanopia"

Explanation: A form of colorblindness characterized by defective perception of red and confusion of red with green.

Q.26 Answer is "Green blindness"

Explanation: Defective color vision with confusion of greens with reds.

Q.27 Answer is "Tritanopia"

Explanation: Defective color vision in which the blue sensitive pigment of the retinal cones is absent.

Q.28 Answer is "X-linked recessive trait"

Explanation: That person will have only blue opsin and lack both red and green opsin.

Q.29 Answer is "Red and green blind"

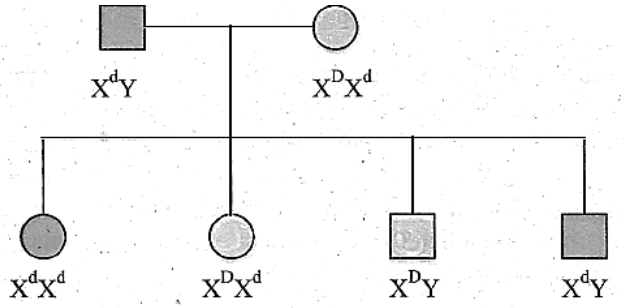
Explanation: Because he/she have only blue opsin in cone cells.

Q.30 Answer is "Blue blindness"

Explanation: Because it is autosomal.

Q.31 Answer is "50%"

Explanation: As it becomes a testcross where mother is heterozygous normal and father is hemizygous colour blind.



Q.32 Answer is "a recessive gene on X-chromosome"

Explanation: tfm gene located on X-chromosome controls it.

Q.33 Answer is "No breasts"

Explanation: A person suffering from testicular feminization syndrome have breasts like a female.

Q.34 Answer is "Testicular feminization syndrome"

Explanation: Persons suffering from testicular feminization syndrome physically look female. They have breast, female genitalia, a blind vagina but no uterus. Degenerated testis are also present in abdomen. Such individuals are happily married as females but are sterile. It is an androgen insensitivity syndrome. Male sex hormone testosterone has no effect on them.

Q.35 Answer is "X-linked dominant trait"

Explanation: As sons receive Y-chromosome from father and X-chromosome from mother. Whereas daughters receive X chromosome from both parents

Q.36 Answer is "Hypophosphatemic Rickets"

Explanation: Hypophophatemic rickets inherits 17% more in females as compared to that in males.

Q.37 Answer is "Hyphosphatemic Rickets"

Explanation: Because the patient is vitamin-D resistant i.e., unable to receive vitamin D's message.

Q.38 Answer is "Hypophosphatemia Rickets"

Explanation: The person have become resistant to vitamin D's message, though vitamin D is not deficient, rather it is genetic communication failure at molecular level. The genes encoding bone proteins never receive vitamin D's message to function.

Q.39 Answer is "Hypophosphatemia Rickets"

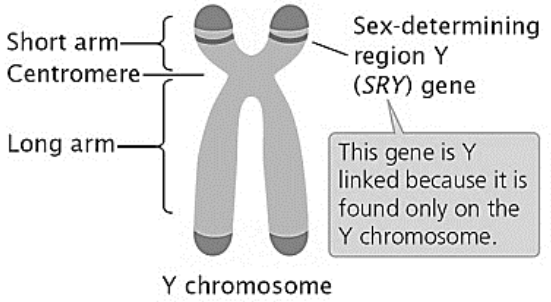
Explanation: Vitamin-D enhances the mineral uptake by increasing absorption of calcium and phosphorus from the digestive tract. If a person becomes deficient in vitamin D or becomes insensitive (resistant) against vitamin D his mineral uptake will be dangerously reduced and bones will become weak and he/she will suffer from rickets.

Q.40 Answer is "D"

Explanation: D gene is dominant gene which is associated with vitamin-D resistance and as result hypophosphatemia.

Q.41 Answer is "Y-linked trait"

Explanation: As SRY gene is carried by short arm of Y-chromosome.



Q.42 Answer is "Y-chromosome from father to son only"

Explanation: As Y-chromosome is received by male zygote only and SRY is carried by male

Q.43 Answer is "Y-linked traits"

Explanation: Genes carried by Y chromosome are transferred to son only as son inherit Y-chromosome from father.

Q.44 Answer is "SRY"

Explanation: SRY (Sex determining region of Y) is located on short arm of Y-chromosome and it determines the maleness in humans.

Q.45 Answer is "SRY gene"

Explanation: SRY is considered a male sex switch. It triggers the developmental.

Q.46 Answer is "sex limited traits"

Explanation: They limited to one sex gender only i.e. either male or female due to their anatomical differences.

Q.47 Answer is "She cannot have a gene for beard"

Explanation: She can have gene for beard but never have beard because she lacks hair follicle underneath the skin required to produce beard.

Q.48 Answer is "Sex limited trait"

Explanation: Sex-limited trait of exclusively occur in either male or female. However, x-linked dominant traits occur more in male. Whereas, X-linked recessive traits occur more in female, but both can occur in opposite gender as well.

Q.49 Answer is "Sex-influenced traits"

Explanation: In such traits a particular sex hormone magnifies the effect of single allele up to that shown by two alleles e.g. pattern boldness.

Q.50 Answer is "Sex influenced trait"

Explanation: It is influenced by a particular sex hormone, so that is why it is called so.

Q.51 Answer is "Classical genetics"

Explanation: Gregor Johann Mendel laid down the foundation of classical genetics by formulating two laws of heredity. Law of segregation and law of independent assortment.

Q.52 Answer is "In his monastery garden"

Explanation: Mendel was a priest. He performed series of breeding experiments on garden pea Pisum sativum in his monastery garden for eleven years (1854-1865).

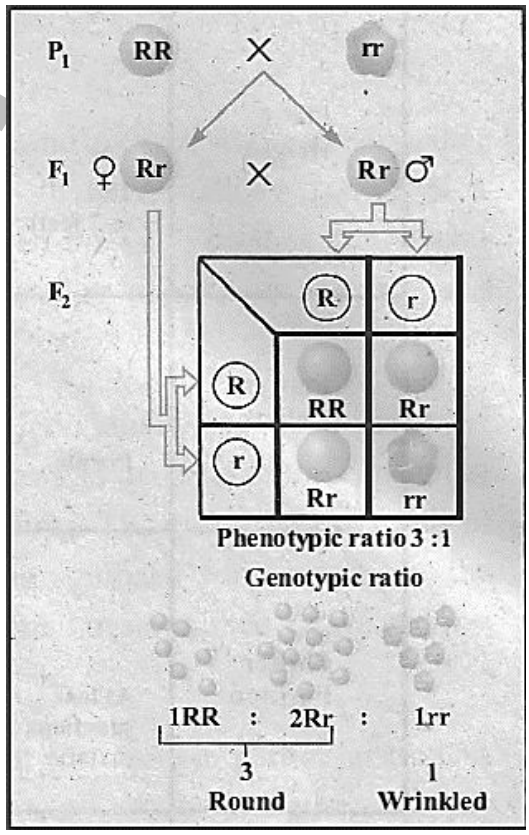
Q.53 Answer is "Round shaped seed"

Explanation:

Trait	Dominant	Recessive
Plant height	Tall	Short
Flower color	Purple	White
Flower position	Axial	Terminal
Pod color	Green	Yellow
Pod shape	Inflated	Constricted
Seed color	Yellow	Green
Seed shape	Round	Wrinkled

Q.54 Answer is "75% round"

Explanation:



Q.55 Answer is "1/4, 2/4, 1/4"

Explanation: As per previous explanation.

Q.56 Answer is "Phenotype, genotype"

Explanation: Mendel devised a cross called test cross, which is used to test the genotype of an individual showing a dominant phenotype. It is a mating in which and individual showing a dominant phenotype is crossed with an individual showing its recessive phenotype. This cross finds out the homozygous and heterozygous nature of the genotype.

Q.57 Answer is "A phenotypically round seed"

Explanation: Round shape in pea seed is dominant character and a dominant phenotype may have two genotypes RR (homozygous round) and Rr (heterozygous round).

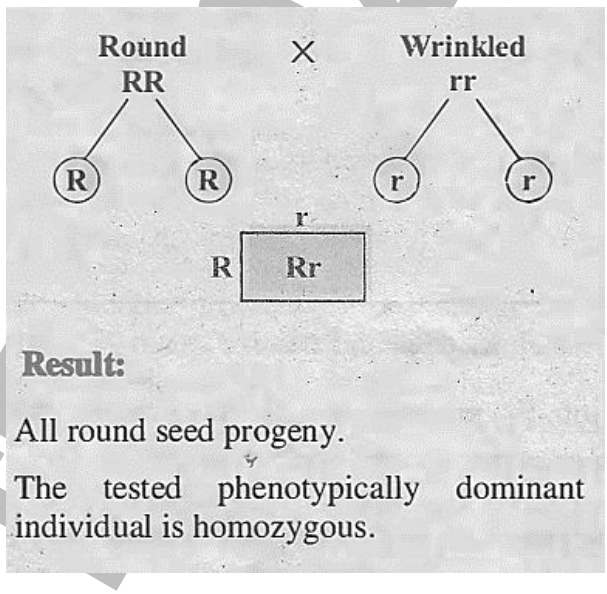
Q.58 Answer is "Always homozygous recessive"

Explanation: Wrinkled shape in pea seed is a recessive trait having single genotype rr (homozygous recessive) as recessive can't be heterozygous.

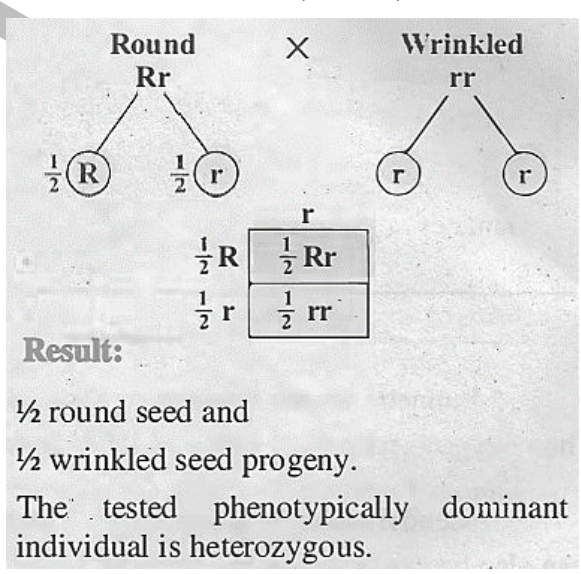
Q.59 Answer is "The tested individual was heterozygous dominant"

Explanation:

Test cross (Case I)



Test cross (Case II)



Q.60 Answer is "6/16"

Explanation: Phenotypic ratio of F_2 of Mendel's dihybrid cross was as under.

Round yellow	9/16	Parental type
Wrinkled yellow	3/16	Recombinants i.e. new combinations
Round green	3/16	
Wrinkled green	1/16	Parental type

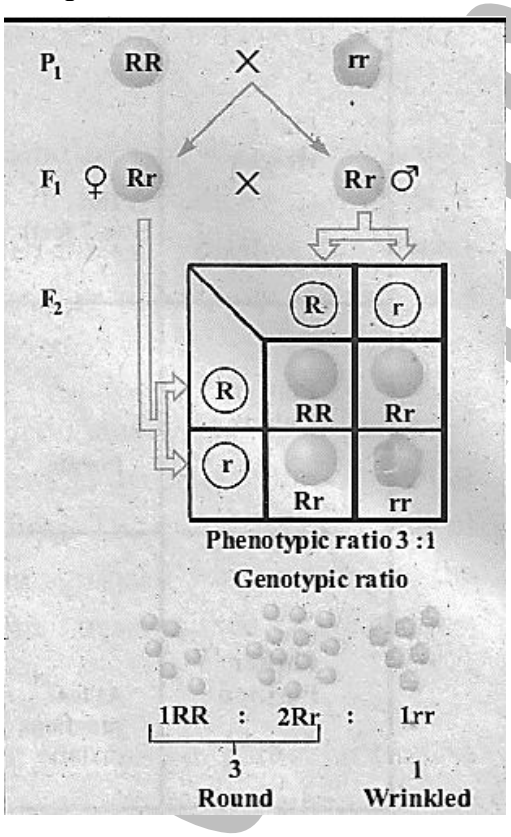
Q.61 Answer is "RY, Ry, rY, ry"

Explanation:

RrYy		
	R	r
Y	RY	rY
Y	Ry	ry

Q.62 Answer is "3/4"

Explanation:

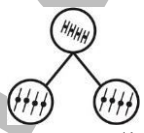


Q.63 Answer is "Genes, chromosomes"

Explanation: as given are carried by chromosomes so both exhibit parallel behavior.

Q.64 Answer is "Sixteen years of his death"

Explanation: In 1900, 16 years after Mendel's death, three botanists, Correns, DeVries and Tschermach independently rediscovered and acknowledged his work.

Q.65 Answer is "  **"**

Explanation: According to the Mendel's law of segregation chromosomes split up into their respective chromatids during gametogenesis (meiosis) and each gamete receives one chromatid (with one allele of gene pairs).

Q.66 Answer is "X – chromosome"

Explanation: Human linkage group number 11 represented by homologous pair number 11 of chromosomes carries linked genes for sickle cell anemia, leukemia and albinism.

Q.67 Answer is "62.5"

Explanation:

$$\frac{9}{16} round\ yellow$$
$$+$$
$$\frac{1}{16} wrinkled\ yellow$$
$$Total = \frac{10}{16} \times 100 = 62.5\%$$

Q.68 Answer is "Homozygous recessive"

Explanation: See explanation of Q # 59.

Q.69 Answer is "Linkage of a gene with a particular gene"

Explanation: All genes located on the same chromosomes are linked to each other. This phenomenon of staying

together is called linkage. Gene linkage is a physical relationship between genes.

Q.70 Answer is "Crossing over"

Explanation: Linked genes can be separated by crossing over. Closer the gene loci, more strongly are their genes linked. The farther apart two genes lie, greater are chances of their separation through crossing over.

Worksheet-17 (ii)

(Evolution)

Q.1 Charles Darwin was born in:

A) Cantbury
B) Shrewsbury in western England
C) Eastern England
D) Cantbury in Eastern England

Q.2 Darwin joined the expedition on Beagle to:

A) North American coastline
B) South African coastline
C) South American coastline
D) North African coastline

Q.3 Darwin observed and collected thousands of specimens of diverse:

A) Fauna of South America
B) Fauna and flora of South America
C) Flora of South America
D) Fauna and flora of North America

Q.4 Most of the animal species on Galapagos:

A) Live nowhere else in the continents
B) Live nowhere else in the world
C) Live everywhere in the world
D) Live everywhere else in the continent

Q.5 Pick up the one not true about the finches collected by Darwin on the Galapagos:

A) Although quite different seemed to be of same species
B) Although quite similar, seemed to be different species
C) Separated from original habitats by geographical barriers
D) Some were unique to individual islands

Q.6 Out of the 13 types of finches collected by Darwin from Galapagos:

A) All were unique to individual islands
B) Some were distributed on two or more islands
C) Some were unique to individual islands
D) Majority were unique to individual islands

Q.7 The history of life is like a tree, with multiple branching and rebranching from a common trunk, in view of:

A) Darwin C) Lamarck
B) Cuvier D) Lyell

Q.8 In Darwinian view, at each fork of evolutionary tree is an ancestor common to all lines branching from that:

A) Tree C) Stem
B) Trunk D) Fork

Q.9 Darwin suggested that populations of individual species become better adapted to their local environments through:

A) Artificial selection
B) Adaptation
C) Variation
D) Natural selection

Q.10 Those individuals whose hereditary characteristics fit them best to their environment are likely to leave _____ than the less fit individuals:

A) More offspring C) No offspring
B) Less offspring D) All offspring

Q.11 The unequal ability of individuals to survive and reproduce will lead to gradual change in a population, with favorable characteristics accumulating over the generations, thus leading to the:

A) Struggle for existence
B) Evolution of new species
C) Overpopulation
D) Persistence of species

Q.12 An important turning point for evolutionary theory was the birth of population genetics, which emphasizes the extensive genetic variation within populations and recognizes the importance of:

A) Qualitative characters
B) Analytical characters
C) Quantitative characters

D) Morphological characters

Q.13 With progress in population genetics Mendelism and Darwinism were reconciled and the genetic basis of _____ and _____ was worked out.

A) Variation, artificial selection

B) Overpopulation, natural selection

C) Variation, evolution

D) Variation, natural selection

Q.14 By the reconciliation of Mendelism and Darwinism, a comprehensive theory of evolution was developed, that became to be known as:

A) Modern synthesis

B) Modern Darwinism

C) Neo synthesis

D) Modern synthesis or Neo Darwinism

Q.15 In "Modern Synthesis" or "Neo-Darwinism" the word synthesis depicts:

A) Origin of discoveries and ideas

B) Integration of discoveries and ideas

C) Modification of discoveries and ideas

D) Confirmation of discoveries and ideas

Q.16 Evolution leaves:

A) No signs

B) Observable signs

C) Non-observable signs

D) Visible signs

Q.17 Darwin's theory of evolution was mainly based on the evidence from the:

A) Geographical distribution of species

B) Fossil record

C) Population genetics

D) Geographical distribution of species and fossil record

Q.18 A mammal that lives only in America is:

A) Armadillo

B) Tasmanian Wolf

C) Kangaroo

D) Indus Dolphin

Q.19 The evolutionary view of biogeography predicts that contemporary armadillos are modified descendants of earlier species that occupied:

A) Distant continents

B) Neighboring continents

C) Other continents

D) These continents

Q.20 Most of the animal species on the _____ live no-where else in the world:

A) South America C) Cape Verde

B) North America D) Galapagos

Q.21 Calculate the value of P when the p^2 = 0.49, 2pq = 0.42 and q^2 = 0.09:

A) 0.8 C) 0.6

B) 0.7 D) 0.5

Q.22 According to Hardy-Weinberg _____ is not a potent force evolution:

A) Sexual recombination

B) Mutation

C) Migration

D) Genetic drift

Q.23 In Hardy-Weinberg theorem 2pq stands for the frequency of:

A) Homozygous dominant individuals

B) Heterozygous dominant individuals

C) Homozygous recessive individuals

D) Dominant alleles

Q.24 In small populations _____ may lead to the loss of particular alleles:

A) Genetic drift C) Migration

B) Mutation D) Selection

Q.25 The breeders select for the desired characters in:

A) Natural selection C) Plant breeding

B) Artificial selection D) Animal breeding

ANSWER KEY (Worksheet-17 (ii))			
1	B	13	D
2	C	14	D
3	B	15	B
4	B	16	B
5	A	17	D
6	C	18	A
7	A	19	D
8	D	20	D
9	D	21	B
10	A	22	A
11	B	23	B
12	C	24	A
		25	B

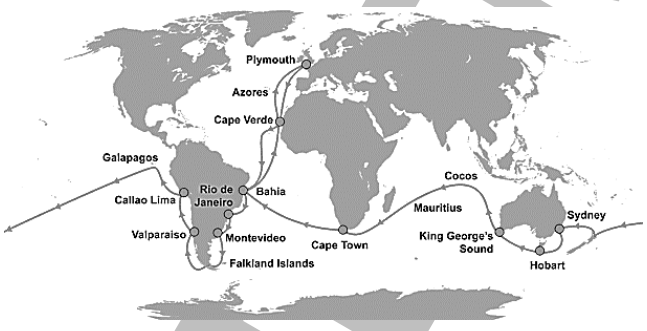
EXPLANATION

Q.1 Answer is "Shrewsbury in Western England"

Explanation: Charles Darwin was born in Shrewsbury, in Western, in 1809.

Q.2 Answer is "South American coastline"

Explanation: He was invited by the British Government to joint an expedition of naturalists. That expedition was sent by British Govt. to study the fauna and flora of South American coastline. It is called Beagle's Voyage, as the ship was H.M.S Beagle.



Q.3 Answer is "Fauna and flora of South America"

Explanation: Darwin observed and collected thousands of specimens of diverse fauna and flora of South America.

Q.4 Answer is "Live nowhere else in the world"

Explanation: A particularly puzzling case of geographical distribution was the fauna and flora of Galapagos Islands. Most of the animals species on the Galapagos live nowwhere else in the World, although they resemble species living on the South American mainland.

Q.5 Answer is "Although quite different seemed to be of same species"

Explanation: Among the birds Darwin collected on the Galapagos were 13 types of finches which were, although quite similar but seemed to be of different species.

Q.6 Answer is "Some were unique to individual islands"

Explanation: Among the birds Darwin collected, on the Galapagos were 13 types of finches that, although quite similar seemed to be different species. Some were unique to individual islands, while other species were distributed on two or more islands that were close together.

Q.7 Answer is "Darwin"

Explanation: In Darwinian view the history of life is like a tree with multiple branching and rebranching from a common trunk all the way to the tips of the living twigs, symbolic of the current diversity of organisms. At each fork of the evolutionary tree is an ancestor common to all lines of evolution branching from that fork.

Q.8 Answer is "Fork"

Explanation: In Darwinian view the history of life is like a tree with multiple branching and rebranching from a common trunk all the way to the tips of the living twigs, symbolic of the current diversity of organisms. At each fork of the

evolutionary tree is an ancestor common to all lines of evolution branching from that fork.

Q.9 Answer is "Natural selection"

Explanation: Natural selection promotes the adaptation which are fit to the environment. Darwin suggested that populations of individual species become better adapted to their local environments through natural selection

Q.10 Answer is "More offspring"

Explanation: It is in accordance with the principle of the Survival of the fittest.

Q.11 Answer is "Evolution of new species"

Explanation: This is evolution through natural selection.

Q.12 Answer is "Quantitative characters"

Explanation: Population genetics is mostly based on quantitative characters.

Q.13 Answer is "Variation and natural selection"

Explanation: Population genetics explains the variations and natural selection.

Q.14 Answer is "Modern synthesis or neo Darwinism"

Explanation: With the progress in population genetics in 1930s, Mendalism and Darwinism were reconciled and the genetic basis of variation and natural selection was worked out.

Q.15 Answer is "Integration of discoveries and ideas"

Explanation: It is called synthesis because it integrated discoveries and ideas from many different fields including paleontology, taxonomy, biogeography and of course population genetics.

Q.16 Answer is "Observable signs"

Explanation: Evolution leaves observable signs in the form of fossils, vestigial organs, analogous organs and homologous organs etc.

Q.17 Answer is "Geographical distribution of species and fossil record"

Explanation: It was impact of Beagl's Voyage.

Q.18 Answer is "Armadillo"

Explanation: It is an example of geographical distribution. Armadillo is also called armored mammal. It is only found in America.

Q.19 Answer is "These continents"

Explanation: The fossil record confirms that such ancestor existed in past as well.

Q.20 Answer is "Galapagos"

Explanation: Charles Darwin joined the expedition on H.M.S. Beagle to south American coastline. He observed and collected thousands of specimens of diverse fauna and flora of South America. A particularly puzzling case geographical distribution was the fauna of Galapagos islands. Most of the animal species on Galapagos live nowhere else in the world, although they resemble species living on the South American mainland. It was as though the Islands were colonized by plants and animals that strayed from the South American mainland and then diversified on different islands.

Q.21 Answer is "0.7"

Explanation:

$$P + q = 01$$

$$0.7 + 03 = 01$$

Q.22 Answer is "Sexual recombination"

Explanation: Hardy Weinberg principle states that the frequencies of alleles and genotypes in a populations gene pool remain constant over the generations unless acted upon by agents other than sexual recombination.

Q.23 Answer is "Heterozygous dominant individuals"

Explanation: In Hardy Weinberg theorem;

p^2 = *homozygous dominant*.

$2pq$ = *heterozygous dominant*

q^2 = *homozygous recessive*

Q.24 Answer is "Genetic drift"

Explanation: It is the change in frequency of alleles at a locus that occurs by chance. In small populations, such fluctuations may lead to the loss of particular alleles. This may occur in a small population when a few individual fail to reproduce and then genes are lost from the population.

Q.25 Answer is "Artificial selection"

Explanation: In artificial selection, the breeders select for the desired characters. In natural selection, the environment plays this role, thus affecting the proportions of gene in a population.

STEP

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