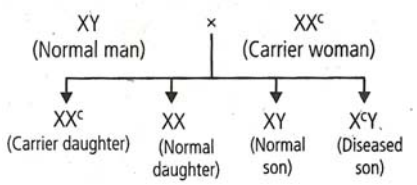
GENETICS

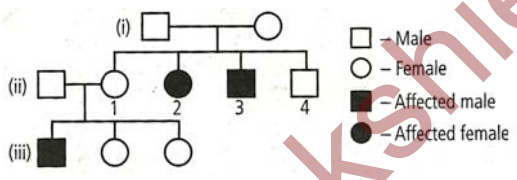
1. **Which of the following is mismatched pair of disease and its related symptom?**

Disease	**Symptom**
1) Phenylketonuria	Urine turns black on exposure to air
2) Down's syndrome	Physical and mental retardation
3) Klinefelter's syndrome	Sterile males
4) Turner's syndrome	Sterile females.

2. 

Inheritance of which of the following traits is shown in the above given cross?

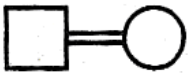
1) X-linked dominant trait
2) X-linked recessive trait
3) Autosomal recessive trait
4) Autosomal dominant trait.

3. 

Study the given pedigree chart for sickle-cell anaemia and select the most appropriate option for the genotypes.

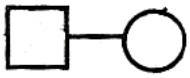
Genotypes of parents	**Genotypes of 1st and 3rd child in F,**
1) $Hb^A\ Hb^S$, $Hb^A\ Hb^A$	$Hb^A\ Hb^A$, $Hb^A\ Hb^S$
2) $Hb^A\ Hb^S$, $Hb^A\ Hb^S$	$Hb^A\ Hb^A$, $Hb^A\ Hb^A$
3) $Hb^A\ Hb^A$, $Hb^A\ Hb^S$	$Hb^A\ Hb^A$, $Hb^S\ Hb^S$
4) $Hb^A\ Hb^S$, $Hb^A\ Hb^S$	$Hb^A\ Hb^S$, $Hb^S\ Hb^S$.

4. **Which one is the incorrect match?**

1)  — Consanguineous mating

2)  — Sex unspecified

3)  — Male

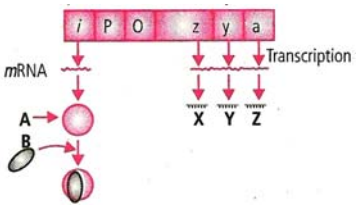
4)  — Affected individuals.

5. **Complete the given table by selecting the correct option.**

Genotypes	Blood groups
I^AI^A, (i)	A
I^BI^B, (ii)	B
(iii)	AB
(iv)	O

	(i)	(ii)	(iii)	(iv)
1)	I^AI^A	I^BI^B	I^AI^B	ii
2)	I^AI^A	I^BI^B	I^AI^B	I^Ai
3)	I^Ai	I^Bi	I^AI^B	ii
4)	I^Ai	I^Bi	I^AI^B	I^Bi

6. **The given figure shows lac operon and its functioning. Select the option which correctly labels A, B, X, Y and Z.**



	A	B	X	Y	Z
1)	Repressor	Inducer	β-Galacto-sidase	Permease	Trans acetylase
2)	Repressor	Inducer	Permease	β-Galacto-sidase	Trans acetylase
3)	Inducer	Repressor	β-Galacto-sidase	Permease	Trans acetylase
4)	Inducer	Repressor	β-Galacto-sidase	Trans-acetylase	Permease

7. Match column I with column II and select the correct option from the codes given below.

Column I	Column II
A) Sigma factor	(i) 5' - 3'
B) Capping	(ii) Initiation
C) Tailing	(iii) Termination
D) Coding strand	(iv) 5' end
	(v) 3' end

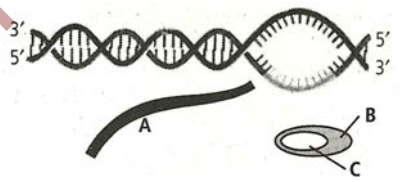
1) (A)-(iii), (B)-(v), (C)-(iv), (D)-(ii)
2) (A)-(ii), (B)-(iv), (C)-(v), (D)-(i)
3) (A)-(ii), (B)-(iv), (C)-(v), (D)-(iii)
4) (A)-(iii), (B)-(v), (C)-(iv), (D)-(i).

8. Match the scientists given in column I to their respective discoveries given in column II and select the correct option.

Column I	Column II
A) Alec Jeffreys	(i) Lac operon
B) F. Sanger	(H) Automated DNA sequencers
C) Jacob and Monoth	(iii) DNA finger printing
D) Avery, Mc Leod and Mc Carty.	(iv)Transforming principle

1) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
2) (A)-(iii), (B)-(ii), (C)-(i), (D)-(iv)
3) (A)-(iii), (B)-(ii), (C)-(iv), (D)-(i)
4) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv).

9. Following figure represents the process of transcription in bacteria.



Select the option which correctly labels A, B and C.

1) A = DNA, B = RNA, C = Promoter
2) A = RNA, B = RNA polymerase, C = Rho factor
3) A = RNA, B = RNA polymerase, C = Sigma factor
4) A = DNA, B = DNA polymerase, C = RNA.

10. Which process occurs in the regulation of gene expression in prokaryotes but does not occur in the regulation of gene expression in eukaryotes.

1) RNA is formed from the transcription of base triplets on DNA

2) Translation of the mRNA starts as the 5′ end

3) RNA polymerase synthesizes RNA nucleotides in a 5′ to 3′ direction

4) Ribosome helps to produce polypeptide during translation

11. Genes that are involved in turning off or on the transcription of set of structural genes are called

1) Operator genes 2) Promotor genes 3) Repressor genes 4) Regulatory genes

12. Which of following statements is correct?

1) Glucose acts as inducer for lac operon

2) Galactose acts as inducer for lac operon

3) Glucose or galactose acts as inducers for lac operon

4) Glucose or galactose canot as inducers for lac operon

13. Lactose is the substrate for the enzyme β - galactosidase, it regulates

1) Switching on and off of the operon 2) Synthesis of polypeptide chain

3) Attachment RNA polymerase to promoter 4) Expression of inhibitor gene

14. Which of the following binds to stop codon at the end of translation?

1) Sigma factor 2) rho factor 3) Release factor 4) Stop factor

15. In view of importance of genetic research, the genome of the plant is analysed

1) Larthyrus oderatas 2) Pisum sativum 3) Arabidopsis 4) Mimosa

16. Nucleotide base pairs in an average gene

1) 1.5 millions 2) 3000 3) 2416 4) 3 billion

17. Number of SNPs (snips) in the genome

1) 2.2 million 2) 1.4 million 3) 1 billion 4) 3 billion

18. Match the following

List – I	List – II
A) 3164 – 7 million bps	i) Protein encoding genes of human
B) 2, 968 genes	ii) Y – chromosome of human
C) 231 genes	iii) Chromosome – I of human
D) 30, 000 genes	iv) Human genome
	v) X – chromosome of human

	A	B	C	D
1	i	ii	iii	iv
3	iv	i	ii	v

	A	B	C	D
2	iv	iii	ii	v
4	iv	iii	ii	iii

19. Arrange the following from up stream to down stream in the following related to lac operon

A) A – structural gene

B) Z – structural gene

C) Y – structural gene

D) Operator

E) Repressor gene

F) Promoter

1) ABCDEF 2) ACBDFE 3) ACBEFD 4) ADEFBC

20. Assertion (A): Lac operon is an inducible operon

Reason (R) : The lac operon gets 'on' by the inducer

1) Both A and R are correct and R is the correct explanation of A

2) Both A and R are correct and R is not the correct explanation of A

3) A is correct but R is incorrect

4) A is incorrect but R is correct

21. Assertion (A): In prokaryotic cells polypeptide begins to get synthesized, before the termination of synthesis of m RNA.

Reason (R): In prokaryotes, ribosomes can bind and begin translation before polymerase has completed of the new m RNA strand.

1) Both A and R are correct and R is the correct explanation of A

2) Both A and R are correct and R is not the correct explanation of A

3) A is correct but R is incorrect

4) A is incorrect but R is correct

22. **Assertion (A):** In most cases the gene in eukaryotes is discontinuous

Reason (R): In eukaryotes, the genes are split genes with coding introns and noncoding exons

1) Both A and R are correct and R is the correct explanation of A

2) Both A and R are correct and R is not the correct explanation of A

3) A is correct but R is incorrect 4) A is incorrect but R is correct

23. **Which of the following acts as a catalyst in a bacterial cell?**

1) hn RNA 2) 23 sr RNA 3) 5sr RNA 4) sn RNA

24. **Allelic sequence variation with more than 0.01 frequencies in a population is**

1) SNP's 2) VNTR's 3) DNA polymorphism 4) Incomplete dominance

25. **Select the correct statement**

a) RNA polymerase I transcribes r RNAs b) RNA polymerase II transcribes sn RNAs

c) RNA polymerase III transcribes hn RNAs d) RNA polymerase II transcribes hn RNAs

1) a and d are correct 2) b and c are correct 3) a and c are correct 4) a and b are correct

26. **Automated DNA sequencing is based on method developed by**

1) Alec jaffreys 2) Frederick Sanger 3) Erwin chargaff 4) Watson & crick

27. **In eukaryotic cell transcription, RNA splicing and RNA capping takes place in**

1) Nucleus 2) Cytoplasm 3) Ribosomes 4) Mitochondria

28. **A unit of lac – operon which in the absence of lactose, suppresses the activity of operator gene is**

1) Structural gene 2) Regulatory gene 3) Repressor gene 4) Promoter gene

29. **Process used for amplification or multiplication of DNA for finger printing is**

1) Polymerase chain reaction 2) Southern blotting technique

3) Autoradiography 4) Electrophoresis

30. **Which of the following technique helps us to find out variations in individuals of a population at DNA level?**

1) Polymerase chain reaction 2) Southern blotting technique

3) DNA finger pointing 4) Gel electrophoresis

31. **DNA finger printing works on which principle in DNA sequence.**

1) Transcription 2) Polymorphism 3) Translation 4) Transformation

32. Which of the following provide flatform for joining of aminoacids in translation?

1) Mitochondria 2) Endoplasmic reticulum

3) Nucleus 4) Ribosomes

33. Identify the free living non-pathogenic nematode.

1) Arabidopsis 2) Drosophila melanogaster

3) Cenorhabditis elegans 4) Wuchereria bancrofti

34. Select the two correct statements out of the four given below about lac operon

i) Glucose or galactose may bind with the repressor and inactivate it

ii) In the absence of lactose the repressor binds with the operator region

iii) The z-gene codes for permease

iv) This was elucidated by Francois Jacob and Jacques Monad

The correct statements are

1) II and III 2) I and III 3) II and IV 4) I and II

35. According to the Lac operon concept, which functional unit of the bacterial genetic material is responsible for suppressing the activity of the operator gene in the absence of lactose?

1) Regulator gene 2) Structural gene 3) Promoter gene 4) Repressor gene

36. An m RNA has some additions sequences that are not translated are present at

1) Before start codon at 5′ end and before stop codon at 3′ end

2) Before start codon at 3′ end and before stop codon at 5′ end

3) Before start codon at 5′ end and after stop codon at 3′ end

4) After start codon at 5′end and before stop codon at 3′ end

37. ABO blood groups in humans are controlled by the gene I. it has three alleles –I^A, I^B and i. since there are three different alleles, six different genotypes are possibile. How many phenotypes can occur?

1) 3 2) 1 3)4 4) 2

38. Which of the following disorders are caused due to recessive autosomal mutations?

1) Tuner's syndrome and sickle cell anaemia

2) Edward's syndrome and Down's syndrome

3) Cystic fibrosis and phenlketonuria

4) Alzheimer's disease and Huntington's chorea

39. A man with enlarged breasts, sparse body hair and XXY genotype is suffering from

1) Down's syndrome 2) Tuner's syndrome

3) Klinefelter syndrome 4) Super male

40. Which of the following is a symptom of Down's syndrome?

1) Flat back of head 2) Many "loops" on finger tips

3) Big and wrinkled tongue 4) All of these

41. Genes with multiple phenotypic effectsas are known as

1) Hypostatic genes 2) Duplicate genes

3) Pleiotropic genes 4) Complementary genes

42. Which one of the following conditions correctly describes the manner of determining the sex?

1) Homozygous sex chromosomes (ZZ) determine female sex in birds

2) Xo type of sex chromosomes determine male sex in grasshopper

3) XO condition in humans as found in turners syndrome, determines female sex

4) Homozygous sex chromosomes (XX) produce male in Drosphila

43. Removal of introns and joining of exons in a defined order during transcription is called

1) Looping 2) Inducing 3) Slicing 4) Splicing

44. The lac operon is turned on when allolactose molecules bind to

1) Promoter site 2) Operator site 3) mRNA 4) Repressor protein

45. Identify the wrong statements

1) In male grasshoppers 50% of the sperms have no sex chromosome

2) In domesticated fowls the sex of the progeny depends on the type of sperm that fertilizes the egg.

3) The human males have one of their sex chromosomes much shorter than the other

4) The male fruit fly is heterogametic

KEY

1)	**1**	2)	**2**	3)	**4**	4)	**3**	5)	**3**	6)	**1**	7)	**2**	8)	**2**	9)	**2**	10)	**2**
11)	**1**	12)	**4**	13)	**1**	14)	**3**	15)	**3**	16)	**2**	17)	**2**	18)	**4**	19)	**2**	20)	**1**
21)	**4**	22)	**3**	23)	**2**	24)	**3**	25)	**1**	26)	**2**	27)	**1**	28)	**3**	29)	**1**	30)	**3**
31)	**2**	32)	**4**	33)	**3**	34)	**3**	35)	**4**	36)	**3**	37)	**3**	38)	**3**	39)	**3**	40)	**2**
41)	**3**	42)	**2**	43)	**4**	44)	**4**	45)	**2**										