

**Class: 12**

**Subject: Biology**

**Topic: Principles of Inheritance and Variation**

**No. of Questions: 20**

**Duration: 60 Min**

**Maximum Marks: 60**

1. Polytene chromosome was first observed by

- A. Stevens and Wilson
- B. Heitz and Batier
- C. Balbiani
- D. Khorana

Ans. C

2. Which one is soluble RNA

- A. tRNA
- B. mRNA
- C. rRNA
- D. snRNA

Ans. A

Solution: tRNA's are short-chain RNA molecules present in the cell (in at least 20 varieties, each variety capable of combining with a specific amino acid) that attach the correct amino acid to the protein chain that is being synthesized at the ribosome of the cell (according to directions coded in the mRNA). It is also called soluble RNA because it is too small to be precipitated by ultracentrifugation at 100,000 g. It constitutes about 10-20% of the total RNA of the cell. Transfer RNA is a relatively small RNA having a molecular weight of about 25,000 to 30,000 and the sedimentation coefficient of mature eukaryote tRNA is 3.8S

3. Had Mendel decided to study those traits together which are determined by linked genes, he would not have found out

- A. Crossing over
- B. Dominance
- C. Principle of segregation
- D. Principle of independent assortment

Ans. D

4. mRNA is synthesized over DNA template in direction

- A. A.5' →3'
- B. B.3' →5'
- C. Both A and B
- D. Depends upon DNA strand

Ans. A

5. Sickle cell anaemia is an example of

- A. Epistasis
- B. Codominance
- C. Pleiotropy
- D. Incomplete dominance

Ans. C

Solution:

It is caused by a defective haemoglobin HbS which is otherwise present as a normal Hb gene.

6. Enzyme needed for production of DNA from RNA is

- A. RNA polymerase
- B. Reverse transcriptase
- C. DNA helicase
- D. DNA polymerase

Ans. B

7. Select the mismatch

- A. McClintock - Jumping genes
- B. Hargobind Khorana - Mutation induction of Drosophila
- C. Karl Landsteiner - Human blood groups
- D. A.R. Wallace - Organic evolution

















Ans. B

8. Double homozygous individuals in F<sub>2</sub> generation of a dihybrid cross would be

- A. 1/16
- B. 4/16
- C. 6/16
- D. 9/16

Ans. B

There would be 4 double homozygous individuals as shown below:

		♂ gametes			
		$R Y$ $\frac{1}{4}$	$R y$ $\frac{1}{4}$	$r y$ $\frac{1}{4}$	$r Y$ $\frac{1}{4}$
♀ gametes	$R Y$ $\frac{1}{4}$	$RR YY$ $\frac{1}{16}$ 	$RR Yy$ $\frac{1}{16}$ 	$Rr Yy$ $\frac{1}{16}$ 	$Rr YY$ $\frac{1}{16}$ 
	$R y$ $\frac{1}{4}$	$RR Yy$ $\frac{1}{16}$ 	$RR yy$ $\frac{1}{16}$ 	$Rr yy$ $\frac{1}{16}$ 	$Rr Yy$ $\frac{1}{16}$ 
	$r y$ $\frac{1}{4}$	$Rr Yy$ $\frac{1}{16}$ 	$Rr yy$ $\frac{1}{16}$ 	$rr yy$ $\frac{1}{16}$ 	$rr Yy$ $\frac{1}{16}$ 
	$r Y$ $\frac{1}{4}$	$Rr YY$ $\frac{1}{16}$ 	$Rr Yy$ $\frac{1}{16}$ 	$rr Yy$ $\frac{1}{16}$ 	$rr YY$ $\frac{1}{16}$ 

9. Haemophilia is

- Sex linked and dominant
- Sex linked and recessive
- Not sex linked
- Not hereditary

Ans. B

10. Anticodon occurs in

- tRNA
- mRNA
- mtDNA
- rRNA

Ans. A

11. Excessive growth of hair on the pinna is a feature found only in males because

- The gene responsible for the character is present on Y-chromosome only
- The female sex hormone estrogen suppresses the character in females
- The character is induced in males as males produce testosterone
- The gene responsible for the character is recessive in females and dominant only in males

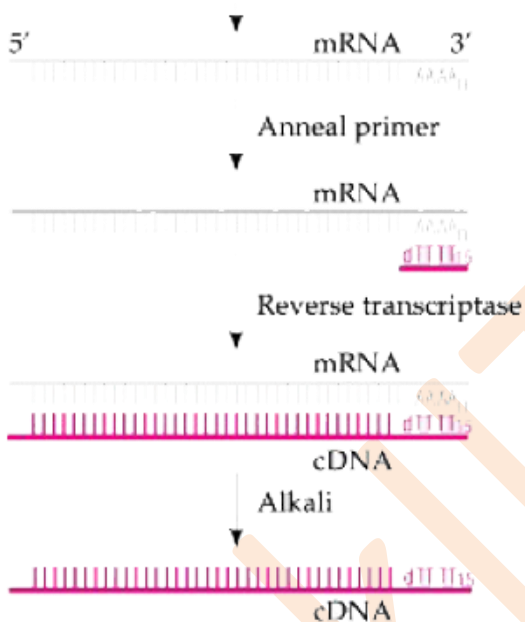
Ans. A

## 12. Reverse transcriptase

- A. Disintegrates host DNA
- B. Polymerises host DNA
- C. Translates host DNA
- D. Transcribes viral RNA to cDNA

Ans. D

Solution:



The viral DNA is not directly converted to the DNA but through a complementary or cDNA

## 13. The sex chromosome complement Turner's syndrome is

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

Ans. C

Solution;

The karyotype of the female is 44, X. One X chromosome is missing

14. DNA is a polymer of

- A. Proteins
- B. Carbohydrates
- C. RNA
- D. Nucleotides

Ans. D

15. The possible blood group of children born to parents having A and AB groups are

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

Ans. A

Solution – There are two cases:

1)  $I_A I_a \times I_A I_B$

Gametes –  $I_A, I_a, I_A, I_B$

Offsprings –  $I_A I_A, I_A I_B, I_A I_a, I_B I_a$

2)  $I_A I_A \times I_A I_B$

Gametes –  $I_A, I_A, I_B$

Offsprings –  $I_A I_A, I_A I_B$

16. Identify the pair of nucleotides which are joined by three hydrogen bonds in double stranded

DNA

- A. AG
- B. AT
- C. TG
- D. CG

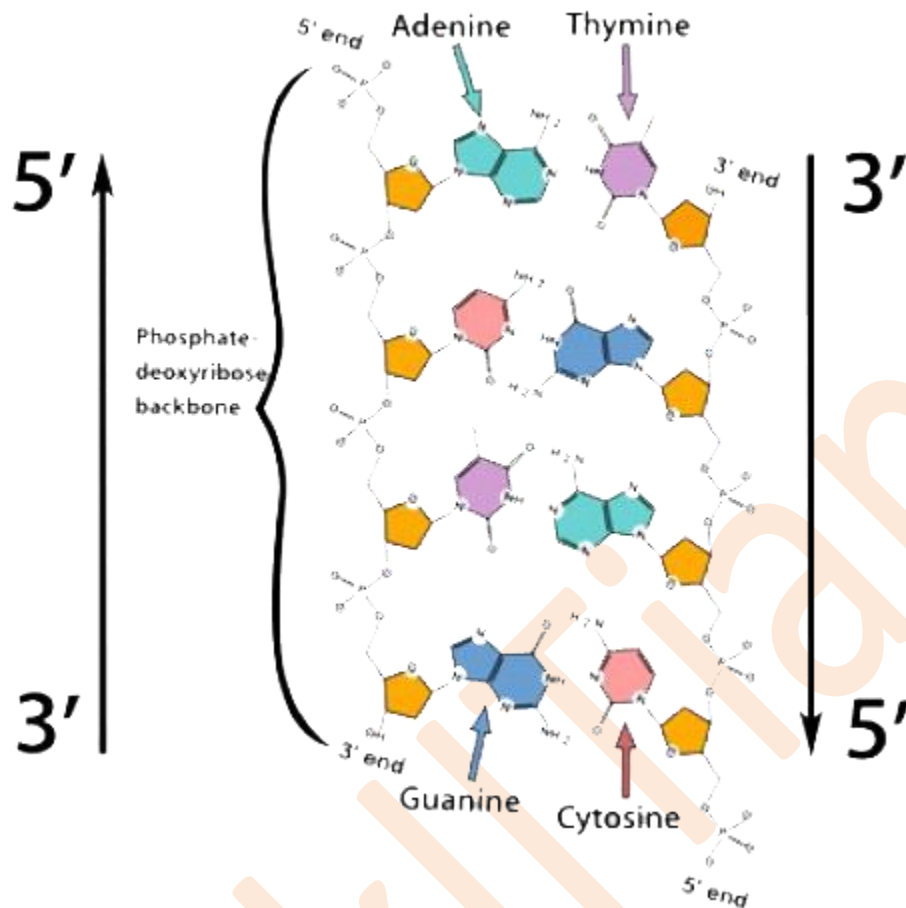
Ans. D

17. The two antiparallel strands

- A. Equidistant and run in 5' 3' direction ' →'
- B. directions of DNA Equidistant but run in 5' 3' and 3 5' →' →'
- C. Unequal and run in opposite directions
- D. Unequal and diverge from each other

Ans. B

Solution:



18. Emasculation is related to

- A. Pure line
- B. Mass selection
- C. Clonal selection
- D. Hybridisation

Ans. D

19. Multiple alleles are present

- A. At different loci in the same chromosome
- B. In different chromosomes
- C. At the same locus in one type of chromosomes
- D. None of the above

Ans. C

20. A colour blind person cannot distinguish

- A. Red and green
- B. Green and blue
- C. Yellow and white
- D. Black and yellow

Ans. A

askITians