

## **BIOLOGY**

## **BOOKS - SARAS PUBLICATION**

## PRINCIPLES OF INHERITANCE AND VARIATION

Example

1. What is criss-cross inheritance?



2. What are genes? **Watch Video Solution** 

3. What is haplodiploidy?



4. What is Lyonisation?



5. Define the unit of heredity.



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6. What are multiple alleles?



**Watch Video Solution** 

7. What is meant by kin selection?



**8.** Define sex linked inheritance.



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**9.** What are sex linked genes?



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10. Explain the process of Karyotyping.



11. What is a Karyotype?



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**12.** Write a brief note on pedigree analysis.



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13. What is aneuploidy?



**14.** Distinguish between heterogametic and homogametic sex determination systems?



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**15.** Differentiate Intersexes from Supersexes.



16. Distinguish between heterogametic and homogametic sex determination systems?



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17. What is criss-cross inheritance?



**Watch Video Solution** 

**18.** What are holandric genes?



19. Mention the symptoms of Phenylketonuria.



**Watch Video Solution** 

**20.** Mention the symptoms of Down's syndrome.



**Watch Video Solution** 

**21.** What is haplodiploidy?



22. What is Lyonisation?



**Watch Video Solution** 

23. Why are sex linked recessive characters more common in the male human beings?



24. Differentiate Intersexes from Supersexes.



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**25.** List any three applications of karyotype.



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26. Explain the genetic basis of ABO blood grouping man.



27. How is sex determined in human beings?



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28. Explain male heterogamety.



**Watch Video Solution** 

29. Brief about female heterogamety.



**30.** Give an account of genetic control of Rh factor?



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**31.** Explain the mode of sex determination in honeybees.



**32.** Disccus the genic balance mechanism of sex determination in Drosophila?



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**33.** Define sex linked inheritance.



**Watch Video Solution** 

**34.** What are extra chromosomal inheritance?

Explain with an example .



**35.** Comment on the methods of Eugenics.



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**36.** Define the unit of heredity.



**37.** Name some methods used in the betterment of human race.



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**38.** What is multiple allelism?



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**39.** Write the three allelic forms of the gene, controlling blood type? What do they specify?



**40.** Which allele of the gene controlling blood type is called 'null' allele? Why?



**41.** Who are secretors? Where can antigenic substances detected in them?



**42.** What is referred to as the "immunogenic D antigen? Why it is called so? What is the disorder caused due to the incompatibility of this antigen in new borns?



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**43.** Write about Wiener hypothesis?



**44.** What are multiple alleles?



**Watch Video Solution** 

**45.** What is meant by kin selection?



**Watch Video Solution** 

46. What is the role of the queen bee in achieving its reproductive success?



47. Define sex linked inheritance.



**Watch Video Solution** 

**48.** What are sex linked genes?



**Watch Video Solution** 

**49.** Give examples of X-linked gene inheritance in humans.



**50.** What is the pattern of inheritance in haemophilia? Give reason.



**51.** Write about the disorder and the name of the gene that is incapable of producing colour sensitive cone cells.



**52.** Write about the disorder or condition caused by inheritance of Y-linked genes.



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**53.** What is karyotyping?



**Watch Video Solution** 

**54.** What is karyotyping?



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**55.** On what basis are human chromosomes classified?



**56.** Explain the types of chromosome, based on position of centromere.



57. Write a brief note on pedigree analysis. **Watch Video Solution 58.** How is a genetic disorder caused? **Watch Video Solution 59.** are examples of mendelian disorders **Watch Video Solution** 

**60.** What is the role of phenylalanine hydroxylase?



**61.** What is the disease caused due to mutation in the gene PAH?



**62.** What is an uploidy?



**63.** Which disorder is known as Cooley's anaemia? What does this disorder lead to?



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**64.** Write about the autosomal aneuploid in humans caused by trisomic condition of chromosome-21.



**65.** What are the abnormalities in humans, caused by mitotic nondisjunction of sex chromosomes.



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**66.** Write short notes on the allelic forms that determine ABO blood group.



**67.** Which blood group type is known as universal donor? Why?



**68.** Who discovered the blood group that is known as universal recipient?



**69.** Explain Rh factor in brief.



**70.** Do animals have antigens on the sur-face of RBC's as in humans. Justfiy



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**71.** Which disease results in the lack of thromboplastin? .



**72.** Write about the condensed body observed Barr and Bertram.

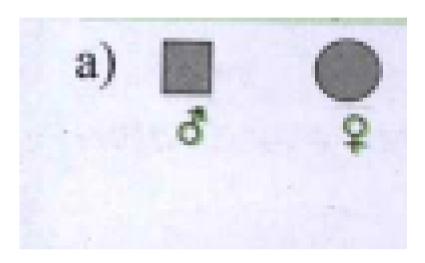


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**73.** Males have one X chromosome. Females have two X chromosomes. How is this dosage difference compensted?

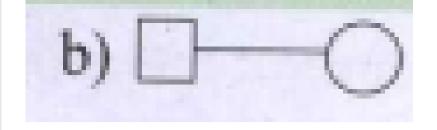


**74.** Identify the following symbols used in pedigree charts and give its explanatin:





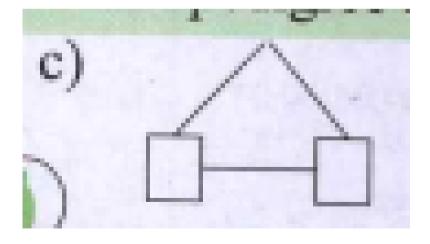
**75.** Identify the following symbols used in pedigree charts and give its explanatin:





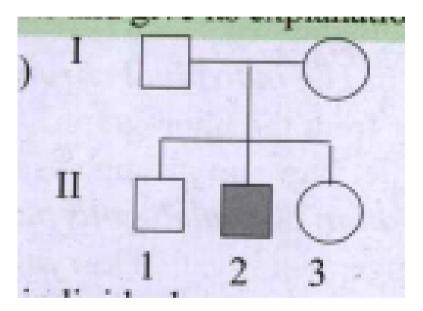
**Watch Video Solution** 

**76.** Identify the following symbols used in pedigree charts and give its explanatin:



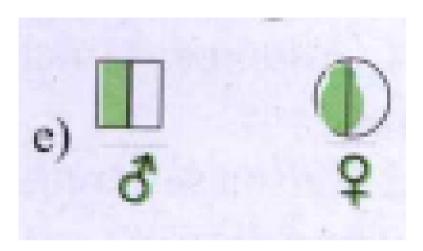


**77.** Identify the following symbols used in pedigree charts and give its explanatin:





**78.** Identify the following symbols used in pedigree charts and give its explanatin:





**79.** How is karyotype prepared? What are the advantages of chromosome banding?



**80.** Write notes on Mendelian disorders.



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81. Explain the disease caused due to the absence of melanin.



**82.** Explain the mode of sex determination in honeybees.



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**83.** What happens when errors occur during cell division? Explain in brief.



84. Write about the autosomal aneuploid in humans caused by trisomic condition of chromosome-21.



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85. The number of chromosomes is a diploid cell of Drosophila is



**86.** What happens when two different in compatible bloods are mixed? What is the reason for this?



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87. Define HDN. How can it be prevented?



**88.** What does current analysis of Y-chromosome reveal and explain its role in male development?



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**89.** Does Rh incompatibility have any significance in child birth? Justify it.



**90.** Give a schematic diagram to show inheritance of colourblindness in their grand children.



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**91.** A colorblind man marries a women with normal sight who has no history of color blindness in her family. What is the probability of their grandson being colorblind?



**92.** Which autosomal recessive disorder is caused due to excessive destruction of RBC?



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**93.** What is the disease caused caused by the presence of 47 chromosomes in humans? Explain it.



**94.** What is the disease caused by the presence of 45 chromosomes in human? Explain it.



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# Exercise

**1.** Mangolism is a genetic disorder which is caused by the presence of an extra chromosome number.

- A. 20
- B. 21
- C. 4
- D. 23



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2. Which of the following phenotypes is not possible in the progeny of the parental genotypic combination  $I^AI^OXI^AI^B$ ?

- A. AB
- B. O
- C. A
- D.B



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3. Improvement of human race by encouraging the healthy persons to marry early and produce large number of childern is called

- A. Positive eugenics
- B. Negative enugeniucs
- C. Positive euthenics
- D. Positive euphenics



- **4.** Which enzyme is produced by  $I^A$  allele?
  - A. N-acetyl galactose transferase

- B. Galactose transferase
- C. Phosphoryl transferase
- D. No transferase enzyme is produced



- **5.** During karyotyping, at which state will colchicine arrest cell division.
  - A. Prophase stage

- B. Metaphase stage
- C. Telophase stage
- D. Anaphase stage



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6. What are holandric genes?



**7.** Mention the symptoms of Downs syndrome.



**8.** Why are sex linked recessive characters more common in the male human beings?



**9.** What is the role of the queen bee in achieving its reproductive success?



**10.** Which allele of the gene controlling blood type is called 'null' allele? Why?



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11. Write about Wiener hypothesis?



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**12.** Differentiate Intersexes from Supersexes.



**13.** What is meant by cytoplasmic inheritance?



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14. Explain with an example.



**15.** Which blood group type is known as universal donor? Why?



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**16.** What happens when errors occur during cell division? Explain in brief.



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17. How are Mendelian disorders transmitted?



18. What are prions? Name one human diseases and cattle disease caused by prions.



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19. Explain Rh factor in brief.



**20.** Which autosomal recessive disorder is caused due to excessive destruction of RBC?



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21. Explain it write about its classification.



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**22.** What will be the phenotype of children when a color blind man marries a normal

visioned woman?



**Watch Video Solution** 

**23.** Give a schematic diagram to show inheritance of colourblindness in their grand children.



**Watch Video Solution** 

**24.** Haemophilia is more common in males because it is a

- A. Recessive character carried by Y-chromosome
- B. Dominant character carried by Y-chromosome
- C. Dominant trait carried by X-chromosome
- D. Recessive trait carried by X-chromosome



### 25. ABO blood group in man is controlled by

- A. Multiple alleles
- B. Lethal genes
- C. Sex linked genes
- D. Y-linked genes

#### **Answer:**



**26.** Three children of a family have blood groups A, AB and B. What could be the genotypes of their parents?

A. 
$$I^A I^B$$
 and  $I^O I^O$ 

$$\mathsf{B}.\,I^AI^O$$
 and  $I^BI^O$ 

$$\mathsf{C}.\,I^BI^B$$
 and  $I^AI^A$ 

$$D. I^A I^A$$
 and  $I^O I^O$ 

#### **Answer:**



- 27. Which of the following is not correct?
  - A. Three or more alleles of a trait in the population are called multiple alleles.
  - B. A normal gene undergoes mutations to form many alleles
  - C. Multiple alleles map at different loci of a chromosome
  - D. A diploid organism has only two alleles out of many in the population.



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**28.** Which of the following phenotypes in the progeny are possible from the parental combination AxB?

A. A and B only

B. A, B and AB only

C. AB only

D. A, B, AB and O



### **Watch Video Solution**

**29.** Which of the following phenotypes is not possible in the progeny of the parental genotypic combination  $I^AI^OXI^AI^B$ ?

A. AB

B.O

C. A

D.B



### **Watch Video Solution**

**30.** Which of the following is true about Rh factor in the offspring of a parental combination DdXDd (both Rh positive)?

- A. All will be Rh-positive
- B. Half will be Rh positive
- C. About 3/4 will be Rh negative
- D. About one fourth will be Rh negative



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**31.** What can be the blood group of offspring when both parents have AB blood group?

- A. AB only
- B. A, B and AB
- C. A, B AB and O
- D. A and B only



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**32.** If the childs blood group is 'O' and fathers blood group is 'A' and mother's blood group is 'B' the genetype of the parents will be

A. 
$$I^A I^A$$
 and  $I^B I^O$ 

$$\mathsf{B}.\,I^AI^O$$
 and  $I^BI^O$ 

$$\mathsf{C}.\,I^AI^O$$
 and  $I^OI^O$ 

$$\mathsf{D}.\,I^OI^O\,\text{ and }\,I^BI^B$$



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**33.** XO type of sex determination and XY type of sex determination are examples of.

- A. Male heterogamety
- B. Female heterogamety
- C. Male homogamety
- D. Both (b) and (c)



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**34.** In an accident there is great loss of blood and there is no time to analyse the blood group which blood can be safely transferred?

- A. O' and Rh negative
- B. O' and Rh positive
- C. B' and Rh negative
- D. AB' and Rh positive



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**35.** Father of a child is colour blind and mother is carrier for colour blindness, the possibility of the child being colour blind is......

A. 0.25

B. 0.5

C. 1

D. 0.75



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**36.** A marriage between a colourblind man and a normal woman produces

- A. All carrier daughters and normal sons
- B. 50% carrier daughers, 50% normal daughters
- C. 50% colour blind sons, 50% normal sons

D. All carrier offsprings

#### **Answer:**



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**37.** Mangolism is a genetic disorder which is caused by the presence of an extra chromosome number.

A. 20

B. 21

C. 4

D. 23

#### **Answer:**



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**38.** Klinefclter's syndrome is characterized by a karyotype of .............

A. XXY

B. XO

- C. XXX
- D. XXY



- **39.** Females with Turners' syndrome have
  - A. Small uterus
  - B. Rudimentary ovaries
  - C. Underdeveloped breasts

D. All of thses

#### **Answer:**



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**40.** Patau's syndrome is also referred to as .....

A. 13- Trisomy

B. 18- Trisomy

C. 21- Trisomy

D. None of these



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**41.** Who is the founder of Modern Eugenics movement?

- A. Mendel
- B. Darwin
- C. Francis Galton
- D. Karl Pearson



- **42.** Improvement of human race by encouraging the healthy persons to marry early and produce large number of childern is called
  - A. Positive eugenics
  - B. Negative eugenics
  - C. Positive euthenics

D. Positive euphenics

## **Answer:**



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**43.** The \_\_\_\_\_ deals with the control of several inherited human diseases especially inborn errors metabolism.

A. Euphenics

B. Eugenics

- C. Euthenics
- D. All of thses



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**44.** "Universal Donor" and "Universal Recipients" blood group are \_\_\_\_\_ and \_\_\_\_ respectively

A. AB, O

B. O, AB

C. A, B

D.B,A

## **Answer:**



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**45.** ZW-ZZ system of sex determination occurs in

A. Fishes

- B. Reptiles C. Birds D. All of thses **Answer: Watch Video Solution** 
  - **46.** Co-dominant blood group is
    - A. A
    - B. AB

C.B

D.O

## **Answer:**



**Watch Video Solution** 

**47.** Which of the following is incorrect regarding ZW-ZZ type of sex determination?

A. It occurs in birds and some reptiles

- B. Females are homogametic and males are heterogametic
- C. Male produces two types of gametes
- D. It occurs in gypsy moth



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**48.** Who discovered antigens on the surface of RBC?

- A. Bernstein
- B. Landsteiner
- C. Wiener
- D. Bertram



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**49.** Who discovered the blood group that is known as universal recipient?

- A. Landsteiner and Barr
- B. Barr and Bertram
- C. Wiener and Ernst
- D. De Castelle and Sturli



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**50.** On which chromosome is the autosomal alleles that determine blood group located?

- A. Chromosome 6
- B. Chromosome 3
- C. Chromosome 9
- D. Chromosome 7



- **51.** Which enzyme is produced by  $I^A$  allele?
  - A. N-acetyl galactose transferase

- B. Galactose transferase
- C. Phosphoryl transferase
- D. No transferase enzyme is produced



- **52.** Which enzyme is produced by  $I^A$  allele?
  - A. N-acetyl galactose transferase
  - B. Galactose transferase

- C. Phosphoryl transferase
- D. None of the above



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**53.** Which allele of the gene controlling blood type is called 'null' allele? Why?

- A.  $I^A$
- $\mathsf{B.}\,I^B$

 $\mathsf{C}.\,I^O$ 

D.  $I^AB$ 

## **Answer:**



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**54.** When should anti D antibodies be administered to mother to prevent erthroblastosis foetalis?

A. 4th and 8th week

- B. 28th and 34 week
- C. 12th and 14th week
- D. 36 and 40th week



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**55.** How many genes are present in X chromosome?

A. 100 genes

- B. 500 genes
- C. 1000 genes
- D. 1500 genes



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**56.** Which organism does not show XX-XO type of sex determination?

A. Drosophila

- B. Bugs
- C. Cockroaches
- D. Grasshoppers



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**57.** Which method of sex determination is called Lygaeus type?

A. XX-XO types

- B. XX-XY type
- C. ZO-ZZ type
- D. ZW-ZZ type



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58. Give the type of sex determination in

Drosophila

A. XX-XO types

- B. XX-XY type
- C. ZO-ZZ type
- D. ZW-ZZ type



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**59.** Which disease is also known as bleeder's disease?

A. Haemophilia

- B. Anaemia
- C. Thalassemia
- D. Aleukemia



- **60.** Haemophilia is caused byt
  - A. Dominant X-linked gene
  - B. Recessive X-linked gene

- C. Dominant Y-linked gene
- D. Recessive Y-linked gene



- **61.** When normal visioned man marries a colour blind women.
  - A. All sons will be normal visioned
  - B. All daughters will be colour blind

- C. All sons will be colour blind
- D. All children will be colour blind



- **62.** The genes for hypertrichosis are transmitted directly from
  - A. Father to daughter
  - B. Mother to daughter

- C. Mother to son
- D. Father to son



- **63.** During karyotyping, at which state will colchicine arrest cell division.
  - A. Prophase stage
  - B. Metaphase stage

- C. Telophase stage
- D. Anaphase stage



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**64.** Which of these is not a Mendelian disorder?

- A. Thalassemia
- B. Phenylketonuria

- C. Sickle cell anaemia
- D. Erythremia



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**65.** Which is an allosomal abnormality in humans.

- A. Turner's syndrome
- B. Down's syndrome

- C. Patau's syndrome
- D. Cushing's syndrome



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**66.** Failure of chromatids to segregate during cell division and resulting in gain or loss of chromosomes is called.

A. Polyploidy

- B. Aneuploidy
- C. Haplodiploidy
- D. Tetraploidy



- **67.** Patau's syndrome is also referred to as .....
  - A. Trisomy-21
  - B. Trisomy-13

- C. Trisomy-18
- D. Trisomy-22



- **68.** Down's syndrome is trisomic condition of
  - A. Chromosome 21
  - B. Chromosome 18
  - C. Chromosome 13

D. Chromosome 22

## **Answer:**



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**69.** Incompatibility reaction is not seen when

- A. A blood group person receives AB blood
- B. O blood group person receives A blood
- C. Rh positive person receives Rh negative

blood

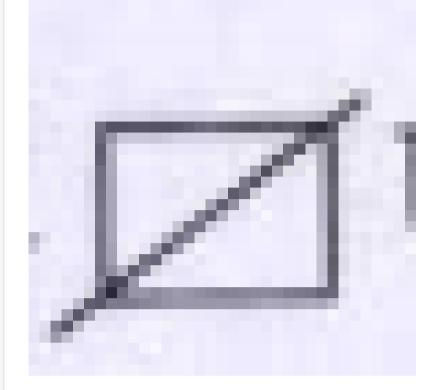
D. B blood group person receives AB blood

## **Answer:**



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**70.** Which is the correct explanation of the symbol used in pedigree charts?



A. Abortion or still birth

B. Sex unspecified

C. Death

D. Carrier of sex linked recessives



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# 71. Haplodiploidy is seen in

A. Ants

B. Drosophila

C. Cockroaches

D. Moths

#### **Answer:**

72. Females who are carriers of the discease,

Haemophilia transmit the disease to

A. 25% of their sons

B. 25% of their daughters

C. 50% of their daughters

D. 50% of their sons

**Answer:** 

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**73.** Albinism is caused due to the absence of the pigment

A. Phthalocyanine

B. Alizarin

C. Melanin

D. Anthocyanin

**Answer:** 



**74.** Which is not a sympton of Huntington's chorea?

A. Progressive degeneration of the nerovus system

B. Mental and physical deterioration

C. Increased separation between the eyes

D. Involuntary jerking of the body.

## **Answer:**



# 75. Person with Klinefelter's syndrome have

- A. 44 AA + XO chromosomes
- B. 44 AA + XXY chromosomes
- C. 45 AA + XYY chromosomes
- D. 43 AA + XO chromosomes

#### **Answer:**



**76.** Phenylalanine hydroxylase is essential for the conversion of

- A. Phenylalanine to tyrosine
- B. 3,4 dihydroxy phenylalanine to melanin
- C. Phenylalanine to alanine
- D. 3,4 dihydroxy phenylalanine to lysine. \

#### **Answer:**



# 77. Match the following

- 1. Haemophilia
- a) Autosomal recessive gene
- 2. Huntington's chorea
- b) Recessive X-linked gene c) Inheritance of Y-linked genes
- Phenylketonuria
   Hypertrichosis
- d) Autosomal dominant lethal gene
- A. 1-d, 2-c, 3-b, 4-a
- B. 1-b, 2-d, 3-a, 4-c
- C. 1-b, 2-a, 3-d, 4-c
- D. 1-d, 2-a, 3-b, 4-c

#### **Answer:**



**78.** ZW-ZZ system of sex determination occurs in

A. (i) and (iv) are correct

B. (ii) and (iv) are correct

C. (i) and (iii) are correct

D. (iii) and (iv) are correct

#### **Answer:**



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79. The sex chromosome in Turner's syndrome
is

- A. XO
- B. XXY
- C. XYY
- D. XXO



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- 80. An idiogram refers to
  - A. the diagram showing incompatibility of blood groups
  - B. the diagrammatic representation of chromosomes
  - C. the phenotypic combinations of alleles
  - D. diagram showing the inheritance pahtway for specific phenotypic characters.



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81. ..... Is used in gender identification

- A. Pedigree analysis
- B. ABO grouping
- C. Karyotyping
- D. Genetic linkage analysis

#### **Answer:**

**82.** What can be the blood group of children when father is AB and mother is O group?

A. A and B groups

B. AB and B groups

C. AB and O groups

D. AB and A groups

**Answer:** 



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**83.** If the child's blood group is 'B' and father's blood group is 'A' and mother's blood group is 'AB', what is the genotype of the father and mother?

A. 
$$I^A I^A$$
,  $I^A I^B$ 

B. 
$$I^OI^A$$
,  $I^BI^O$ 

$$\mathsf{C}.\,I^AI^O,\,I^AI^B$$

D. 
$$I^A I^A$$
,  $I^O I^O$ 



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**84.** The genotypes of a husband and wife are  $I^AI^B$  and  $I^AI^O$ . Among the blood types of children, how many different genotypes and phenotypes are possible?

- A. 2 genotypes and 3 phenotypes
- B. 4 genotypes and 3 phenotypes
- C. 4 genotypes and 4 phenotypes

D. 3 genotypes and 3 phenotypes

# **Answer:**



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**85.** In ABO blood grouping, how many genotypes show codominace?

**A.** 1

B. 2

C. 3



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**86.** A person of AB negative blood group met with an accident and is need of blood transfusion. Which blood group is not safe to be administered to this person?

A. AB negative

- B. A negative
- C. O negative
- D. O Positive



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**87.** Which blood type is considered as a universal donor?

A. O positive

- B. O negative
- C. AB positive
- D. AB negative



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**88.** What will be the genotypes of parents if they produce offspring with all the four blood groups A, B, AB and O?

A.  $I^AI^O, I^BI^O$ 

 $\mathsf{B}.\,I^AI^A,\,I^BI^B$ 

C.  $I^A I^A$ ,  $I^B I^O$ 

D.  $I^A I^O$ ,  $I^B I^B$ 

**Answer:** 

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**89.** When the genotypes of the parents are  $I^AI^A$  and  $I^BI^O$ , which blood group is not possible in the offspring?

- A. A and AB groups
- B. O group
- C. O and AB groups
- D. B and AB groups



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**90.** Rh incompatibility problems canoccur during pregnancy is mother is ...... and child is ......

- A. Rh positive, Rh negative
- B. Rh positive, Rh negative
- C. Rh negative, Rh positive
- D. Rh negative, Rh negative



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**91.** The genotype of a plant showing the dominant phenotype can be determined by

A. 
$$R^{O}r^{Y}$$

B.  $R^{O}r$ 

C.  $rr^Y$ 

D.  $R^Z r$ 

# Answer:



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**92.** A mother of blood type O has a child of O group. The blood type of father is .......

- A. A or B
- B. O only
- C. AB only
- D. A or B or O



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**93.** Which couple can produce children with all the 4 types of blood group

- A. AXAB
- B. BxAB
- C. AxB
- D. ABxO



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94. In each of the following questions, there are two statements. One is assertion (A) and other is reasoning (R). Mark the correct answer as

If both A and R are true and R is correct explanation for A.

if both A and R are true but R is not the correct explanation for A

If A is true but R is false

If both A and R are false Assertion (A):

Pedigree is same in colour blindness and
haemohilia Reason (R): Colour blindness and
haemophilia are X-linked recessive traits



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95. (A): Trisomic condition of chromosome-21results in Down's syndromeReason (R): Mitotic or meiotic non-disjunctionof sex chromosomes causes autosomal

- A. If both A and R are true and R is correct
  - B. if both A and R are true but R is not the
    - correct explanation for A
  - C. If A is true but R is false

explanation for A.

abnormalities.

D. If both A and R are false Assertion



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**96.** (A): Person with Turner's syndrome have 47 chromosomes. Reason (R): Turner's syndrome is also knownas (44AA+XX) syndrome.

A. If both A and R are true and R is correct explanation for A.

B. if both A and R are true but R is not the

correct explanation for A

C. If A is true but R is false

D. If both A and R are false Assertion

# **Answer:**



**97.** In each of the following questions, there are two statements. One is assertion (A) and other is reasoning (R) . Mark the correct

answer as

If both A and R are true and R is correct explanation for A.

if both A and R are true but R is not the correct explanation for A

If A is true but R is false

If both A and R are false Assertion (A):

Pedigree is same in colour blindness and
haemohilia Reason (R): Colour blindness and
haemophilia are X-linked recessive traits



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