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## QUIZZES

### Unit Wise Test-12 (Variations and Genetics/Inheritance)



30 Questions



25 min

#### Topics

Mendelian Inheritance, Law of Segregation, Law of independent assortment, Dominance Relations, Multiple Alleles (ABO blood group System), Epistasis and Bombay Phenotype, Gene linkages and crossing over, Patterns of sex determinations, Sex Linkage in Humans (hemophilia and color blindness), Recombination Frequency and Genetic Map of Chromosome, Basic Terms, Polygenic Inheritance



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Start Quiz



1/30



25 min



Hint

Q : All of the following are true about alleles except:

A

They are always identical

B

They control same trait

C

Present on respective homologue

D

Can be expressed independently

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

1

2

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2/30



25 min



Hint

Q : Which one of the following does not have a fix locus?

A

Polygenes

B

Multiple alleles

C

Pleiotropic gene

D

Jumping gene

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

1

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3/30



25 min



Hint

Q : \_\_\_\_\_ is the basic unit of biological information:

A

Gamete

B

Chromosome

C

DNA

D

Gene

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

1

2

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4/30



25 min



Hint

Q : Seed shape in pea plant is:

A

Trait

B

Phenotype

C

Genotype

D

Genome

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

1

2

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7

24 : 55



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5/30



25 min



Hint

Q : Which of the following is considered as a recessive character of Mendel?



Green pod color



Round seed shape



Axial flower position



Wrinkled seed shape

SAEED MDCAT

SAEED MDCAT TEAM



SAEEDMDCAT





Q

6/30



25 min



Hint

Q : In Mendel's monohybrid cross, what percentage of round seed plants were produced by  $F_1$  heterozygous round on self-fertilization?

A

25%

B

50%

C

75%

D

100%

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

1

2

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7



7/30



25 min



Hint

Q : Mendel's principle of segregation was based on the separation of alleles in the garden pea during:

A

Pollination

B

Seed formation

C

Embryonic development

D

Gamete formation

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

1

2

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5

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7





8/30



25 min



Hint

Q : According to Mendel's monohybrid cross, the characters which appears in  $F_1$  is said to be:

A

Recessive

B

Co-recessive

C

Dominant

D

Partially dominant

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



9/30



25 min



Hint

Q : What will be the probability of a round green seed in a dihybrid cross if the independent probability of a round seed is  $\frac{3}{4}$  and green seed is  $\frac{2}{4}$ ?



5/8



6/8



3/16



6/16

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



10/30



25 min



Hint

Q : What percentage of round green seeds in  $F_2$  progeny of dihybrid cross is heterozygous for round seed shape?

A

25%

B

33%

C

66%

D

75%

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

24 : 44



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11/30



25 min



Hint

Q : What type of gametes will be formed by genotype RrYy?



A RY, Ry, rY, ry



B Ry, Ry, Yy, ry



C RY, Ry, ry, ry



D Rr, RR, Yy, YY

SAEED MDCAT

SAEED MDCAT TEAM



SAEEDMDCAT

6

7

8

9

10

11

12



12/30



25 min



Hint

Q : Dominance is physiological effect of an allele over its partner allele occupying:

A

Same locus on same chromosome

B

Same locus on respective homologue

C

Different locus on same chromosome

D

Different locus on respective homologue

# SAEED MDCAT

## SAEED MDCAT TEAM

 SAEEDMDCAT



13/30



25 min



Hint

Q : An allele is said to be dominant if:

A

It is expressed only in heterozygous combination

B

It is expressed only in homozygous combination

C

It is expressed in both homozygous and heterozygous condition

D

It is expressed only in second generation

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

11

12

13

14

15

16

17



14/30



25 min



Hint

Q : Which is not true about multiple alleles?

A

Formed due to gene mutation

B

Belong to polymorphic gene

C

Number is always two

D

Gamete having just one of them

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

11

12

13

14

15

16

17



Q

15/30



25 min



Hint

Q : Blood group of a person is O while his children having A. All of the following can be the genotype of mother except:

A

Homozygous for gene  $I^A$ 

B

Heterozygous for gene  $I^A$ 

C

Homozygous for gene  $i$ 

D

Heterozygous for gene  $i$ 

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

11

12

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14

15

16

17



24 : 37



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16/30



25 min



Hint

Q : How many alleles of ABO blood group are present in an individual?



1



3



2



300

SAEED MDCAT

SAEED MDCAT TEAM



SAEEDMDCAT

11

12

13

14

15

16

17



17/30



25 min



Hint

Q : A trait being controlled by a gene pair on chromosome 9 is interfered by a gene pair on chromosome 19. This effect is called:

A

Over dominance

B

Mutation

C

Epistasis

D

Complete dominance

# SAEED MDCAT

## SAEED MDCAT TEAM

 SAEEDMDCAT



18/30



25 min



Hint

Q : Tongue rolling is due to:

A

Single recessive gene

B

Single dominant gene

C

Homozygous recessive

D

Multiple alleles

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



19/30



25 min



Hint

Q : Mendel's law of independent assortment is applicable for:

A

All genes in all organisms

B

All linked genes only

C

All genes of pea plant only

D

All non-linked genes only

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



20/30



25 min



Hint

Q : Physical association of two genes is known as:

A

Heterozygosis

B

Recombination

C

Linkage

D

Homozygosis

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



21/30



25 min



Hint

Q : Genes for which of the following form a linkage group on chromosome 11?

A

Leukemia, Albinism

B

Hemophilia, Gout

C

Gout, Sickle cell anemia

D

Color blindness, Hemophilia

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



22/30



25 min



Hint

Q : Genes can be mapped on a chromosome on the basis of their:

A

Tetrad formation

B

Location of jumping genes

C

Chiasmata formation

D

Recombination frequencies

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



23/30



25 min



Hint

Q : The probability of having a male or female offspring in ZZ-ZW pattern of sex determination is:

A

25%

B

50%

C

75%

D

100%

# SAEED MDCAT

## SAEED MDCAT TEAM

 SAEEDMDCAT





24/30



25 min



Hint

Q : In humans, sex of an individual depends upon:

A

Homogametic mother

B

Heterogametic mother

C

Homogametic father

D

Heterogametic father

# SAEED MDCAT

## SAEED MDCAT TEAM

 SAEEDMDCAT



25/30



25 min



Hint

Q : Chromosomal combination of a person with tfm syndrome is:

A

XO

B

XY

C

XX

D

XYY

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

22

23

24

25

26

27

28



Q

26/30



25 min



Hint

Q : Even a single recessive allele on X chromosome in male can be expressed because:

A

All genes on X chromosome can be expressed

B

Y chromosome has dominant allele for that trait

C

X chromosome alleles are dominant over Y chromosome

D

Y chromosome does not have counter part of allele of X chromosome

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



27/30



25 min



Hint

Q : It is an example of X-linked dominant trait and occur more in females as compared to the males:

A

Hemophilia

B

Color blindness

C

Vit. D resistant rickets

D

Lesch-Nyhan syndrome

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT

22

23

24

25

26

27

28



28/30



25 min



Hint

Q : Hemophilia B is due to absence or abnormality of blood clotting factor:

A

VIII

B

IX

C

X

D

XI

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



29/30



25 min



Hint

Q : A normal woman whose father was red-blind marries a red-blind man. What proportion of their children can have normal colour vision?

A

25%

B

75%

C

50%

D

100%

# SAEED MDCAT

## SAEED MDCAT TEAM



## SAEEDMDCAT



Q

30/30



25 min



Hint

Q : Hypophosphatemic rickets is due to a protein defect that does not respond to vitamin D signal. This protein is located on:

A

Liver cells

B

Bone cells

C

Intestinal cells

D

Skin cells

# SAEED MDCAT

## SAEED MDCAT TEAM

 SAEEDMDCAT



Correct



Unattempted



Incorrect



1/30

Q : All of the following are true about alleles except:



A They are always identical



B They control same trait



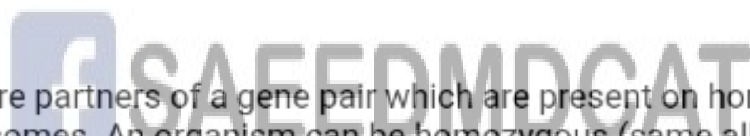
C Present on respective homologue



D Can be expressed independently

SAEED MDCAT

Explanation  
SAEED MDCAT TEAM



Alleles are partners of a gene pair which are present on homologous chromosomes. An organism can be homozygous (same alleles) or heterozygous (different alleles) with respect to alleles.

1

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Correct



Unattempted



Incorrect



2/30

Q : Which one of the following does not have a fix locus?



A Polygenes



B Multiple alleles



C Pleiotropic gene

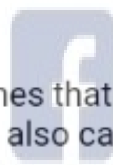


D Jumping gene

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

Such genes that keep on hopping from one position to another position, also called as transposons do not have fix locus.

1

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Correct



Unattempted



Incorrect



3/30

Q: \_\_\_\_\_ is the basic unit of biological information:



Gamete



Chromosome



DNA

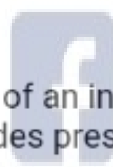


Gene

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

All traits of an individual are control by specific sequence of nucleotides present on DNA.

1

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Correct



Unattempted



Incorrect



4/30

Q : Seed shape in pea plant is:



A

Trait



B

Phenotype



C

Genotype



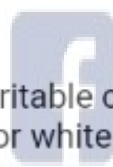
D

Genome

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

The inheritable characteristics are traits. i.e. flower colour is a trait and red or white is phenotypes.

1

2

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Correct



Unattempted



Incorrect



5/30

Q : Which of the following is considered as a recessive character of Mendel?



Green pod color



Round seed shape



Axial flower position



Wrinkled seed shape

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

Green pod color, round shaped seeds and axial position of the flowers in *P. sativum* are dominant characters while wrinkled seed shape is a recessive character.

1

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Correct



Unattempted



Incorrect



6/30

Q : In Mendel's monohybrid cross, what percentage of round seed plants were produced by  $F_1$  heterozygous round on self-fertilization?



25%



50%



75%



100%

SAEED MDCAT

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

$F_2$  self-fertilization of heterozygous round will give the same results as self-fertilization of  $F_1$  round.

1

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Correct



Unattempted



Incorrect



7/30

Q : Mendel's principle of segregation was based on the separation of alleles in the garden pea during:



Pollination



Seed formation



Embryonic development



Gamete formation

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

In gametogenesis meiosis occurs. Mendel inferred that both alleles for a trait got separated during gamete formation.

1

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Correct



Unattempted



Incorrect



8/30

Q : According to Mendel's monohybrid cross, the characters which appears in  $F_1$  is said to be:



Recessive



Co-recessive



Dominant

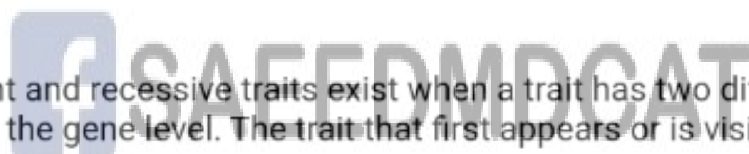


Partially dominant

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Explanation

SAEED MDCAT TEAM



Dominant and recessive traits exist when a trait has two different forms at the gene level. The trait that first appears or is visibly expressed in the organism is called the dominant trait. The trait that is present at the gene level but is masked and does not show itself in the organism is called the recessive trait.





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Correct



Unattempted



Incorrect



9/30

Q : What will be the probability of a round green seed in a dihybrid cross if the independent probability of a round seed is  $\frac{3}{4}$  and green seed is  $\frac{2}{4}$ ?



5/8



6/8



3/16



6/16

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

Probabilities of events in a dihybrid cross are calculated by product rule.





Correct



Unattempted



Incorrect



10/30

Q : What percentage of round green seeds in  $F_2$  progeny of dihybrid cross is heterozygous for round seed shape?



25%



33%



66%



75%

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

Among 3 round green seeds in  $F_2$  two are heterozygous for round and one is homozygous.



Correct



Unattempted



Incorrect



11/30

Q : What type of gametes will be formed by genotype RrYy?



A RY, Ry, rY, ry



B Ry, Ry, Yy, ry



C RY, Ry, ry, ry

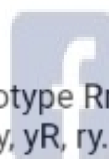


D Rr, RR, Yy, YY

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

The genotype RrYy can form gametes with four possible genotypes i.e. RY, Ry, yR, ry.

5

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11



Correct



Unattempted



Incorrect



13/30

Q : An allele is said to be dominant if:



A It is expressed only in heterozygous combination



B It is expressed only in homozygous combination



C It is expressed in both homozygous and heterozygous condition

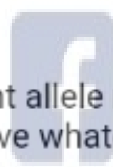


D It is expressed only in second generation

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

Dominant allele mask over its alternative form so should be expressive whatever will be the genotype.



Correct



Unattempted



Incorrect



12/30

Q : Dominance is physiological effect of an allele over its partner allele occupying:



A Same locus on same chromosome



B Same locus on respective homologue



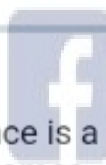
C Different locus on same chromosome



D Different locus on respective homologue

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

Dominance is a relationship between partner alleles on homologous chromosomes.



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Correct



Unattempted



Incorrect



14/30

Q : Which is not true about multiple alleles?



A Formed due to gene mutation



B Belong to polymorphic gene



C Number is always two

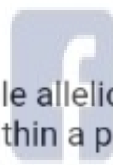


D Gamete having just one of them

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



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In multiple allelic system, gene exists in more than two alternative forms within a population but an individual contains any two of them.



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Correct



Unattempted



Incorrect



15/30

Q : Which is not true about multiple alleles?



SAEED MDCAT

Explanation  
SAEED MDCAT TEAM

SAEEDMDCAT

In multiple allelic system, gene exists in more than two alternative forms within a population but an individual contains any two of them.



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Correct



Unattempted



Incorrect



14/30

Q : Which is not true about multiple alleles?



A Formed due to gene mutation



B Belong to polymorphic gene



C Number is always two

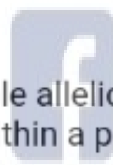


D Gamete having just one of them

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

In multiple allelic system, gene exists in more than two alternative forms within a population but an individual contains any two of them.





Correct



Unattempted



Incorrect



15/30

Q : Blood group of a person is O while his children having A. All of the following can be the genotype of mother except:



Homozygous for gene  $I^A$



Heterozygous for gene  $I^A$



Homozygous for gene  $i$



Heterozygous for gene  $i$

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

A person having A blood group must have at least one parent with  $I^A$  allele in them.





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Correct



Unattempted



Incorrect



16/30

Q : How many alleles of ABO blood group are present in an individual?



1



3



2



300

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

Human ABO blood groups system is controlled by three alleles e.g.  $I^A$ ,  $I^B$ ,  $i$ .



Correct



Unattempted



Incorrect



17/30

Q : A trait being controlled by a gene pair on chromosome 9 is interfered by a gene pair on chromosome 19. This effect is called:



Over dominance



Mutation



Epistasis



Complete dominance

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

Epistasis is the mechanism in which genes which occupy different loci interact with each other to control a single trait.



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Correct



Unattempted



Incorrect



18/30

Q : Tongue rolling is due to:



A Single recessive gene



B Single dominant gene



C Homozygous recessive

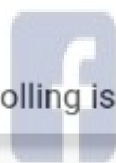


D Multiple alleles

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

Tongue rolling is the product of heterozygous genotype.



Correct



Unattempted



Incorrect



19/30

Q : Mendel's law of independent assortment is applicable for:



A All genes in all organisms



B All linked genes only



C All genes of pea plant only

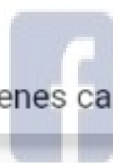


D All non-linked genes only

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



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Correct



Unattempted



Incorrect



20/30

Q : Physical association of two genes is known as:



A Heterozygosis



B Recombination



C Linkage

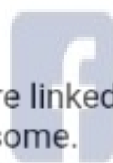


D Homozygosis

SAEED MDCAT

Explanation

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Genes are linked linearly on the same DNA molecule within a chromosome.



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Correct



Unattempted



Incorrect



21/30

Q : Genes for which of the following form a linkage group on chromosome 11?



A Leukemia, Albinism



B Hemophilia, Gout



C Gout, Sickle cell anemia



D Color blindness, Hemophilia

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

Genes for Leukemia and Albinism are present on autosome 11. Hemophilia is X linked.



Correct



Unattempted



Incorrect



22/30

Q : Genes can be mapped on a chromosome on the basis of their:



Tetrad formation



Location of jumping genes



Chiasmata formation

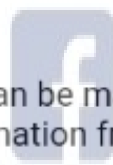


Recombination frequencies

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

Genes can be mapped on a chromosome on the basis of their recombination frequencies.





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Correct



Unattempted



Incorrect



23/30

Q : The probability of having a male or female offspring in ZZ-ZW pattern of sex determination is:



25%



50%



75%



100%

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

In ZZ-ZW pattern, female is heterogametic and produce two types of eggs. Thus, there are equal chances of offspring to be male or female.





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Correct



Unattempted



Incorrect



24/30

Q : In humans, sex of an individual depends upon:



A Homogametic mother



B Heterogametic mother



C Homogametic father

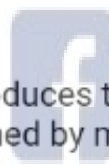


D Heterogametic father

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

Male produces two types of gametes, so sex of offspring is determined by male gametes.



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Correct



Unattempted



Incorrect



25/30

Q : Chromosomal combination of a person with tfm syndrome is:



XO



XY



XX



XYY

SAEED MDCAT

Explanation

SAEED MDCAT TEAM



SAEEDMDCAT

It is complete androgen insensitivity syndrome, but genetically they are male.



Correct



Unattempted



Incorrect



26/30

Q : Even a single recessive allele on X chromosome in male can be expressed because:



A All genes on X chromosome can be expressed



B Y chromosome has dominant allele for that trait



C X chromosome alleles are dominant over Y chromosome



D Y chromosome does not have counter part of allele of X chromosome

SAEED MDCAT TEAM

Explanation



SAEEDMDCAT

Hemizygous have only one copy of gene and the other copy is missing on its counterpart.



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Correct



Unattempted



Incorrect



27/30

Q : It is an example of X-linked dominant trait and occur more in females as compared to the males:



Hemophilia



Color blindness



Vit. D resistant rickets



Lesch-Nyhan syndrome

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Explanation



SAEEDMDCAT

Hemophilia, color blindness and Lesch-Nyhan syndrome are examples of X-linked recessive traits while Vit. D resistant rickets is an example of X-linked dominant trait.



Correct



Unattempted



Incorrect



28/30

Q : Hemophilia B is due to absence or abnormality of blood clotting factor:



VIII



IX



X

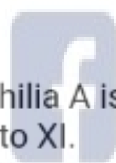


XI

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Explanation

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Haemophilia A is due to abnormality of factor VIII, while haemophilia C is due to XI.



Correct



Unattempted



Incorrect



29/30

Q : A normal woman whose father was red-blind marries a red-blind man. What proportion of their children can have normal colour vision?



25%



75%



50%



100%

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Explanation



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Since, the female is carrier and her husband is red blind, so 50% of their children can inherit red color blindness. And 50% of their children will be normal phenotypically.



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Correct



Unattempted



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Correct



Unattempted



Incorrect



30/30

Q : Hypophosphatemic rickets is due to a protein defect that does not respond to vitamin D signal. This protein is located on:



Liver cells



Bone cells



Intestinal cells



Skin cells

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Explanation



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Mineralization of bone needs vitamin D to deposit calcium.