

India's Number 1 Education App

### **BIOLOGY**

## BOOKS - NEW JYOTHI BIOLOGY (TAMIL ENGLISH)

## PRINCIPLES OF INHERITANCE AND VARIATION

**Ncert Text Book Questions** 

1. Mention the advantages of selecting pea plant

for experiment by Mendel.



**2.** Differentiate between the following:

(a) Dominance and Recessive

(b.) Homozygous and Heterozygous

(c). Monohybrid and Dihybrid.

3. A diploid organism is heterozygous for 4 loci,

how many types of gametes can be produced?



**4.** Explain the Law of Dominance using a monohybrid cross.

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5. Define and design a test-cross.



**6.** Using a Punnett Square, work out the distribution of phenotypic features in the first filial generation after a cross between a homozygous female and a heterozygous male for a single locus.

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7. When a cross is made between tall plant with yellow seed (TtYy) and tall plant with green seed (Ttyy), what proportions of phenotype in the offspring could be expected to be

a. tall and green.

b.dwarf and green.

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**8.** Two heterozygous parents are crossed. If the two loci are linked what would be the distribution of phenotypic features in F generation for a dihybrid cross?

9. Briefly mention the contribution of T.H.

Morgan in genetics



10. What is pedigree analysis? Suggest how such

an analysis, can be useful.

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11. How is sex determined in human beings?

**12.** A child has blood group O. If the father has blood group A and mother blood group B, work out the genotypes of the parents and the possible genotypes of the other offspring.

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**13.** Explain the following terms with example.

a. Co-dominance

b. Incomplete dominance

**14.** What is point mutation? Give one example.

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15. Who had proposed the chromosomal theory

of inheritance?

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16. Mention any two autosomal genetic disorders

with their symptoms.

#### New Evaluation Type Questions

#### 1. Match the following.

Α	В
a. Mendel	Chromosome theory
b. Karl Landsteiner	Genetics
c. Sutton and Boveri	Polytene chromosome
d. Morgan	Incomplete dominance
e. Bateson	Blood groups

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2. a. Name the phenomenon of co-existance of

two or more genes in same chromosome. b.



Thalesemia.





### 6. Complete the flowchart on the criss-cross

inheritance seen in human beings.





**7.** Note the relationship between the first two words and suggest a suitable word for the 4th place.

a. Genetics - Bateson : Genes -

b. Visible characters of an organism - Phenotype

- :: Genetic constitution of an organism.
- c. Epigenesis Wolf :: Blending inheritance -
- d. Multiple alleles Blood group : Polygenic traits

- e. Heredity Resemblance between parents and offspring : Variation -
- f. Garden pea Pisum sativum Sweet pea -
- g. Monohybrid ratio 3:1 :: Dihybrid ratio

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8. Find out the odd one in each group.

a. 3:1, 1:2:1, 9:3:3:1, 9:7

b. Homozygous, Heterozygous, Hemizygous,

Azygous

c. Monohybrid, Dihybrid, Polyhybrid, Back cross

d. Tall, Axial, Purple, White

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**9.** Mendel studied seven traits in garden pea. Which one or more of the following were recessive?

Wrinkled seed, axial flower, yellow colour of pod,

tall, purple flower.

**10.** Name a plant that shows incomplete dominance in respect to the colour of its flowers.



**11.** A heterozygous tall plant is crossed with a homozygous dominant plant. What is the result in F1 generation? Explain with adequate illustration.



12. Give the names of the scientist who

rediscovered Mendelism.



#### 13. What do you understand from the following

#### flow chart?



**14.** What do the following genetic symbols mean? Aa, AA

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

16. Give reason.

a. Mendel selected garden pea (Pisum sativum) as his experimental plant.

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b. Blood group identification is not required while transfusing serum.

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**17.** In man, four types of blood groups A, B, AB and O are controlled by three alleles of a gene. Name the type of inheritance involved in blood group.



heredity?

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#### 19. Match the related items from B and C with

#### column A.

A - Blood groups	<b>B</b> - Antigens	C - Antibodies
A	В	А
В	A	В
AB		AB
0	AB	



#### 20. Identify the personality.





21. Name the pigment that gives colour to the

skin of man.

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#### **22.** Match the following.

A	B
i. Incomplete dominance	Punnet
ii. Polygenic traits	Blood groups
iii. Multiple alleles	Skin colour
iv. Checker board	Mirabilis jalapa



**23.** Mendel, in his last breath said 'Meine zeit word schoon kommen'. What is the meaning of it?



#### 24. Give the scientific names of the following.

4 o'clock plant, Sweet pea, Snap dragon.



**25.** Who discovered blood groups?



**27.** A plant with red flowers was crossed with another plant of the same species with white flowers. The offspring thus obtained were 60 plants with only pink flowers. On selfing, these plants produced 60 plants with red flowers, 120 plants with pink flowers and 60 with white flowers.

a. Name the genetic principle behind this.

b. Give scientific explanation for this. "

c. Name the geneticist who conducted this experiment.

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#### 28. All test crosses are back cross. But all back

crosses are not test cross'. Justify the statement.

**29.** Copy and complete the checker board of dihybrid cross. Write the genotypic and phenotypic ratio. Gametes are given.



**30.** Test cross is used to identify whether the plant is homozygous or heterozygous. Justify this statement.



**31.** Note the relationship between the first two words and suggest a suitable word for the $4^{th}$  place.

a. XX - XO mechanism - Grasshopper: XX - XY mechanism

b. Sex limited inheritance - Beard in man: Sex

influenced inheritance -

c. Phenylketonuria - Phenylalanine hydroxylase:

Alkaptonuria -

d. Down syndrome - Langdon Down : Klinefelter's syndrome -

e. Turner's syndrome - 45 chromosomes: Down's

syndrome -

f. Ascaris megalocephala - 2:Ophioglossum

reticulatum



**32.** Find the odd one of the following:

a. Alkaptonuria, Phenylketonuria, Albinism, Colour blindness

b. Deletion, Duplication, Inversion, Conversion

c. Haploidy, Diploidy, Polyploidy, Polydactyly

d. Nullisomic, Monosomic, Polysomic, Polygenic

e. Klinefelter's syndrome, Down's syndrome, Turner's syndrome, Acquired Immune Deficiency syndrome.

33. Give reason

a. Drosophila is the ideal material for genetic study.

b. Haemophilia is more common in males.

c. Aneuploidy leads to variation.

d. Sex of the child is determined by father.

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34. Construct a flow chart showing criss-cross

inheritance.



# **35.** Observe the following diagrams and identify the different types of chromosomal mutation.



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**36.** Substitution of a wrong aminoacid valine instead of glutamic acid in the  $6^{th}$  position of

globin chain of RBC causes a disease in man

a. Name the disease.

b. Draw the amino acid sequence of both normal

and diseased Hb.



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**38.** Which one of the following is male

Drosophila?





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**39.** A man suffering from haemophilia marries a carrier woman. Work out the chances, of their progeny suffering from the disease. Use a flow chart/Punnet square.



#### 40. Match the following,

A		В	
a.	Mutation theory	Garrod	
b.	Chromosome map	John Cotto	
c.	Haemophilia	Hugo de Vries	
d.	Inborn errors of metabolism	Sturtevent	



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**41.** Some so called doctors claim that their medicines provide 100% guarantee for getting a son or a daughter according to the wish of the parent. How do you react to such claims on the basis of your knowledge of genetics? Give a suitable explanation.



#### 42. What will be the sex of a child which develops

from 44 + XX zygote?

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43. Explain how an XXY individual can arise in

human.

44. Drosophila is known as the 'pea' of animal

kingdom. Justify this statement.



**45.** Some genetic disorders such as haemophilia, colour blindness etc. transmit from father to grandson through daughter. Name the type of inheritance.



**46.** Give one word for the following.

a. Agents that cause mutation.

b. Diagrammatic representation of karyotype

- c. Seat of genes
- d. Loss of chromosome segment
- e. Fixed position of a gene
- f. Exchange of segments between non-sister chromatids
- g. Failure of separation of chromosome during meiosis.
- h. A chromosome pair is lost from the diploid set.


#### 47. Match the related items from B and C with

#### column A

	А	В	С
i.	Turner's syndrome	a.Autosomal defect (Chromosome No.7)	f. Sterile male
ii.	Sickle cell anemia	b.Inborn error of metabolism	g.Failure of chloride ion transport
iii.	Klinefelter's syndrome	c. 44A + X	h Abnormal Hb
iv.	Phenylketonuria	d.Substitution of wrong aminoacid	i. Sterile female
v.	Cystic fibrosis	e.44A + XXY	j. Lack of phenyl alanine hydroxylase



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# **48.** Give the chromosome numbers of the following animals and plants.

Animals	Plants	
i. Ascaris megalocephala	a.	Pisum sativum
ii. Drosophila melanogaster	b.	Allium cepa
iii. Apis (honey bee)	с.	Oryza sativa
iv. Homosapiens	d.	Ophioglossum reticulatur
v. Equus (horse)	е.	Saccharum officinarum
vi. Culex	f.	Solanum tuberosum

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#### **49.** Complete the flow chart.





50. Correct the aminoacid sequence of sickle cell

#### haemoglobin.



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51. Down's syndrome may occur in both sexes.

Comment.



52. Chromosome sets of four individuals are helow given 44A + XXY, 44A + XO, 45A + XX, 45A + XY. a. How many body chromosomes and sex chromosomes are present in normal male and females? b. Identify and write the names of chromosomal

abnormalities in the above listed chromosome sets.

c. Down's syndrome is seen in both sexes. Comment.



#### **Previous Year Hse Questions**

**1.** To find out the unknown genotype of a violet flowered pea plant a researcher done the following cross. Observe the diagram and answer the following questions.



a. What would be the above cross called ?

b. Can you determine the unknown genotype of

violet flowered parent by drawing Punnet swuare

#### ?



2. Polypeptide chains of two haemoglobin molecules are shown below. One of the chains shows an abnormality. Observe the diagram and answer the following questions.

h (Pro) Gh Thr - B

a. Which of the polypeptide chain in haemoglobin is abnormal leading to a disease?
b. What is the reason for this abnormality?
c. What will be the effect of this change in polypeptide chain?

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**3.** Some genetic abnormalities, their genotypes and features are distributed in columns A, B and

#### C respectively. Match them correctly.

A	В	C
Down's Syndrome	44 A + XO	Rudimentary ovary and sterility
Turner's Syndrome	44 A + XXY	Furrowed tongue and partially opened mouth
Klinefelter's Syndrome	45A +XX/XY	Gynaecomastia and sterility

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#### **Previous Year Competitive Exam Questions**

1. Epistatic effect in which the dihybrid cross
AaBb \* AaBb resulting in the ratio 12:3:1 is due
to
.

A. a) Interaction between two alleles of the

same locus

B.b) Interaction between two alleles of different loci

C.c) Dominance of one allele on another

allele of the same locus

D.d) Dominance of one allele on another

allele of both loci

Answer: B



2. Mendel's law of independent assortment can

be demonstrated by

A. Test cross

B. Monohybrid cross

C. Back cross

D. Dihybrid cross

Answer: D

**3.** If Mendel had studied the 7 traits using a plant with 12 chromosomes instead of 14, in what way would the interpretation have been different ?

- A. a) He would have mapped the chromosome
- B. b) He would not have discovered the law of

independent assortment

C. c) He would have discovered blending or

incomplete dominance

D. d)He would have discovered sex linkage

Answer: B





**4.** How many types of genetically different gametes will be produced by heterozygous plant having the genotype AABbcc?

A. Two

B. Four

C. Six

D. Eight

Answer: A



5. When a plant of F1 generation is crossed with

a homozygous dominant parent, it is known as

A. Simple Cross

**B.** Special cross

C. Back cross

D. Test cross

Answer: C

**6.** The ability of a gene to have many effects is called

A. pleiotropy

B. epistasis

C. dominant gene

D. phenotype

**Answer: A** 

7. The back Cross of F1 hybrid with the recessive

parent is called

A. monohybrid cross

B. reciprocal cross

C. test cross

D. Punnet square cross

Answer: C

8. Skin colour inheritance in man is

A. monogenic

B. polygenic

C. sex linked

D. multiple alleles

**Answer: B** 



**9.** The blood group \_\_\_\_\_ is called universal

donor.

A. AB group

B. A group

C. O group

D. B group

Answer: C

10. The ratio of 1:1:1:1 is obtained from a cross

between the parents \_\_\_\_\_.

A. RRYY  $\times$  rryy

B. RRYY  $\times$  rrYy

C. RrYY  $\times$  Rryy

D. RrYy  $\times$  rryy

Answer: D

**11.** A cross between F1 hybrid and recessive parent (Tt x tt) gives a ratio

- A.1:1
- B. 2:1
- C.3:1
- D.4:1

Answer: A

**12.** Pleiotropic gene \_\_\_\_\_.

A. controls only one phenotype

B. controls several phenotypes

C. masks the expression of another non-allelic

gene

D. inhibits crossing over

Answer: B

**13.** The process that involves inter-genic suppression or the masking effect which one gene locus has upon the expression of another is called

A. epistasis

B. dominance

C. incomplete dominance

D. recessive

Answer: A



14. Two sister chromatids are attached with the

A. spindle fibres

B. chromatid

C. centromere

D. chromocentre

Answer: C

15. Genes are arranged linearly in a chromosome

was concluded by the study of

A. codominance

B. incomplete dominance

C. linkage

D. sex chromosomes

Answer: C

**16.** Crossing over occurs between \_\_\_\_\_.

- A. a) two sister chromatids of same chromosomeB. b) two non sister chromatids of same bivalent
- C. c) two non sister chromatids of different

bivalent

D. d) None of these







17. Chemical composition of chromosome is

A. a) DNA and proteins

B. b) DNA and lipids

C. c) DNA and carbohydrates

D. d) protein and lipids

Answer: A

18. Which pair is a chromosomal aberration?

A. a) Duplication and translocation

B. b) Duplication and transduction

C. c) Duplication and transversion

D. d) All of these

**Answer:** A

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19. Chromosomal aberrations refer to

A. a) morphological changes

B. b) aneuploidy

C. c) polyploidy

D. d) All of these

Answer: A

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20. Linkage reduces the frequency of

A. all parental types

B. homozygous recessive parents

C. hybrids

D. heterozygous dominant parents

Answer: C

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### 21. Chromosome complement with 2n - 1 is called

A. a) nullisomy

B.b) monosomy

C. c) trisomy

D. d) tetrasomy

**Answer: B** 



**22.** The term genome refers to the total number of genes contained in a

A. a) haploid set of chromosome

B. b) diploid set of chromosome

C. c) nucleus of a megasporocyte

D. d) nucleus of a cell of stem apex

#### Answer: A

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# **23.** DNA is associated with highly basic proteins called

A. a) histons

B. b) non - histones

C. c) albumins

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



# 24. A person with sex chromosomes XXY suffers

from

- A. a) Down syndrome
- B. b) Turner's syndrome
- C. c) Gynandromorphism
- D. d) Klinefelter's syndrome



# **25.** Pairing of homologous chromosomes can be seen during

- A. a) leptotene
- B. b) zygotene
- C. c) pachytene
- D. d) diplotene





**26.** The meiosis during sperm formation in Ascaris was studied by

A. Brauer (1893)

B. Boveri (1887)

C. Flemming (1892)

D. Abbe (1878)



# **27.** The chromosome associated with sex determination is known as

A. autosomes

B. accessory chromosomes

C. super numenary

D. determinant chromosome



**28.** The exchange of chromosome segments between non-homologous chromosome is called

A. translocation

B. deletion

C. transfer

D. frameshift





**29.** In case of Hemophilia, if the carrier daughter (Hh) marries a normal man 'H', then among their daughter

A. 50% will be normal (HH) and 50% carrier (Hh)

B. 50% will be normal (HH) and 50 hemophilic
C. 50% carrier (Hh) and 50% hemophilic (h)

D. 25% carrier (Hh) and 75% hemophilic (h)

**Answer:** A



**30.** Name the scientist who was awarded the Nobel Prize for his genetic studies on the linear arrangements of genes on chromosomes in the fruit fly, Drosophila melanogaster

A. T.H. Morgan

B. C.F. Wolf

C. T.A. Knight

D. J. Swammerdam

Answer: A

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## **31.** In humans, philadelphia chromosome results from the reciprocal translocations between

chromosome numbers

A. 10 and 20

B. 3 and 11

C. 9 and 22

D. 20 and 9

#### **Answer:**

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## 32. The person with Turner's syndrome has

A. 44 autosomes and XXY sex chromosomes

B. 44 autosomes and XO sex chromosomes

C. 44 autosomes and XYY sex chromosomes

D. 44 autosomes and X sex chromosomes

**Answer: B** 



## 33. The length of one full turn of DNA is

A. 3.4Å

B. 34. *A*Å

C. 20.0*A*Å

 $\mathsf{D}.\,3.04$ 

#### Answer: B

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## 34. Width of DNA molecule is

**A.** 34Å

 $\mathsf{B.}\,20\text{\AA}$ 

**C**. 15Å

## D. $25\text{\AA}$



## **35.** The sex chromosome constitution in a Klinefelter male is

A. XXY

B. XXX

C. XO

D. XYY





**36.** What are all the chances of colour blind daughters and sons being born in a marriage of normal man marrying a normal woman whose father was colour blind?

A. All sons are normal and all daughters are

colour blind

B. Both the sons and daughters are phenotypically normal C. 50% sons are colour blind and all daughters are normal D. Both the sons and daughters are colour blind

**Answer:** 



37. Phenylketonuria is a genetic disorder due to a

defect in metabolism of the following

A. Polysaccharides

B. Amino acids

C. Vitamins

D. Hormones

Answer: D

**38.** When closely placed genes on the same chromosome are inherited together the phenomenon is called

A. Qualitative inheritance

B. Crossing over

C. Gene interaction

D. linkage

**Answer:** 

**39.** The amino acid substituted in sickle cell anemia is

A. Glutamic acid for valine in the alpha chain

B. Glutamic acid for valine in the beta chain

C. Valine for glutamic acid in the alpha chain

D. Valine for glutamic acid in the beta chain

Answer: D

40. Monosomic trisomy is represented as

- A. 2n 1 + 1
- B. 2n 1 1
- $\mathsf{C.}\,2n-1$
- D. 2n + 1 + 1

#### Answer: A



41. Turner's syndrome is an example of

A. Monosomy

B. Bisomy

C. Trisomy

D. Polyploidy

Answer: A

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**42.** In sickle cell anaemia the glutamic acid is replaced by

A. proline

B. alanine

C. serine

D. valine

Answer: D

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## 43. Phenylketonuria is a genetic disorder of

A. trisomic condition

B. monosomic condition

C. autosomal dominant gene

D. autosomal recessive gene

Answer: D



**44.** Blackening of urine when exposed to air is a metabolic disorder in human beings. This is due

to

A. phenylalanine

B. tyrosine

C. valine replacing glutamine

D. homogentisic acid

#### **Answer:**



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## **45.** The accumulation of protein called amyloid $\beta$

peptide in human brain causes

A. Addison's disease

B. Huntington's disease

C. Alzheimer's disease

D. Motor-neuron disease

#### Answer: C

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**46.** Chromosome theory of inheritance was proposed by

A. Gregor Mendel

B. Hugo de Vries

C. Bridges

D. Sutton and Bovery



## 47. Gynaecomastia is a condition seen in

A. Down's syndrome

B. Turner's syndrome

C. Klinefelter's syndrome

D. Patau's syndrome

#### Answer: C





**48.** Cri-du-chat syndrome is caused by

A. para centric inversion

**B.** duplication

C. translocation

D. deletion

Answer: D

49.	Down's	syndro	ome	and	Turner's	syndrome	
occur in human beings due to							
		•				1.1.	
	A. monos	Somic	and	nul	lisomic	conditions	
	respec	tively					
E	3. monos	somic	anc	l tr	isomic	conditions	
	respec	tively					
(	C. trisom	ic ar	nd	mono	osomic	conditions	
	respec	tively					
[	D. nulliso	omic a	and	mon	osomic	conditions	
	respec	tively					



- **50.** Inheritance of blood group is a condition of
- I. Co-dominance
- II. Incomplete dominance
- III. Multiple allelism
- IV. dominance
  - A. I, II
  - B. II, IV

C. II, II

D. I, III,IV

#### **Answer:**



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**51.** When a dihybrid cross is fit into a Punnet square with 16 boxes, the maximum number of

different phenotypes available are

A. 8

**B.**4

C. 2

D. 16

**Answer: B** 



# **52.** Sex chromosomes of a female bird are represented by

A. XO

B. XX

C. XY

D. ZW

#### Answer:

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### 53. A man can inherit his X chromosome from

A. his maternal grandmother or maternal grandfather.

B. his father

C. his maternal grandfather only

D. his paternal grandfather

Answer: A

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54. Down's syndrome is an example of

A. aneuploidy

B. polyteny

C. polyploidy

D. monoploidy







56. Which of these is not a Mendelian disorder?

A. Cystic fibrosis

B. Sickle cell anaemia

C. Colour blindness

D. turners syndrome

#### **Answer:**



57. Who postulated the mutation theory?

A. G. Mendel

**B.** Charles Darwin

C. J.B. Lamarck

D. Hugo de Vries

#### Answer: D



58. Which of the following represents a test

cross?

A. WwXXww

B. WwXXWw

 $\mathsf{C}. Ww imes ww$ 

D. WW imes wwww

Answer: C

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59. In which one of the following, complementary

gene interaction ratio of 9:7 is observed?

A. Fruit shape in Shepherd's purse

B. Coat colour in mouse

C. Feather colour in fowl

D. Flower colour in pea

Answer: D

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**60.** 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 dominant

gene disorder

iv. Phenylketonuria is an autosomal recessive gene disorder

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

A. (i), (iii) and (iv) are correct

B. (i) and (iii) are correct

C. (ii) and (v) are correct

D. (i), (iv) and (v) are correct

#### Answer:



61. ABO blood group in human is an example of

A. pleiotropism

B. epistasis

C. polygenic inheritance

D. incomplete dominance

Answer:

62. The dominant epistasis ratio is

A. 9:3:3:1

B. 12: 3:1

C. 9: 3: 4

D.9:6:1

**Answer: B** 



## 63. Match Column I with Column II and find the

#### correct answer.

Column I	Column II		
a. Monoploidy	i. 2n – 1		
b. Monosomy	ii. 2n + 1		
c. Nullisomy	iii. 2n + 2		
d. Trisomy	iv. 2n – 2		
e. Tetrasomy	v. n		
	vi. 3n		

A. 
$$a-v, b-I, c-iv, d-ii, e-iii$$

B. 
$$a-v, b-ii, c-iv, d-I, e-iii$$

C. 
$$a-vi, b-v, c-iii, d-iv, e-ii$$

D. 
$$a-ii, b-I, c-iii, d-vi, e-v$$

#### **Answer: A**



**64.** In Morgan's experiments on linkage, the percentage of white eyed, miniature winged recombinants in  $F_2$  generation is

- A. 1.3
- B.37.2
- C. 62.8

D. 73.2

#### **Answer: B**





**65.** The graphical representation to calculate the probability of all possible genotypes of offspring in a genetic cross is called

A. Pedigree analysis

B. Karyotype

C. Punnett square

D. Chromosome map

#### Answer: C




66. Inheritance of flower colour is an example of

incomplete dominance, which is seen

A. Antirrhinum

B. Pisum

C. Solanum

D. Hibiscus

Answer: A

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**67.** Identify the wrong statement

A. In male grasshoppers 50% of the sperms have no sex chromosome B. Usually female birds produce two types of gametes based on sex chromosomes C. The human males have one of their sex chromosomes much shorter than the other D. The male fruit fly is heterogametic

## Answer:





68. The ABO blood grouping in human beings is

an example for

i. Dominance

ii . Incomplete dominance

iii. Co-dominance

iv. Multiple alleles

A. i and ii only

B. ii, iii and iv

C. i, ii and iv

D. iii and is only



**69.** Which of the following genotype does not produce any sugar polymer on the surface of the RBC?

A.  $I^A I^A$ 

 $\mathsf{B}.\,I^Bi$ 

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



## 70. Gynaecomastia is a common feature seen in

A. Klinefelter's syndrome

- B. Turner's syndrome
- C. PKU
- D. Cystic fibrosis

## **Answer:**





71. Haemophilia in man is due to

A. sex-linked inheritance

B. sex limited inheritance

C. sex-influenced inheritance

D. primary non-disjunction

## Answer: A



**72.** Which of the following is not a Mendelian disorder ?

A. Haemophilia

B. Cystic fibrosis

C. Colour blindness

D. Turner's Syndrome

**Answer:** 

