NEET REVISION SERIES

PRINCIPLE OF INHERITANCE AND VARIATION

Revise Most Important Questions to Crack NEET 2020

Q-1 - 35214208

A person with 47 chromosomes due to an additional Y-chromosome suffers from a condition called

(A) Down's syndrome

(B) Super female

(C) tuner's syndrome

(D) klinefelter's syndrome

CORRECT ANSWER: D

SOLUTION:

HF Klinefelter first described this condition in 1942. The

chromosome number is 2n = 47 with the formula 44A + XXY.

Phenotypically these individuals are males, but they can show some female secondary sexual characteristics and are usually sterile.

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Q-2 - 30701408

Chromosomes found in the salivvaary glands of Drosophila are

(A) Lampbrush

(B) Polytene

(C) Supernumerary

(D) B-chromosomes.

CORRECT ANSWER: B

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Q-3 - 35214028

Among the following characters, which one was not considered by Mendel in his experiments on pea?

(A) Stem - Tall or Dwarf

(B) Trichomes - Glandular or Non-glandular

(C) Seed - Green or Yellow

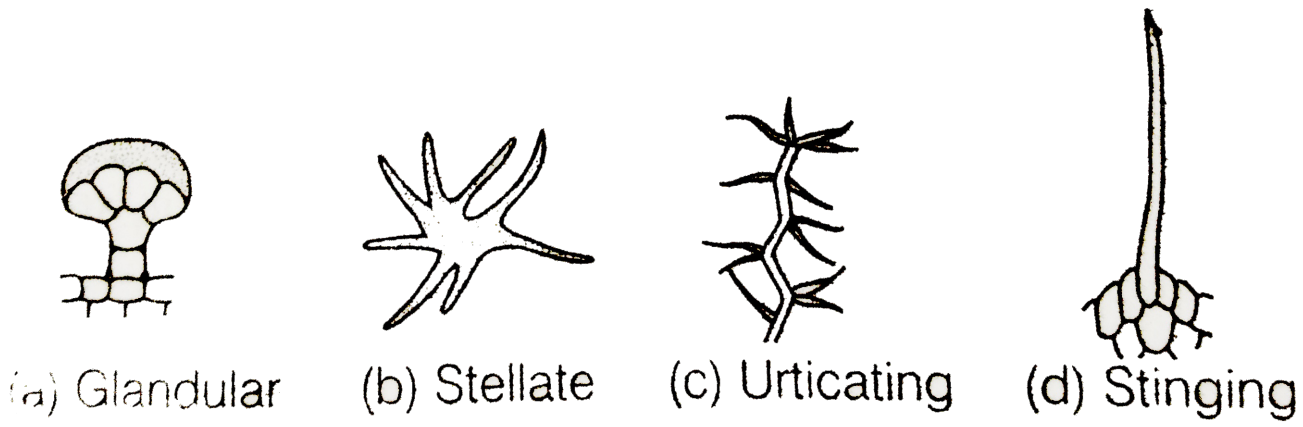
(D) Pod - inflated or Constricted

CORRECT ANSWER: B

SOLUTION:

Trichomes are the epidermal tissues structure. When epidermal cells become glandular hair, it is called trichome. This character was not amongst the seven

characters of pea, which mendel selected for his hybridisation experiments.



Different types of trichomes

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Q-4 - 30701434

Complete linkage is found in

(A) Birds

(B) Snakes

(C) Female Drosophila

(D) Male Drosphila

CORRECT ANSWER: D

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Q-5 - 35214050

The term "linkage" was coined by

(A) TH Morgan

(B) T Boveri

(C) G Mendel

(D) W Sutton

CORRECT ANSWER: A

SOLUTION:

The term linkage was coined by TH Morgan. He carried out several dihybrid crosses in Drosophila to study genes that were sex-linked. He described the physical association of genes on a chromosome.

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Q-6 - 35214033

Which of the following most appropriately describes haemophilia?

(A) X-linked recessive gene disorder

(B) Chromosomal disorder

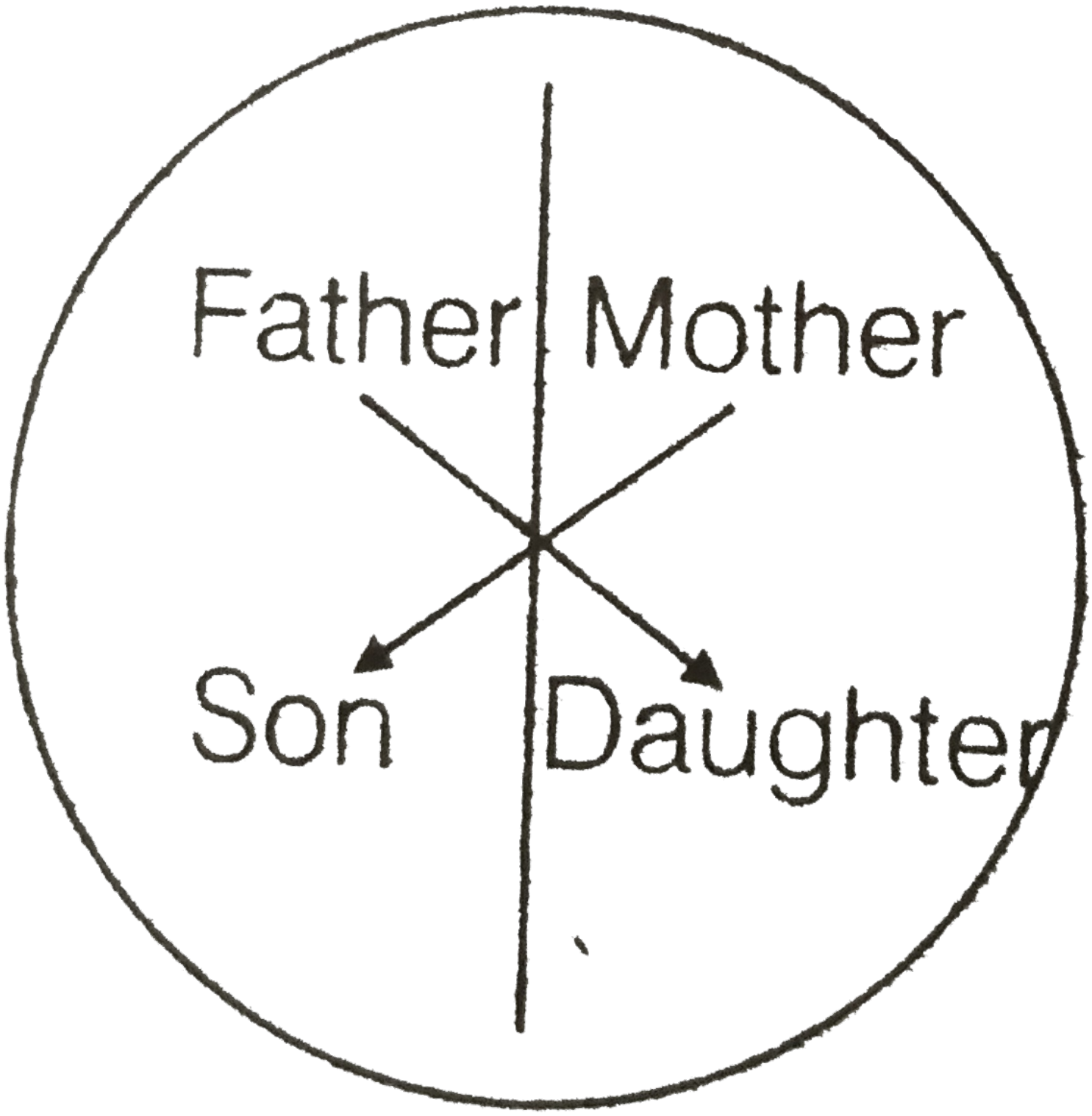
(C) Dominant gene disorder

(D) Recessive gene disorder

CORRECT ANSWER: A

SOLUTION:

Haemophilia is X-linked recessive gene disorder. It is a blood clotting disorder and shows criss-cross inheritance. In this, characters from father are transmitted to daughter and from mother to son.



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Q-7 - 30701414

A chromosome with sub terminal centromere is

(A) Acentric

(B) Acrocentric

(C) Metacentric

(D) Telocentric

CORRECT ANSWER: B

Q-8 - 35214046

A true breeding plant is

(A) one that is able to breed on its own

(B) produced due to cross-pollination among unrelated plants

(C) near homozygous and produces offspring of its own kind

(D) always homozygous recessive in its genetic constitution

CORRECT ANSWER: C

SOLUTION:

A true breeding plant (pureline) has homozygous genes for a character (e.g. TT for tall or tt for dwarf). It always produces offsprings which are true (pure) for its characters.

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Q-9 - 30701403

Term chromosome was coined by

(A) Hofmeister

(B) Sutton

(C) Boveri

(D) Waldeyer

CORRECT ANSWER: D

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Q-10 - 35214272

Two linked genes a nad b show 20% recombination the indivsuls of a hybrid cross between ++/++ X ab/ab shaoll show gemetes:

(A) $+\ +\ 80:ab:20$

(B) $+\ +\ 50:ab:50$

(C)
$+\ +\ 40:ab40:\ +\ a10:$
$+\ b:10$

(D)
$+\ +\ 30:ab30:\ +\ a20:$
$+\ b:20$

CORRECT ANSWER: C

SOLUTION:

The gametes of a dihybrid cross between

$++/++ \times ab/ab$ will be + + 40 : ab40 : +a10 : +

b : 10

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Q-11 - 35214084

Which one of the following cannot be explained on the basis of Mendel's Law of Dominance?

(A) The discrete unit controlling a particular character is called a factor

(B) Out of one pair of factors one is dominant, and the other recessive

(C) Alleles do not show any blending and both the characters recover as such in F_2-generation

(D) Factors occur in pairs

CORRECT ANSWER: C

SOLUTION:

Out of the following statement (c) is incorrect because the law of dominance does not occur universally. After Mendel several cases were recorded by scientists, where a clear deviation from law of dominance was seen.

Where, F_1 hybrids exhibited a mixture or blending of character of two parents, the case is considered as that of incomplete dominance or blending inheritance. It simply means that two genes of allelomorphic pair are not related as dominant or recessive, but are not related as dominant or allelomorphic pair are not related as dominant or recessive, but each of them expresses itself partially. In the case of 4 O'clock plant, when plants with red flowers are crossed with plants having white flower,

the F_1 hybrids bear pink flower. When these pink flowers are self pollinated, they develop red, pink and white flowers in the ratio of 1 : 2 : 1 respectively.

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Q-12 - 30701443

Crossing over occurs at

(A) Single strand satge of chroomosmes during propase

(B) Two strand stage during zygotene

(C) Metaphase II of meiosis

CORRECT ANSWER: C

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Q-13 - 18704887

Howmany types of gemete will be produced by an individual having genotype AaBbcc:

(A) Four

(B) Three

(C) Two

(D) One

CORRECT ANSWER: A

SOLUTION:

Na

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Q-14 - 35214077

Select the correct statement from the ones given below with respect

to dihybrid cross.

(A) Tightly linked genes on the same chromosome show higher recombinations

(B) Genes far apart on the same chromosome show very few recombinations

(C) Genes loosely linked on the same chromosome show similar recombinations as the tightly linked ones

(D) Tightly linked genes on the same chromosome show very few recombinations

---

CORRECT ANSWER: D

SOLUTION:

Morgan and his group found that when genes were grouped on the same chromosome, some genes were very tightly linked (showed very low recombination),

while others were lossely linked (showed higher recombination). Recombination is a process of rearrangement of genes during meiosis so that a gamete contains a haploid genotype with a new gene combination.

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Q-15 - 35214205

HJ Muller was awarded Noble Prize for his

(A) discovery that chemicals can induce gene mutations

(B) discovery that ionizing radiations can induce gene mutations

(C) work on gene mapping in Drosophila

(D) efforts to prevents the use of nuclear weapons

CORRECT ANSWER: A

SOLUTION:

HJ Muller was awarded Nobel Prizefor discovering that ionizing radiations can induce gene mutations.

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Q-16 - 18704910

In a population of 1000 individuals 360 belong to genototype AA ,480 to Aa and the remaining 160 to aa Based on this data ,the frequency of allele A in the population is

(A) 0.6

(B) 0.7

(C) 0.4

(D) 0.5

CORRECT ANSWER: A

SOLUTION:

(a) According to Hardy Weinberg principle

P^2+2pq+q^(2)=1,(p+q)^(2)=1$(\forall)$P^(2)=360

$outof1000 \in$

$\div idual$ or

P^(2)=36$outof$100q^(2)=160$outof$1000 or q^(2)=16

$outof100so$, q=sqrt(.16)=.4. As" "p+q=1`

so, p is 0.6.

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Q-17 - 35214907

[" 8.A man,after a tour,finds that he had spent "],[" every day as many rupees as the number of "],[" days he had been on tour.How long did his "],[" tour last,if he had spent in all "21,296" ? "]

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Q-18 - 35214076

Which one of the following conditions correctly describes the manner of determining the sex in the given example?

(A) XO type of sex chromosomes determine male sex in grasshopper

(B) XO condition in humans as found in Turner syndrome, determines female sex

(C) Homozygous sex chromosomes (XX) produce male in Drosophila

(D) Homozygous sex chromosomes (ZZ) determine female sex in birds.

CORRECT ANSWER: A

SOLUTION:

Grasshopper is an example of XO type of sex determination in which the males have only one X-chromosome besides the autosomes, whereas females have a pair of X-chromosomes.

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Q-19 - 18705022

Lathyrus odoratus is an example of which of the following genes

(A) Supplementry genes

(B) Complementry genes

(C) Lethel genes

(D) Condominant genes

CORRECT ANSWER: B

SOLUTION:

(b) $\underset{White}{\mathrm{CCpp}} \times \underset{\substack{\downarrow \\ CcPp \\ Red}}{} \underset{White}{\mathrm{ccPP}}$

In complementary gene action, 9:7 ratio is obtained in

F_2 in which two dominant genes are responsible for red

flower colour.

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Q-20 - 35214214

The polytene chromosomes were discovered for the first time in

(A) Drosophila

(B) Chironomus

(C) Musca nebulo

(D) Musca domestica

CORRECT ANSWER: B

SOLUTION:

Polytene chromosomes were first time discovered by the Italian cytologist EG Balbiani (1881) in the salivary gland cells of Chironomus larva.

Q-21 - 30701441

Greater is the distance between the two genes on a chromosome

(A) Greater is te linkage strength

(B) Lesser is the linkage streangth

(C) Linikage strength remains unchangeed

(D) There is no relationship between the two

CORRECT ANSWER: B

Q-22 - 35214035

A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in

(A) polyploidy

(B) somaclonal variation

(C) polyteny

(D) aneuploidy

CORRECT ANSWER: A

SOLUTION:

Polyploid cells have a chromosome number that is more than double the haploid number, e.g. Triticum aestivum (wheat) is a hexaploid (6n).

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Q-23 - 30701453

The blue green algae and bacteria contain

(A) One linkage group

(B) Two linkage groups

(C) Threee linkage groups

(D) None of the above

CORRECT ANSWER: A

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Q-24 - 35214199

The hereditary material (DNA) present in the bacterium E.coli is :

(A) single stranded RNA

(B) double stranded RNA

(C) single stranded DNA

(D) double stranded DNA

CORRECT ANSWER: D

SOLUTION:

Bacterial chromosome is single, circular double stranded DNA molecule.

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Q-25 - 30701409

A giant chormosome with a number of chromonemata is

(A) Lampbrush chromosome

(B) Heterochromosome

(C) supernumerary chromosome

(D) `Polytene chromosome

CORRECT ANSWER: D

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Q-26 - 35214045

If a colourblind man marries a woman who is homozygous for normal colour vision, the probability of their son being colourblind is

(A) 0

(B) 0.5

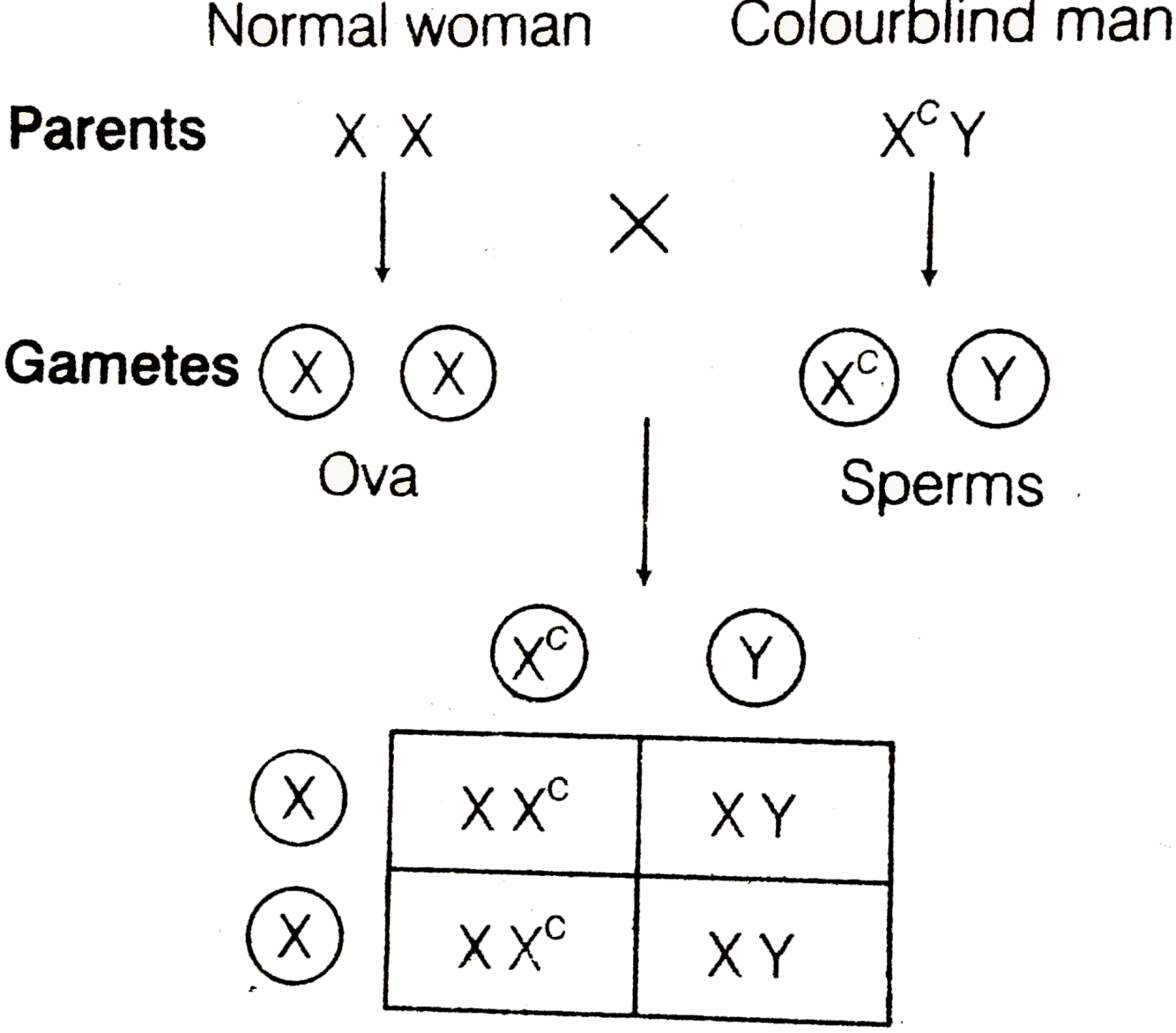
(C) 0.75

(D) 1

CORRECT ANSWER: A

SOLUTION:

If a colourblind man marries a woman who is homozygous for normal colour vision, the probaility of their son being colourblind is zero. Colour blindness is a recessive sex-linked trait in which the eye fails to distinguish between appears only when both sex chromosomes carry recessive gene (X^cX^c). However, in human males, the defect appears due to single recessive gene (X^cY) because Y chromosome does not carry gene for colour vision. This disease shows criss-cross inheritance.



Thus, there is zero probability of son being colourblind.

Hence, option (a) is correct.

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Q-27 - 18705039

Incomplete dominance is found in

(A) Pisum sativum

(B) Antirrhinum majus

(C) Both (a) and (b)

(D) None of these

CORRECT ANSWER: B

SOLUTION:

(b) Incomplete dominance is found in Antirrhinum majus

(snapdragon) and Mirabillis jalapa (4 O' clock plant).

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Q-28 - 35214203

Different mutations referrable to the same locus of chromosome

give rise to

(A) pseudoalleles

(B) polygenes

(C) oncogenes

(D) multiple alleles

CORRECT ANSWER: D

SOLUTION:

The phenomenon of multiple allelism is the simultaneous occurrence of more than two alleles (multiple alleles) at a given gene locus. Any mutation occurring within a gene (at the same locus) will give rise to a new form or new allele of that gene.

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Q-29 - 35214066

If both parents are carriers for thalassaemia, which is an autosomal

recessive disorder, what are the chances of pregnancy resulting in an affected child?

(A) No chance

(B) 0.5

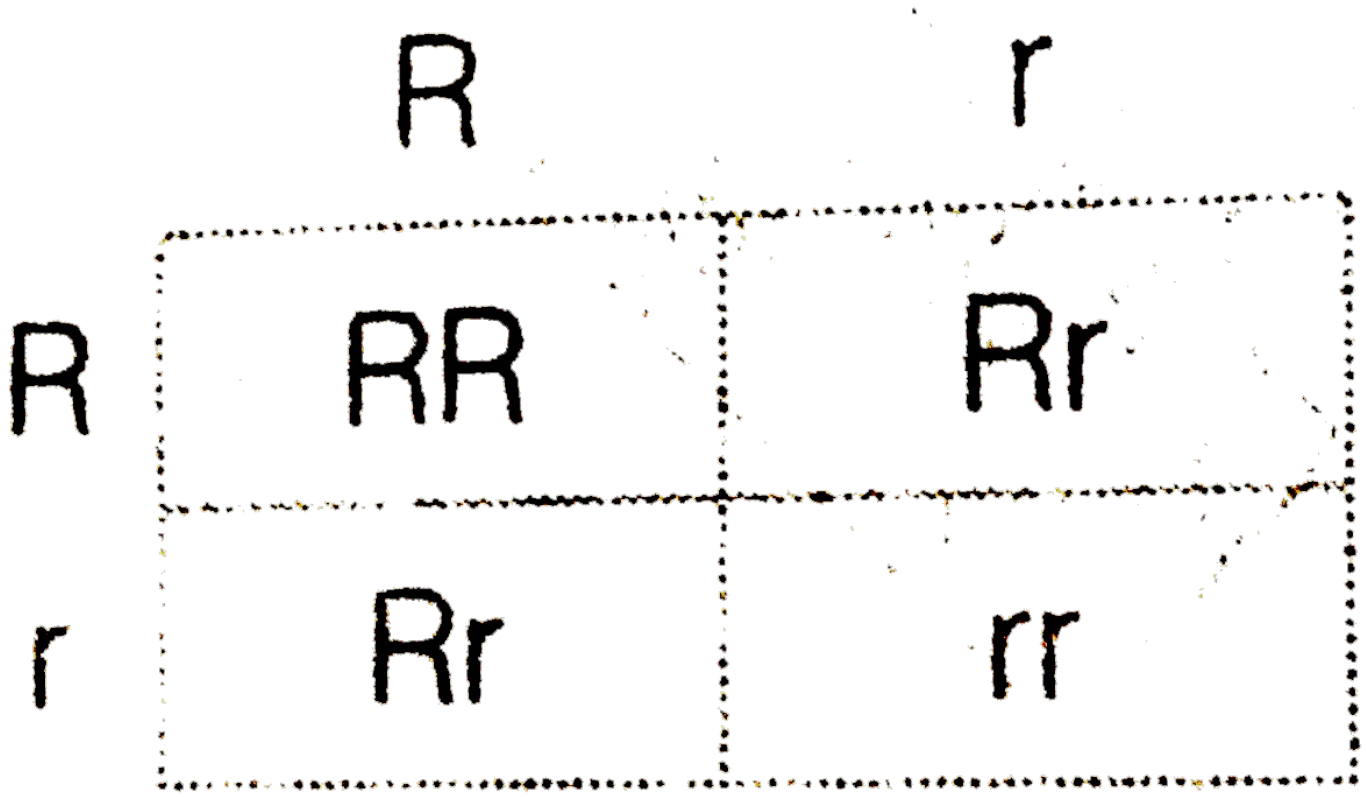
(C) 0.25

(D) 1

CORRECT ANSWER: C

SOLUTION:

In the given question since both parents carry a haemoglobinopathy trait of thalassemia the risk is 25% for each pregnancy for an affected child.



RR-Unaffected (25%)

Rr-Carrier (50%)

rr-Affected (25%)

So, the chances of pregnancy resulting in an affected child is 25%.

Q-30 - 30701415

A chromosome with centromere near the middle is called

(A) Metacentric

(B) Submetacentric

(C) Acrocentric

(D) Telocentric

CORRECT ANSWER: B

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Q-31 - 35214252

One gene pair hides the effect of another. The pheomenon is:

(A) epistasis

(B) dominance

(C) mutation

(D) None of these

CORRECT ANSWER: A

SOLUTION:

Epistasis is the phenomenon by which a gene suppresses the phenotypic expression of a non-allelic gene.

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Q-32 - 18705056

Coupling and repulsion are the two faces of

(A) Crossing over

(B) Linkage

(C) Chiasmata

(D) Mutation

CORRECT ANSWER: B

SOLUTION:

(b) The tendency of parental combinations to remain together, which is expressed in terms of low frequency of recombinations is called linkage.

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Q-33 - 35214032

A disease caused by an autosomal primary non-disjunction is

(A) down's syndrome

(B) klinefelter's syndrome

(C) tuner's syndrome

(D) sickle-cell anaemia

CORRECT ANSWER: A

SOLUTION:

Non-disjunction is the failure of chromosomes to disjoin or separate and move away to opposite poles. Non-disjunction of 21st chromosome during oogenesis is the cause of down's syndrome. It occurs due to the presence of an additional copy of chromosome no. 21 (trisomy of 21st chromosome) is humans.

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Q-34 - 30701457

Maize has 10 pairs of chromosomes.How many linkage groups does it have ?

(A) 20

(B) 10

(C) 5

(D) 40

CORRECT ANSWER: B

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Q-35 - 18704882

Mendal was te native of

(A) France

(B) Sweden

(C) India

(D) Austria

CORRECT ANSWER: D

SOLUTION:

(d) He was ans abbort (heat) of Augustion monastery of St. Thomas at brun ,Augustion monastery of St. thoms at brunn ,Austria in 1847

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Q-36 - 35214063

Which of the following statements is not true of two genes that show 50% recombination frequency?

(A) The genes may be on different chromosomes

(B) The genes are tightly linked

(C) The genes show independent assortment

(D) If the genes are present on the same chromosome, they undergo more than one crossovers in every meiosis

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CORRECT ANSWER: B

SOLUTION:

Out of the given statements (b) is incorrect because the tightly linked genes on chromosomes show 100% parental types and 0% recombinants. Two genes that undergo independent assortment indicated by a recombinant frequency of 50% are either on non-homologous chromosomes or located far apart in a single chromosome.

As the distance between two genes increases, crossover frequency increases. More recombinant gametes, fewer parential gametes.

Q-37 - 35214061

A human female with Turner's syndrome

(A) has 45 chromosomes with XO

(B) has one additional X-chromosome

(C) exhibits male characters

(D) is able to produce children with normal husband

CORRECT ANSWER: A

SOLUTION:

A human female with Turner syndrome has the absence of one of the X-chromosome, i.e. 45 with XO (or 44 + XO). Turner syndrome is a chromosomal condition that affects the development in females. The most common feature of Turner syndrome is short stature, which become evident by the age of 5. An easily loss of ovarian function is also very common.

The ovaries develope normally at first, but egg cells

usually die prematurely and most overian tissue degenerates before birth.

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Q-38 - 18705088

When synapsis is complete all along the chromosomes, the cell is said to have entered a stage called

(A) Zygotene

(B) Pachytene

(C) Diplotene

(D) Diakinesis

CORRECT ANSWER: B

SOLUTION:

(b) The synapsis, pairing of homologous chromosomes takes place during zygotene. Synapsis results in the formation of bivalents during zygotene. The formation of special proteionaceous structure called synaptonemal complex occur. After zygotene stage cell enters in pachytene stage in which the bivalents become spiralled, shortened and thickened.

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Q-39 - 35214247

Out of 8 ascospores formed in Neutrospora the arrangement is 2a : 4a : 2a showing

(A) no crossing over

(B) some meiosis

(C) second generation division

(D) first generation division

CORRECT ANSWER: C

SOLUTION:

In Neurospora after crossing over between the gene and centromere, the paired arrangement of ascospores is AA aaaa AA or 2a : 4a : 2a. This is known as second division segregation.

Q-40 - 18705108

the long and short arms of chromosome are designated respectively as :

(A) p and q arms

(B) q and p arms

(C) m and p arms

(D) l and s arms

CORRECT ANSWER: B

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Q-41 - 35214093

Point mutation involves

(A) insertion

(B) change in single base pair

(C) duplication

(D) deletion

CORRECT ANSWER: B

SOLUTION:

The point mutations involve alterations in the structure of gene by altering the structure of DNA, i.e. change in single base pair. Point mutations are of two types, i.e. base pair substitution and frameshift substitution.

Insertion is the addition of one or more nitrogenous bases to a nucleotide chain.

Duplication is the presence of one block of genes more than once in a haploid component.

Deletion is the removal of one or more nitrogenous bases from a nucleotide chain.

Q-42 - 18705105

The distance between the genes a,b,c and d in mapping units are a-d=3,5, b-c=1,a-b=6,c-d=1.5, a-c=5. Find out the sequence of arrangeent of these genes

(A) acdb

(B) abcd

(C) acbd

(D) adcb

CORRECT ANSWER: D

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Q-43 - 35214197

A mutation at one base of the first codon of a gene produces a non-functional protein. Such a mutation is referred as

(A) frameshift mutation

(B) mis-sense mutation

(C) non-sense mutation

(D) reverse mutation

CORRECT ANSWER: B

SOLUTION:

If mutation at one base of the first codon of a gene takes place then all the subsequent codons will be out of register (genetic code). This results into the formation of mis-sense protein which is formed due to the mutation in the first base of first codon and thus called missense mutation.

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Q-44 - 18705123

Heterochromatin remains condensed in which part of chromosome

(A) secondary constrictions- I

(B) secondary constrictions- II

(C) Telomeres

(D) Both a and b

CORRECT ANSWER: A

SOLUTION:

(a) Each chrosome has a centromere (primary construction) but in some cases secondary construction is also present , more specifically called as 'secondary construction - II' . Its position is constant for particular chromosome heterochrmatin is condensed in this region . In man 'secondary construction - II ' is present in chrosome number $1, 10, 13, 16$ and Y . Nuclear organizer is called 'secondary construction - I'.

Q-45 - 35214089

Select the incorrect statement from the following

(A) linkage is an exception to the principle of independent assortment in heredity

(B) galactosemia is an inborn error of metabolisms

(C) small population size results in random genetic drift in a population

(D) baldness is a sex limited trait

CORRECT ANSWER: D

SOLUTION:

Out of the given statements (d) is incorrect because baldness is not a sex-limited trait.

Q-46 - 18705091

Chiasma shows the sites of

(A) Spindle formation

(B) Synapsis

(C) Crossing over

(D) None of these

CORRECT ANSWER: C

SOLUTION:

(c) Morgan proposed that chaismata lead to crossing over by breakage and reunion of homologous chromosomes.

Q-47 - 30701416

Puffs or balbiani rings in salivary gland chromsosomes are sites of

(A) DNA replication

(B) DNA duplication

(C) RNA synthesis

(D) Protein synthesis

CORRECT ANSWER: C

Q-48 - 18705079

What is the unit of crossing over

(A) Cistron

(B) Muton

(C) Recon

(D) None of the above

CORRECT ANSWER: C

SOLUTION:

(c) Recon- Unit of recombination

Muton- Unit of mutation

Cistron- Unit of function

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Q-49 - 35214038

Match the terms in column I with their description in column II and

choose the correct option.

	Column I	Column II
A.	Dominance	1. Many genes gove
B.	Codominance	2. In a heterozygous organism
C.	Pleiotropy	3. In a heterozygous organism bo
D.	Polygenic inheritance	4. A single gene influ

(A) A B C D
2 3 4 1

(B) A B C D
4 1 2 3

(C) A B C D
4 3 1 2

(D) A B C D
2 1 4 3

CORRECT ANSWER: A

SOLUTION:

Dominance-Expression of only one allele in a heterozygous organism.

Codominance-Side by side full expression of both alleles. F_1 resembles both parents.

Pleiotropy - Single gene can exhibit multiple phenotypic expression, e.g.,Phenylketonuria.

Polygenic inheritance-Many genes govern a single character, e.g. Human skin colour.

Q-50 - 35214041

Pick out the correct statements.

I. Haemophilia is a sex-linked recessive disease.

II.Down's syndrome is due to aneuploidy.

III. Phenylketonuria is an autosomal recessive gene disorder.

IV. Sickle-cell anaemia is an X - linked recessive gene disorder.

(A) II and IV are correct

(B) I, III and IV are correct

(C) I, II and III are correct

(D) I and IV are correct

CORRECT ANSWER: C

SOLUTION:

Sickle-cell anaemia is an autosomal recessive gene disorder in which sickle-celled RBCs are formed instead of normal ones. They carry very less content of O_2 as their haemoglobin is malformed. The person suffering from this disease show symptoms of anaemia.

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Q-51 - 30701410

Lampbrush chormosome occur in

(A) Salivary glands

(B) Lymph glands

(C) Cancer cells

(D) Oocytes

CORRECT ANSWER: D

Q-52 - 35214048

The mechanism that causes a gene to move from one linkage group to another is called

(A) inversion

(B) duplication

(C) translocation

(D) crossing over

CORRECT ANSWER: C

SOLUTION:

Translocation is the process causing a gene to move from one linkage group to another. It is the separation of a chromosome segment and its union to a non-homologous chromosome. It is of two types-simple and reciprocal In simple translocation one chromosome shows deletion or deficiency while a nonhomologous chromosome comes to have an additional segment. In reciprocal translocation two non - homologous chromosomes exchange segments between themselves to create new linkage groups in both the chromosomes

Hence, option (c) is correct.

Q-53 - 30701417

Chromosome theory of inheritane was proposed by

(A) Sutton (1902)

(B) `Boveri(1902)

(C) Both Sutton (1902) and Boveri (1902)

(D) Correns (1909)

CORRECT ANSWER: C

Q-54 - 30701462

Alkaptonurics excreate excess of

(A) Urine

(B) Albumen

(C) Malony caetic acid

(D) Homogentisic acid

CORRECT ANSWER: D

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Q-55 - 35214098

Two genes R and Y are located very close on the chromosomal linkage map of maize plant. When RRYY and rryy genotypes are hybridised, then F_2 segregation will show

(A) higher number of the recombinant types

(B) segregation in the expected 9 : 3 : 3 : 1 ratio

(C) segregation in 3 : 1 ratio

(D) higher number of the parental types

CORRECT ANSWER: D

SOLUTION:

Higher number of the parental types formed when RRYY and rryy genotypes are hybridised giving the condition that R and Y genes are closely linked. Law of independent assortment does not applicable when the gene of different character occupy the same homologous chromosome i.e. are linked gene.

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Q-56 - 18705213

"Nu body" was shown by

(A) Darlington

(B) Johanssen

(C) Woodcock

(D) Temin and Baltimore

CORRECT ANSWER: C

SOLUTION:

(c) Wood cock (1973) observed the structure of chromatin under electron microscope . He termed each beaded structure on chromosome as nucleosome .

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Q-57 - 35214102

Test cross involves

(A) crossing between two genotypes with recessive trait

(B) crossing between two F_1 hybrids

(C) crossing the F_1 hybrid with a double recessive genotype

(D) crossing between two genotypes with dominant trait

CORRECT ANSWER: C

SOLUTION:

The test cross involves the crossing of F_1 hybrid with a double recessive genotypic parent. By test cross, the heterozygosity and homozygosity of the organism can be tested.

Thus, the offspring will be 100% dominant, if the individual which crossed with recessive parent, i.e. (tt) was homozygous dominant and ratio will be 50% dominant and 50% recessive if the individual was heterozygous dominant. In dihybrid test cross, ratio will be 1:1:1:1.

Q-58 - 18705270

Human blood groups are example of a

(A) Gradulism

(B) Cline

(C) Gradient of diplodiy

(D) Polymorphism

CORRECT ANSWER: D

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Q-59 - 18705212

The peroson who discovered 'Y' Chromosomes was

(A) Mc Carthy

(B) Mc Clung

(C) Gregor Mendel

(D) Netti Stevens

CORRECT ANSWER: D

Q-60 - 35214104

In which mode of inheritance do you expect more maternal influence among the offspring?

(A) Autosomial

(B) Cytoplasmic

(C) Y-linked

(D) X-linked

CORRECT ANSWER: B

SOLUTION:

The more maternal influence can be expected in the cytoplasmic inheritance, i.e. the inheritance of genes contained in the cytoplasm of a cell, rather than the nucleus.

The reason is that the female reproductive cell or the egg has a large amount of cytoplasm containing many such organelles which contain their own genes and can reproduce independently, e.g. mitochondria and chloroplast and which are consequently incorporated into the cytoplasm of all the cells of the embryo.

The male reproductive cells (sperm or pollen) consist almost solely of a nucleus. Cytoplasmic organelles are thus, not inherited from the male parent.

This is why, the cytoplasmic inheritance is also called

maternal inheritance.

A gene located in the X-chromosome is said to be X-linked and its inheritance is called X-linked inheritance. In this, a male transmits his X-chromosome only to his daughters while a female transmits one of her X-chromosomes to the offspring of both sexes.

Q-61 - 30701526

Theroy of heterogamesiss for sex determination was proposed by

(A) Morgan

(B) Darwin

(C) Correns

(D) Bridges

CORRECT ANSWER: C

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Q-62 - 35214107

Phenotype of an organism is the result of

(A) mutations and linkages

(B) cytoplasmic effects and nutrition

(C) environmental changes and sexual dimorphism

(D) genotype and environmental interactions

CORRECT ANSWER: D

SOLUTION:

Phenotype is the observable characteristics or the total appearance of an organism. It is determined by its

genes, the relationships between the alleles and by the interaction during development between its genetic constitution (genotype) and the environment.

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Q-63 - 30701497

The frequency of mutation in a species can be increased by the use of

(A) X-rays

(B) UV-rays

(C) Nitrous acid

(D) All the above

CORRECT ANSWER: D

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Q-64 - 35214190

Loss of an X-chromosome in a particular cell, during its development, results into

(A) diploid individual

(B) triploid individual

(C) gynandromorphs

(D) Both (a) and (b)

CORRECT ANSWER: C

SOLUTION:

Gynandromorphs are those individuals in which one part of the body is female while another part is male. It occurs due to the irregularity in mitosis at the first cleavage of the zygote. One of the X-chromosomes of

an XX (female) zygote lags in the spindle, one daughter nucleus receives only one X-chromosomes. while the other receives two X-chromosomes. A mosaic body pattern is thus established which is known as gynandromorph.

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Q-65 - 35214113

A man and a woman, who do not show any apparent signs of a certain inherited disease, have seven children (2 daughters and 5 sons). Three of the sons suffer from the given disease but none of the daughters are affected. Which of the following mode of inheritance do you suggest for this disease ?

(A) Autosomal dominant

(B) Sex-linked dominant

(C) Sex-limited recessive

(D) Sex-linked recessive

CORRECT ANSWER: D

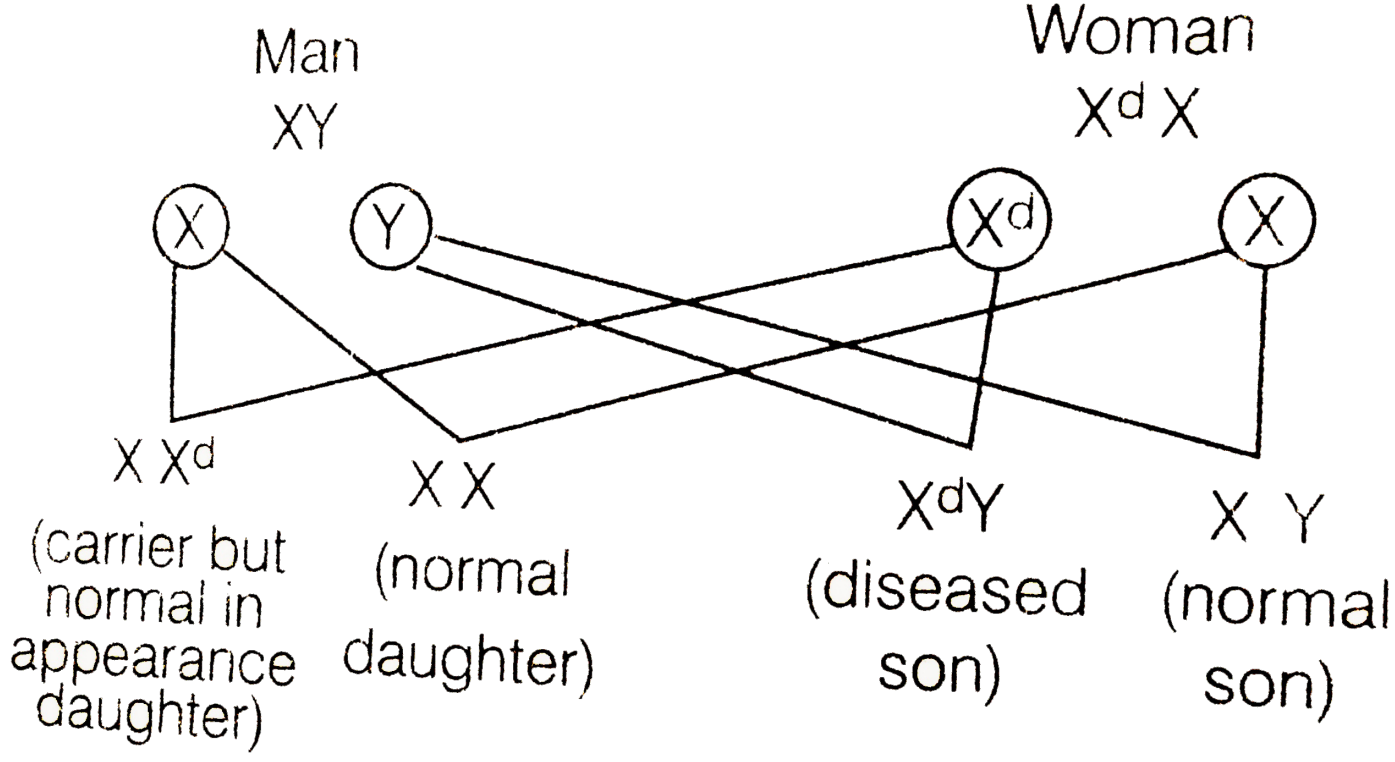
SOLUTION:

In given problem, disease is the result of sex-linked recessive genes. As neither man nor woman shows signs of disease it means woman would be carrier for disease. In their children non of the daughters suffer from disease, while the sons were suffered, it means daughters are also carrier (i.e. X-linked recessive).

Suppose, genotype of man = X Y

Genotype of woman = X^dX

(d-disease causing gene)



For each delivery the probability for each combination is 25%. So, among seven children 2 normal daughter, 3 diseased sons and 2 normal sons are possible.

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Q-66 - 30701484

A classical example off allopolyploid is

(A) Brassica

(B) raphnobrassica

(C) Raphanius

(D) All the above

CORRECT ANSWER: B

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Q-67 - 35214138

When a cluster of genes shows linkage behaviour they

(A) do not show independent assortment

(B) induce cell division

(C) do not show a chromosome map

(D) show recombination meiosis

CORRECT ANSWER: A

SOLUTION:

Linked genes do not show independent assortment

because they are located on the same chromosome. But genes which are located on the same chromosomes (called linked genes) do not assort independently. Such type of genes are called linked genes and this phenomenon is called as linkage.

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Q-68 - 30701477

Aneuplody is the term applied for the

(A) Gene mutation

(B) chromosomal mutation

(C) Crhromosomal mutations involving the addition or loss of one or more chromoso9mes

(D) Chromosomal mutation involving the addition of one or more complete set of chromosomes

CORRECT ANSWER: C

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Q-69 - 35214116

A male human is heterozygous for autosomal genes A and B and is also hemizygous for haemophilic gene h. What proportion of his sperms will be abh?

(A) $\frac{1}{8}$

(B) $\frac{1}{32}$

(C) $\frac{1}{16}$

(D) $\frac{1}{4}$

CORRECT ANSWER: A

SOLUTION:

The genotype of human male in question must be Aa Bb X^hY.

Hence $2 \times 2 \times 2 = 8$ types of gametes would be formed. AB X^h, ABY, aB X^h aBY, Ab X^h, AbY, ab X^h, abY.

Hence, $1/8$ proportion of his sperms would be abh.

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Q-70 - 30701645

One barr body is found in man of genotype

(A) XY

(B) XXXY

(C) XXY

(D) XX

CORRECT ANSWER: C

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Q-71 - 18705161

The point at which the polytene chromosomes appeart to be attached togeher is known as

(A) Centriole

(B) Chromocentre

(C) Centromere

(D) Chromomere

CORRECT ANSWER: B

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Q-72 - 35214182

Mental retardation in man, associated with sex chromosomal abnormality is usually due to

(A) reduction in X-complement

(B) increase in X-complement

(C) moderate increase in Y-complement

(D) large increase in Y-complement

CORRECT ANSWER: B

SOLUTION:

Sterile males with undeveloped testes, mental retardation, etc. are due to increase in their X-complement which takes place in a disorder called Klinefelter's syndrome. These are formed by union of an XX egg and a normal Y sperm or normal X egg and abnormal XY sperm. The individual thus has 47

chromosomes (44 + XXY)

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Q-73 - 18705176

Balbiani rings are present in

(A) Polysomes

(B) Autosomes

(C) Polytene chromosomes

(D) None of these

CORRECT ANSWER: C

SOLUTION:

(c) Polytene chromosomes was described by Kollar

(1882) and first reported by Ballbiani(1881) . They are

found in salivary glands of insects (Drosophila) and called as salivary gland chromosomes .

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Q-74 - 18705211

Some genes in bacteria and virus mau bcode for more than one polypetide, they are called in

(A) Overlapping genes

(B) Jumping gene

(C) Split gene

(D) None of these

CORRECT ANSWER: A

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Q-75 - 35214132

Two crosses between the same pair of genotypes or phenotypes in which the sources of the gametes are reversed in one cross, is known as:

(A) dihybrid cross

(B) reverse cross

(C) test cross

(D) reciprocal cross

CORRECT ANSWER: D

SOLUTION:

Since genotypes/phenotypes of both parents are same- only sources of gametes are reversed, these crosses are called reciprocal crosses.

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Q-76 - 18705214

"Cytochimeras" means

(A) Cell having halodpid

(B) Cells having two nuclei

(C) Cells having different chromosomes other than vegetative cells

(D) None of these

CORRECT ANSWER: C

SOLUTION:

(c) Chimeras are the individual having the different genotypes in its different parts .

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Q-77 - 35214162

Ratio of complementary genes is

(A) $9:3:4$

(B) $12:3:1$

(C) $9:3:3:4$

(D) $9:7$

CORRECT ANSWER: D

SOLUTION:

In case of complementary genes, the ratio of 9 : 7 is obtained in F_2-generation. This was first discovered by Bateson and Punnett.

Complementary genes are those genes which express

themselves when present together. None of express themselves when present together. None of these two get expressed yourself when present alone.

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Q-78 - 35214123

In a mutational event, when adenine is replaced by guanine, it is the case of

(A) frameshift mutation

(B) transcription

(C) transition

(D) transversion

CORRECT ANSWER: C

SOLUTION:

In case of transition, purine base is replaced by another purine (e.g. $A \Leftrightarrow G$) and pyrimidine is replaced by another pyrimidine (e.g. $C \Leftrightarrow T$) and vice versa. In case of transversion purine is replaced by a pyrimidine and vice versa.

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Q-79 - 30701502

Cholchicine interferes in

(A) Spindle organisation

(B) DNA replication

(C) Chromosome condensation

(D) Polyploidy

CORRECT ANSWER: A

Q-80 - 35214137

Which of the following discoveries resulted in a Nobel Prize

(A) Recombination of linked genes

(B) Genetic engineering

(C) X-rays induce sex-linked recessive lethal mutations

(D) Cytoplasmic inheritance

CORRECT ANSWER: C

SOLUTION:

HJ Muller was awarded Nobel Prize in 1946 for his discovery of the production of mutation by X-ray radiation.

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Q-81 - 30701546

Huntington 's chorea appears at the age of

(A) 25-55 years

(B) 15-25 years

(C) 50-60 years

(D) 10-15 years

CORRECT ANSWER: A

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Q-82 - 35214118

The recessive genes located on X-chromosome in humans are always

(A) lethal

(B) sublethal

(C) expressed in males

(D) expressed in females

CORRECT ANSWER: C

SOLUTION:

The recessive genes located on X-chromosome in humans are always expressed in males because a female may be homozygous or heterozygous while male is always hemizygous (i.e. only allele is present). Haemophilia, colour blindness are some human diseases which are frequently found in males.

Q-83 - 30701627

An auxotroph is a (an):

(A) Plant capable of synthesising own crbohydrates

(B) Plant showing quick bending response to sunlight

(C) A mutatn having lost the ability to synthesisie one or more nutrients

(D) An organism dependent on another for nutritional requirements

---

CORRECT ANSWER: C

Q-84 - 35214155

Inheritance would be extranuclear in case of

(A) Killer Paramecium

(B) Killer Amoeba

(C) Euglena

(D) Hydra

CORRECT ANSWER: A

SOLUTION:

Extranuclear inheritance or cytoplasmic inheritance is the inheritance of the characters of only one parent (generally the female parent). E.g. some strains of Paramecium called killer strain.

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Q-85 - 35214121

Lack of independent assortment of two genes A and B in fruit fly

Drosophila is due to

(A) repulsion

(B) recombination

(C) linkage

(D) crossing over

CORRECT ANSWER: C

SOLUTION:

TH Morgan (1910) explained the lack of independent assortment in Drosophilia due to the linkage. When genes closely present adhere or link together in a group and transmitted as a single unit, the phenomenon is called linkage. It stops the process of independent assortment. Incomplete linkage is broken down due to the crossing over.

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Q-86 - 18705126

The largest gene in man is :

(A) Dystrophin

(B) Insulin gene

(C) Beta globin gene of haemoglobin

(D) Tumor suppressor gene

CORRECT ANSWER: A

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Q-87 - 30701472

If a part of chromosome gets separted and reattached in reverse positoion to the same chromosome, the mutation is called

(A) Inversion

(B) Transverion

(C) Transloction

(D) Gene mutation

CORRECT ANSWER: A

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Q-88 - 35214166

Mutation generally produces

(A) recessive genes

(B) lethal genes

(C) polygenes

(D) dominant genes

CORRECT ANSWER: A

SOLUTION:

Mutations generally produce recessive genes. Mutation is a sudden heritable change in the characteristics of an organism. The individual which shows these heritable changes is known as mutant.

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Q-89 - 30701479

What term is appied to the gene mutation wher a base is replaced by another base?

(A) Duplication

(B) Aneuploidy

(C) Euploidy

(D) Substitution

CORRECT ANSWER: D

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Q-90 - 35214178

Albinism is known to be due to an autosomal recessive mutation. The first child of a couple with normal skin pigmentation was an albino. What is the probability that their second child will also be an albino?

(A) 100 %

(B) 25 %

(C) 50 %

(D) 75 %

CORRECT ANSWER: B

SOLUTION:

Since, albinism is a recessive character, a child will be albino only if it is homozygous for albinism genes. Since, parents have normal skin, it means they are heterozygous. As a result of cross between two heterozygous parents 25% of the children will be homozygous recessive. The nature of hte second child is not affected in any way by the nature of the first child because both are independent events.

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Q-91 - 30701506

The scientist who first discorved cytoplasmic inheritance was

(A) Correns

(B) Rhoades

(C) Mendel

(D) Morgan

CORRECT ANSWER: A

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Q-92 - 18705142

Genes which are cofined to differential region of the Y-chromosome only are called :

(A) Mutant

(B) Autosomal

(C) Holndric

(D) Completely sex-linked

CORRECT ANSWER: C

SOLUTION:

(c) The genes present on the differential part of Y chromosome are passed directly from father to son and are called as Holandric genes .

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Q-93 - 35214164

During organ differentiation in Drosophila, an organ is modified to another organ (such as wings may be replaced by legs). Genes responsible for such metamorphosis are called

(A) double dominant genes

(B) plastid genes

(C) complementary genes

(D) homeotic genes

CORRECT ANSWER: D

SOLUTION:

Homeotic genes are control genes which either be getting expressed or by remaining silent during development, influence the differentiation of organs.

These have been found in insectsn one nematode and some plants. A DNA sequence called homeobox, present in these genes, is involved in specification of organs.

A mutation that causes a body part to develop in appropriate position in an organism, is called homeotic mutation, e.g. in Drosophila, such mutation may cause legs to develop on the head in place of antennae.

Mongoloid condition is releated to or In monglolism a patient

(A) Monosomy

(B) Trisomy

(C) Nullisomy

(D) None of the above

CORRECT ANSWER: B

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Q-95 - 35214158

Male XX and female XY sometime occur due to :

(A) deletion

(B) transfer of segments in X and Y-chromosomes

(C) aneuploidy

(D) hormonal imbalance

CORRECT ANSWER: D

SOLUTION:

Hormondal inbalance may lead to developmentof male characters in female or vice versa. Deletion is the removal of one of few nitrogenous bases from a nucleotide chain. Aneuploidy is a chromosomal aberration in which certain chromosomes are present in extra copies or certain are deficient in number.

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Q-96 - 18705219

Which of the following is incorrectly paired

(A) Sry gene X chromosome

(B) 2n-2-nullisomic

(C) Nucleiod prokaryote

(D) Polytecnic

CORRECT ANSWER: A

Q-97 - 18705300

Example of qualilative inheritance is

(A) Colour of skin

(B) Colourblindness

(C) Klinefelter's syndrome

(D) Alkaptonuria

CORRECT ANSWER: A

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Q-98 - 35214145

There are three genes a, b, c, percentage of crossing over between a and b is 20%, b and c is 28% and a and c is 8%. What is the sequence of genes on chromosome?

(A) b, a, c

(B) a, b, c

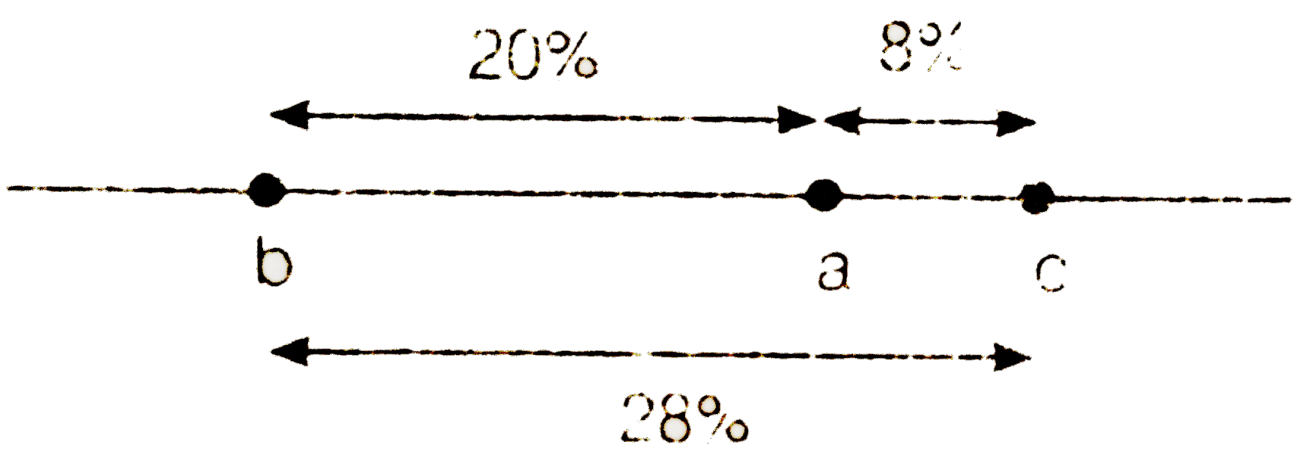
(C) a, c, b

(D) None of these

CORRECT ANSWER: A

SOLUTION:

According to the given question the sequence of genes son chromosome are b, a, c.



Q-99 - 18705245

In slpit genes, the coding sequences are called

(A) Cistrons0

(B) Operons

(C) Exons

(D) Introns

CORRECT ANSWER: C

SOLUTION:

(c) Unwanted portion (introns) of genes is spliced off

and remaining part i.e., exons get joined by ligase .

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Q-100 - 18705256

Which of the following is genetically dominant in man

(A) Colour blindness

(B) Rh positive

(C) Haemophilia

(D) Albinism

CORRECT ANSWER: B

SOLUTION:

(b) The difference between Rh positive and Rh negative depend on a single pair of genes (rr) with the gene

responsible for the Rh positive condition dominant (RR, Rr)

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Q-101 - 35214127

Pattern baldness, moustanches and beard in human males are examples of :

(A) sex differentiating traits

(B) sex determining traits

(C) sex linked traits

(D) sex limited traits

CORRECT ANSWER: D

SOLUTION:

Sex limited traits are those which are limited to one sex only. Moustaches, beard are found in human males only. It was suggested on the basis of statistical analysis that premature baldness is controlled by a dominant gene, which expresses only in the presence of a certain level of male hormone (androgen).

Q-102 - 30701542

Phenylketonura is

(A) Sex linked dominant trait

(B) Sex linked recesive trait

(C) Autosomal dominant trait

(D) Autosomal recessive trait

CORRECT ANSWER: D

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Q-103 - 18705162

Balbiani discovered special type of chronomus larva which are recognized by the presence of

(A) Bands

(B) Loosps

(C) Both bands and loops

(D) All the above

CORRECT ANSWER: C

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Q-104 - 35214143

Genetic map is one that :

(A) shows the stages during the cell division

(B) shows the distribution of various species in a region

(C) establishes sites of the genes on a chromosome

(D) establishes the various stages in gene evolution

CORRECT ANSWER: C

SOLUTION:

Genetic map is a diagram which shows the relative position of genes on a chromosome. Strutevant in 1911 prepared the first genetic map of two chromosomes of fruit fly.

Rh factor is named after

(A) Man

(B) Rat

(C) Monkey

(D) Chimpanzee

CORRECT ANSWER: C

SOLUTION:

Rhesus monkey (Macaa rhesus).

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Q-106 - 18705255

In human beings, the colour of skin is controlled by

(A) Multiple alleles

(B) Lethal gens

(C) Polytgenic effect

(D) None of these

CORRECT ANSWER: A

SOLUTION:

(a) The skin colour of a person is the result of an interaction between two pairs of genes .

Q-107 - 18705166

Lampbrush chromosomes are visible

(A) In diplotene of meiosis

(B) In prophase of meiosis

(C) In interphase

(D) In metaphase of meiosis

CORRECT ANSWER: A

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Q-108 - 35214139

In Drosophila, the sex is determined by

(A) the ratio of pairs of X-chromosomes to the pairs of autosomes

(B) whether the egg is fertilised or develops parthenogenetically

(C) the ratio of number of X-chromosomes to the set of autosomes

(D) X and Y-chromosomes

CORRECT ANSWER: A

SOLUTION:

Calvin Bridges demonstrated that in Drosophilia, the sex is detemined by ratio of the number of X-chromosomes to the sets of autosomes. According to genic balances theory of sex-determination, Y-chromosome of Drosophilia does not important for the determination of sex.

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Q-109 - 30701564

Allsomees are the name of

(A) Sex chromosomes

(B) Swellings on the chromosomes

(C) Chromosomes other than the ones which determine sex

(D) Nucleolus organising regions of chromosomes

CORRECT ANSWER: A

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Q-110 - 35214156

Number of Barr bodies in XXXX female would be

(A) 1

(B) 2

(C) 3

(D) 4

CORRECT ANSWER: C

SOLUTION:

The number of Barr bodies in XXXX female are 3. Barr body is a condensed mass of chromatin found in the nuclei of placental mammals which contain one or more X-chromosomes, so named after its discovers Murray Barr. The number of Barr bodies is one less than the number of X-chromosomes present.

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Q-111 - 30701489

When chromosome sets are present in multiple of 'n', the condition is termed

(A) Diploidy

(B) Haploidy

(C) Euploidy

(D) Aneuploid

CORRECT ANSWER: C

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Q-112 - 35214140

Genes for cytoplasmic male sterility in plants are located in

(A) nuclear genome

(B) cytosol

(C) chloroplast genome

(D) mitochondrial genome

CORRECT ANSWER: D

SOLUTION:

Mitochondria are originated from pre-existing mitochondri. These are semi-autonomous, living organelles present in all eukaryotic cells. These contain DNA (mtDNA). The available evidences show that the genes located in mtDNA control the cytoplasmic male sterility.

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Q-113 - 18705189

The linkage map of X-chromosome of fruit fly has 66 units with yellow body gene Y at one end and bobbed hair B gene at he other end. The recombination frequency between these two genes Y and B should be

(A) 1

(B) 0.66

(C) 0.5

(D) 0.055

CORRECT ANSWER: B

SOLUTION:

(b) The actual distance between two genes is said to be equivalent to the percentage of crossing over between these genes i.e 66% . Crossing over chances between y and b genes suggest that these are to be placed on the chromosome at a distance of 66 units .

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Q-114 - 18705362

Edward's syndrome, Patau's syndrome and Down's syndrome are

due to

(A) Mutation due to malnutrition

(B) Change in sex chromosomes

(C) Change in autosomes

(D) Change in both sex chromosomes and autosomes

CORRECT ANSWER: C

SOLUTION:

There is a large scale possibility of autosomal

aneuploidy in human beings .

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Q-115 - 18705201

Polytene Chromosomes are formed by

(A) Endoreduplication of chromosomes

(B) Somantic pairing of homologolous chromosomes

(C) Somantic pairing of non-homologous chromosomes

(D) Germinal pairing of non-homologous chromosomes

CORRECT ANSWER: A