

- Q.1.** Choose correct statement regarding Mendel's law of segregation
- Alleles do not blend but retain individuality.
 - Gametes are always pure with respect to alleles.
 - Segregation of alleles occurs during anaphase of mitosis.
 - A monohybrid cross shows 3:1 phenotypic ratio in F_2 .
 - Heterozygous parent produce two kind of gametes each having one allele with equal proportion.
- A and B only
 - A, C, and D only
 - B, C, and E only
 - A, B, D, E only
- Q.2.** Choose correct statement regarding incomplete dominance
- Phenotype is intermediate in heterozygotes.
 - Genotypic ratio = phenotypic ratio (1:2:1).
 - Snapdragon flower color shows incomplete dominance.
 - F_1 resembles one parent only.
 - Incomplete dominance disproves Mendel's law of segregation.
- A and B only
 - A, B, and C only
 - B, C, and E only
 - A, B, D, E only
- Q.3.** Choose correct statement wrt law of independent assortment
- Genes for different traits assort independently if on different chromosomes.
 - A dihybrid cross shows 9:3:3:1 ratio in F_2 .
 - Dihybrid test cross produces 1:1:1:1 ratio.
 - Genes far apart on same chromosome may behave as unlinked.
 - Linkage increases number of recombinants.
- A and B only
 - A, B, C, and D only
 - B, C, and E only
 - A, B, D, E only
- Q.4.** Following statements are given for chromosomal theory of inheritance. Choose correct one only
- Proposed by Sutton and Boveri.
 - Chromosomes are located on genes
 - Chromosomes and genes segregate independently during meiosis.
 - Experimental proof came from Morgan's work on *Drosophila*.
 - Linked genes assort independently.
- A and B only
 - A, C, and D only
 - B, C, and E only
 - A, B, D, E only
- Q.5.** Select incorrect statements regarding linkage & recombination
- Genes located on different chromosome show linkage.
 - Linkage increases recombinant frequency.
 - Maximum recombination frequency possible is 100%.
 - Morgan proved linkage using *Drosophila*.
 - Crossing over produces recombinants.
- A and B only
 - A, C, and D only
 - A, B and C only
 - D and E only
- Q.6.** Choose correct wrt to gene mapping
- It was used for HGP project
 - 1% recombination = 1 map unit (centiMorgan).
 - Map distance between two genes is always additive.
 - Alfred Sturtevant used the frequency of recombination between gene pairs on the same chromosomes as a measure of distance between gene and mapped their position on the chromosomes
 - Maximum mapping distance can exceed 50 cM.
- A and B only
 - A and E only
 - A, B and D only
 - C, D and E only

- Q.7.** Choose incorrect wrt to ABO Blood Group
- ABO blood group is governed by 3 alleles I^A, I^B, i .
 - $I^A I^B$ blood group is codominant.
 - Blood group O has genotype $I^A i$.
 - AB is expressed in heterozygote ($I^A I^B$)
 - Multiple alleles are present in a population, but only 2 allele in one individual.

- (1) A and B only
- (2) A, B, D and E only
- (3) A, B and D only
- (4) D and E only

- Q.8.** Select incorrect statement from following

- In co-dominance the F_1 generation donot resemble with both parents
- In incomplete dominance the F_1 generation resemble with both parents
- In dominance the F_1 generation donot resemble with both parents
- Flower color in *Antirrhinum* sp =snapdragon is an example of co-dominance
- AB blood group is an example of co-dominance

- (1) A and B only
- (2) D and E only
- (3) A, B and D only
- (4) A, B, C and D only

- Q.9.** Select true statements wrt sex determination

- In humans: $XX =$ female, $XY =$ male (male heterogamety).
- In birds: $ZZ =$ male, $ZW =$ female (female heterogamety). Therefore egg dicide fate of zygote wheather formed zygote is male or female.
- In grasshopper: $XO =$ male, $XX =$ female.
- In honeybee: females diploid, males haploid (parthenogenesis).
- In honeybee, haploid males produce gametes by meiosis.

- (1) A, B, C and D only
- (2) D and E only
- (3) A, B and D only
- (4) C and D only

- Q.10.** Choose correct one wrt sex-linked inheritance (X-linked)

- Hemophilia is X-linked recessive disorder
- Color blindness more common in males.
- A female carrier transmits the trait to 50% of sons.
- Affected father transmits the disease to all sons.
- Daughters of affected father are always carriers (if mother normal).

- (1) A and B only
- (2) A, D and E only
- (3) A, B and D only
- (4) A, B, C and E only

- Q.11.** Choose correct regarding pedigree analysis

- Pedigree helps trace inheritance of traits in families.
- Autosomal dominant traits skip generations frequently.
- Autosomal recessive traits can appear in offspring of normal parents.
- X-linked recessive traits are more common in males.
- In autosomal dominant disorder, affected individuals usually have at least one affected parent.

- (1) A and C only
- (2) A, D and E only
- (3) A and D only
- (4) A, B, D and E only

- Q.12.** Select correct statement regarding pleiotropy

- One gene controls multiple traits in pleiotropy
- Sickle cell anemia is an example of pleiotropy
- If one character is controlled by more than one gene pair
- Pleiotropy complicates Mendelian ratios.
- Mendel's seed shape gene showed pleiotropic effect on starch synthesis.

- (1) A, B, D and E only
- (2) A, D and E only
- (3) A and D only
- (4) A and E only

Q.13. Choose correct statement about polygenic inheritance

- A. Multiple genes control a single trait in polygenic inheritance.
- B. Polygenic traits show continuous variation.
- C. Human skin color is a classic polygenic trait.
- D. F₂ ratio in polygenic inheritance is simple 9:3:3:1.
- E. It is not at all affected by environment

- (1) A and B only
- (2) A, D and E only
- (3) A, B and C only
- (4) A, B, C and E only

Q.14. Choose correct statements wrt mutation

- A. Point mutation involves change in one base pair.
- B. Sickle cell anemia arises due to substitution of valine for glutamic acid in α - chain of globin
- C. Frame-shift mutation arises due to insertion/deletion.
- D. Chromosomal mutations involve changes in number or structure.
- E. It results in alteration of DNA sequence, therefore change in phenotype but not genotype of an organism

- (1) A, C and D only
- (2) D and E only
- (3) A, B and D only
- (4) C and D only

Q.15. Which of the following statements are not related to Down's Syndrome

- A. Down's syndrome caused by trisomy of chromosome 21.
- B. Symptoms include mental retardation, flat face, and broad palm.
- C. Occur due to additional copy of X-chromosome
- D. This was first described by Langdon Down
- E. It is an autosomal dominant disorder.

- (1) A, B and D only
- (2) C and E only
- (3) A, C and D only
- (4) C and D only

Q.16. Select correct statement regarding Thalassemia

- A. α -Thalassemia is controlled by two closely linked genes HBA1 and HBA2 on chromosome 16
- B. β -Thalassemia is controlled by a single gene HBB on chromosome 11
- C. It is qualitative disorder of globin molecules
- D. It is qualitative disorder of globin molecule
- E. It is autosomal dominant disorder

- (1) A, B and D only
- (2) C and E only
- (3) A, B and C only
- (4) C and D only

Q.17. Choose correct one with respect to Sickle Cell anemia

- A. Caused by point mutation in β -globin gene.
- B. Heterozygotes ($Hb^A Hb^S$) show sickle cell trait and malaria resistance.
- C. Homozygous ($Hb^S Hb^S$) individuals show severe anemia.
- D. Inheritance is autosomal recessive.
- E. The disease is caused by deletion mutation.

- (1) A, B, C and D only
- (2) C and E only
- (3) A, B and C only
- (4) C and D only

Q.18. Choose true statement only from the following regarding color blindness

- A. Color blindness is sex-linked recessive disorder
- B. It occurs due to mutation in certain gene present on X-chromosome
- C. It occurs in about 8% of males
- D. A daughter will not normally be color blind, unless her mother is carrier and her father is color blind
- E. It occurs due to defect in rods of eye

- (1) A, B, C and D only
- (2) C and E only
- (3) B and D only
- (4) C and D only

Q.19: Consider the following statements about Klinefelter's Syndrome:

- A. It is caused due to aneuploidy of sex chromosomes resulting from nondisjunction during gamete formation.
- B. The karyotype of an affected individual is usually 47, XXY.
- C. Individuals are phenotypically female but genetically male.
- D. Common features include gynecomastia, small testes, sterility, and reduced secondary sexual characters.
- E. It can be easily studied by analysis of karyotype

Which statements are correct?

- (1) A, B, D, and E only
- (2) A, C, D, and E only
- (3) B, C, and D only
- (4) A, B, C, D, and E

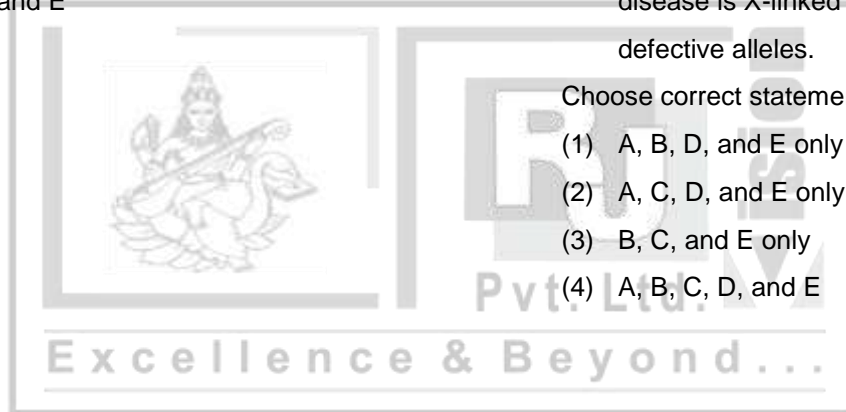
Q.20 A woman (II-2) approaches a genetic counselor. Her father (I-1) was haemophilic, while her mother (I-2) was normal. She marries a normal man (II-3). The counselor explains the risk of haemophilia in her children.

Following statements are given with respect to above case

- A. Since her father was haemophilic, the woman (II-2) must be a carrier of haemophilia.
- B. If she has a son, there is a 50% chance he will be haemophilic.
- C. All her daughters will be haemophilic because they inherit one defective X from her and one normal X from father.
- D. Haemophilia is caused by a defect in clotting factor VIII (Haemophilia A) or factor IX (Haemophilia B), which are proteins.
- E. Females are rarely haemophilic because the disease is X-linked recessive and requires two defective alleles.

Choose correct statements

- (1) A, B, D, and E only
- (2) A, C, D, and E only
- (3) B, C, and E only
- (4) A, B, C, D, and E



ANSWERS - KEY

Q	1	2	3	4	5	6	7	8	9	10
Ans.	(4)	(2)	(2)	(2)	(4)	(3)	(2)	(4)	(1)	(4)
Q	11	12	13	14	15	16	17	18	19	20
Ans.	(4)	(1)	(3)	(1)	(2)	(3)	(1)	(1)	(1)	(1)