



ITL PUBLIC SCHOOL

HOLIDAY HOMEWORK

Summer Engagement Programme 2023

Class XII

BIOLOGY

Theory: Practice Assignment sheet based on Unit VII(Genetics and Evolution)
Completion of NCERT questions of chapter 1-5

Investigatory Project and Practical File: Completion of Investigatory Project and practical file as discussed in class.

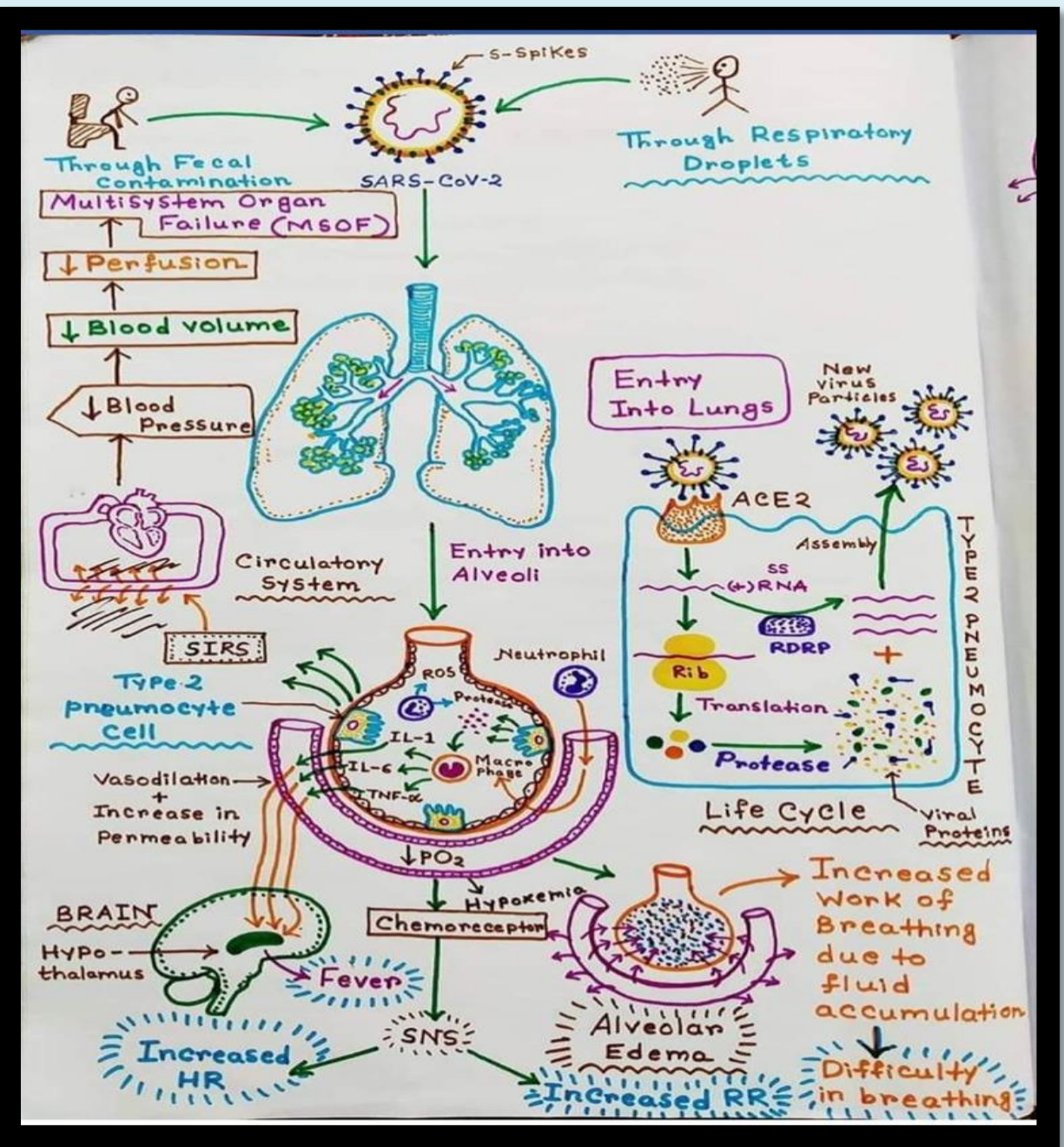
This **research-based project** will be assessed during practicals according to curriculum.

The project can be done individually or in group of 2-3 students.

This research-based project will help in **Experiential learning** which is a process through which students develop knowledge, skills, and values from direct experiences outside a traditional academic setting.

For the same, **integrate art** in your research by:

1. Preparing **presentation on Canva.**
2. **Study and use of various media and techniques to the extent of their availability.**
3. Study of **visual resources** (at home and in the surroundings) and means of creative expression
4. **Sketches** - Prepare Sketches to explain mode of spread, life cycle, genome of COVID 19 etc.
5. One of the example of sketch is done for you:

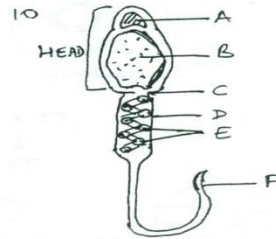


3. Expanded: VD -
2. RTI -

3. IUT -
4. ZIFT -
5. IVF -
6. ICSI -
7. IUI -
8. AI -
9. MTP -
10. IUD -
11. MMR -
12. IMR -
13. RCH -
14. AIDS -
15. HIV -
16. OC -
17. hCG -
18. hPL -
19. LH -
20. FSH -

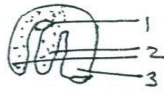


FEMALE REPRODUCTIVE
SYSTEM

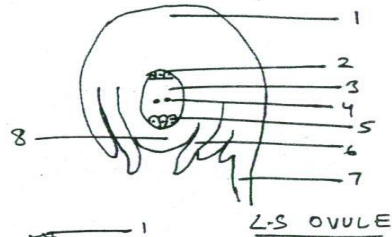


HUMAN
SPERM

- XII
1. Label 1, 2, 3 and state function of each part.



2. Label



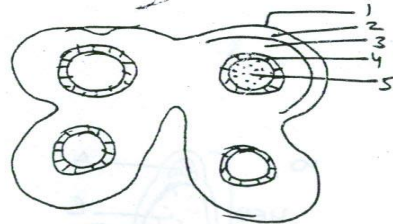
L-S OVULE

- 3.

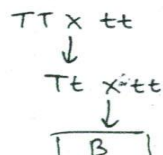
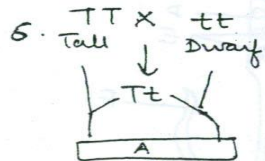


POLLEN GRAIN

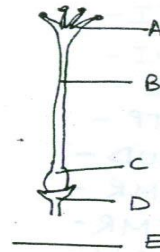
- 4.



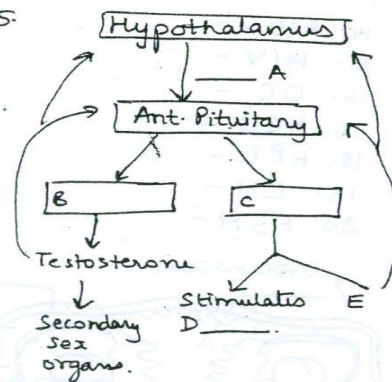
T.S anther



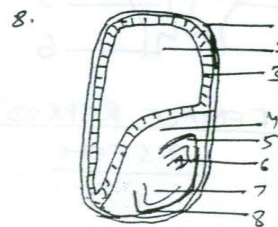
Identify cross A and B and possible genotypes

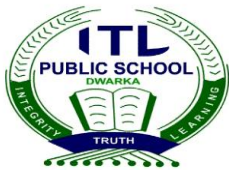


- 5.



In males



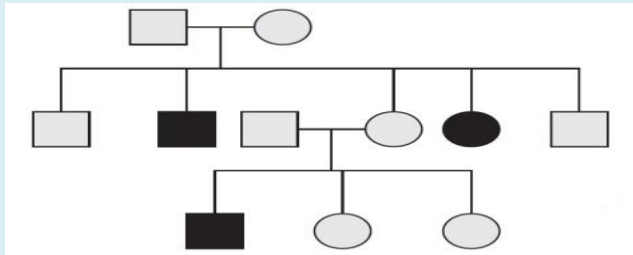



ITL PUBLIC SCHOOL
Biology Assignment (2023-24)

Class: XII

Chapter -4
(Principles of Inheritance and Variation)

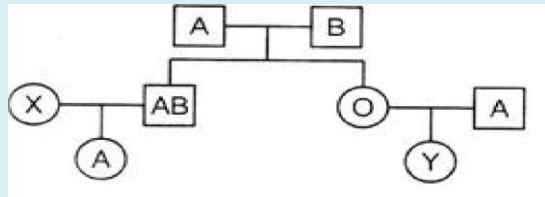
	SECTION - A	
1	<p>In a certain taxon of insects some have 17 chromosomes and the others have 18 chromosomes. The 17 and 18 chromosome-bearing organisms are:</p> <p>(a) males and females, respectively (b) females and males, respectively</p> <p>(c) all males (d) all females</p>	1
2	<p>The cause of Down's Syndrome in humans is:</p> <p>(a) Extra copy of an autosome (b) Extra copy of a sex chromosome</p> <p>(c) Absence of an autosome (d) Absence of a sex chromosome</p>	1
3	<p>Which of the following features show the mechanism of sex determination in honey-bee?</p> <p>(i) An offspring formed from the union of a sperm and egg develops as a male.</p> <p>(ii) Males have half the number of chromosomes than that of female.</p> <p>(iii) The females are diploid having 32 chromosomes.</p> <p>(iv) Males have father and can produce sons.</p> <p>(a) (i) and (ii) (b) (ii) and (iii)</p> <p>(c) (i) and (iv) (d) (ii) and (iv)</p>	1
4	<p>Select the pair that is incorrect:</p> <p>(a) Sickle-cell anemia : Autosome linked recessive trait</p> <p>(b) Haemophilia : Autosome linked recessive trait</p> <p>(c) Colour blindness : Sex linked recessive trait</p> <p>(d) Thalassemia: Autosome linked recessive trait</p>	1

5	An example of a human trait where a single gene can exhibit multiple phenotypic expression is– (a) Phenylketonuria (b) Cystic fibrosis (c) Thalassemia (d) Haemophilia	1												
6	Life cycle of <i>Drosophila melanogaster</i> is completed in– (a) 7 days (b) 14 days (c) 21 days (d) 28 days	1												
7	How many types of gametes would develop by an organism with genotype AaBBCcDD? (a) 1 (b) 2 (c) 3 (d) 4	1												
8	In <i>Pisum sativum</i> the flower colour may be Violet (V) or White (v). What proportion of the offspring's in a cross of VV × vv would be expected to be violet? (a) 25% (b) 50% (c) 75% (d) 100%	1												
9	Which one of the gene pair is expected to give a ratio of 1 : 1 : 1 : 1 in the progeny of a Mendelian Dihybrid cross? (a) AaBb × AaBb (b) AABB × AaBb (c) AaBb × aabb (d) AABB × aabb	1												
10	The progeny of a cross between two snap-dragon plants, heterozygous for flower colour, bearing different coloured flower would be: (a) 50% pink, 50% white (b) 25% red, 50% pink, 25% white (c) 50% red, 50% white (d) 75% red, 25% white	1												
11	Study the given pedigree of a family and select the trait that shows this pattern of inheritance:  (a) Autosomal recessive, Phenylketonuria (b) Sex-linked recessive, Colour-blindness (c) Autosomal dominant, Myotonic dystrophy (d) Sex-linked dominant, Vitamin-D resistant rickets	1												
12	A child with blood group A has father with blood group B and mother with blood group AB. What would be the possible genotypes of parents and the child? Choose the correct option: <table border="1" data-bbox="168 1648 613 1837"><thead><tr><th></th><th>Father</th><th>Mother</th><th>Child</th></tr></thead><tbody><tr><td>(a)</td><td>I^A i</td><td>I^B i</td><td>I^A i</td></tr><tr><td>(b)</td><td>I^A I^B</td><td>I^A i</td><td>I^A I^A</td></tr></tbody></table>		Father	Mother	Child	(a)	I ^A i	I ^B i	I ^A i	(b)	I ^A I ^B	I ^A i	I ^A I ^A	1
	Father	Mother	Child											
(a)	I ^A i	I ^B i	I ^A i											
(b)	I ^A I ^B	I ^A i	I ^A I ^A											

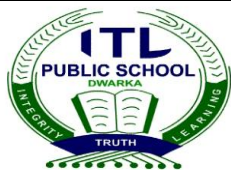
	<table><tr><td>(c)</td><td>I^B i</td><td>I^A I^B</td><td>I^A i</td></tr><tr><td>(d)</td><td>I^B I^B</td><td>I^A I^B</td><td>I^A I^A</td></tr></table>	(c)	I ^B i	I ^A I ^B	I ^A i	(d)	I ^B I ^B	I ^A I ^B	I ^A I ^A																		
(c)	I ^B i	I ^A I ^B	I ^A i																								
(d)	I ^B I ^B	I ^A I ^B	I ^A I ^A																								
13	<p>In a dihybrid Mendelian cross, garden pea plants heterozygous for violet flowers and round seeds are crossed with homozygous white flowers and wrinkled seeds. The genotypic and phenotypic ratio of F1 progeny would be</p> <p>(a) 9 : 3 : 3 : 1 (b) 1 : 2 : 2 : 1 (c) 1 : 1 : 1 : 1 (d) 3 : 1</p>	1																									
14	<p>Colour-blindness is a sex linked recessive trait in humans. A man with normal colour vision marries a women who is colourblind. What would be the possible genotypes of the parents, the son and the daughter of this couple?</p> <table><tr><td></td><td>Mother</td><td>Father</td><td>Daughter</td><td>Son</td></tr><tr><td>(a)</td><td>XX</td><td>X^CY</td><td>X^CX</td><td>XY</td></tr><tr><td>(b)</td><td>X^CX^C</td><td>X^CY</td><td>X^CX^C</td><td>X^CY</td></tr><tr><td>(c)</td><td>X^CX</td><td>XY</td><td>X^CX</td><td>XY</td></tr><tr><td>(d)</td><td>X^CX^C</td><td>XY</td><td>X^CX</td><td>X^CY</td></tr></table>		Mother	Father	Daughter	Son	(a)	XX	X ^C Y	X ^C X	XY	(b)	X ^C X ^C	X ^C Y	X ^C X ^C	X ^C Y	(c)	X ^C X	XY	X ^C X	XY	(d)	X ^C X ^C	XY	X ^C X	X ^C Y	1
	Mother	Father	Daughter	Son																							
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(b)	X ^C X ^C	X ^C Y	X ^C X ^C	X ^C Y																							
(c)	X ^C X	XY	X ^C X	XY																							
(d)	X ^C X ^C	XY	X ^C X	X ^C Y																							
15	<p>How many types of gametes can be produced in a diploid organism which is heterozygous for 4 loci?</p> <p>(a) 4 (b) 8 (c) 16 (d) 32</p>	1																									
16	<p>Given below a Karyotype obtained after analysis of foetal cells for probable genetic disorder.</p>  <p>Based on the above Karyotype, the chromosomal disorder detected in unborn foetus and the consequent symptoms the child may suffer from are—</p> <p>(a) Down's syndrome : Gynaecomastia, overall masculine development</p> <p>(b) Down's syndrome : Furrowed tongue, short stature</p> <p>(c) Klinefelter's syndrome : Gynaecomastia, Masculine development</p>	1																									

	(d) Klinefelter's syndrome : Rudimentary ovaries, short stature	
17	State a difference between a gene and an allele.	1
18	What is a Mutagen? Name a physical factor that can be a Mutagen.	1
19	What is point mutation? Give one example.	1
20	Give an example of a human disorder that is caused due to a single gene mutation.	1
21	A male honeybee has 16 chromosomes whereas its female has 32 chromosomes. Give one reason.	1
22	Name the type of cross that would help to find the genotype of a pea plant bearing violet flowers.	1
<p>Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R).</p> <p>Answer these questions selecting the appropriate option given below:</p> <p>A. Both A and R are true and R is the correct explanation of A.</p> <p>B. Both A and R are true and R is not the correct explanation of A.</p> <p>C. A is true but R is false.</p> <p>D. A is False but R is true.</p>		
23	<p>Assertion (A): There is expression of only one gene of the parental character in a Mendelian Monohybrid cross in F₁ generation.</p> <p>Reason (R): In a dissimilar pair of factors one member of the pair dominates the other.</p>	1
24	<p>Assertion : Cross of F₁ individual with recessive homozygous parent is test cross.</p> <p>Reason : No recessive individual are obtained in the monohybrid test cross progeny.</p>	1
25	<p>Assertion : In a monohybrid cross, F₁ generation indicate dominant characters.</p> <p>Reason : Dominance occurs only in heterozygous state.</p>	1
26	<p>Assertion: The cross between the F₁ progeny and either of the parent types is a test cross.</p> <p>Reason: The cross between F₁ progeny and the double recessive genotype is back cross.</p>	1
27	<p>Assertion: Gametes receives only one allele of a gene.</p> <p>Reason: During gamete formation, mitosis takes place leads to formation of haploid cells.</p>	1
28	<p>Assertion: A good example of multiple alleles is ABO blood group system.</p> <p>Reason: When I^A and I^B alleles are present together in ABO blood group system, they both express their own types.</p>	1
Case Study Based Question		

29	<p>Haemophilia is a sex linked disease which is also known as bleeder's disease as the patient will continue to bleed even from a minor cut since he or she does not possess the natural phenomenon of blood clotting due to absence of anti-haemophilic globulin or factor VIII and plasma thromboplastin factor IX essential for it. As a result of continuous bleeding the patient may die of blood loss.</p> <ol style="list-style-type: none"> 1. If a haemophilic man marries a woman whose father was haemophilic and mother was normal then what is chance to have hemophilic boy . 2. Which types of genetic disorder is this. 3. Write one major causes of haemophillia 	2+1+1												
	SECTION - B													
30	How does a test cross help to determine the genotype of an individual?	2												
31	In pea plants, the colour of the flower is either violet or white whereas human skin colour shows many gradations. Explain giving reasons how it is possible.	2												
32	<p>Identify a, b and c in the table given below:</p> <table border="1"> <thead> <tr> <th></th><th>Pattern of inheritance</th><th>Monohybrid F₁ phenotypic expression</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Co-dominance</td><td>a</td></tr> <tr> <td>2.</td><td>b</td><td>The progeny resembled only one of the parents.</td></tr> <tr> <td>3.</td><td>Incomplete dominance</td><td>c</td></tr> </tbody> </table>		Pattern of inheritance	Monohybrid F ₁ phenotypic expression	1.	Co-dominance	a	2.	b	The progeny resembled only one of the parents.	3.	Incomplete dominance	c	2
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1.	Co-dominance	a												
2.	b	The progeny resembled only one of the parents.												
3.	Incomplete dominance	c												
33	A cross between a red flower bearing plant and a white flower bearing plant of <i>Antirrhinum</i> produced all plants having pink flowers. Work out a cross to explain how this is possible.	2												
34	Write the scientific name of the fruit fly. Why did Morgan prefer to work with fruit-files for his experiments? State any three reasons.	2												
35	Give an example of a gene responsible for multiple phenotypic expressions. What are such genes called? State the cause that is responsible for such an effect.	2												
36	Why did T.H. Morgan select <i>Drosophila melanogaster</i> to study sex-linked genes for his lab experiments?	2												
37	How does the gene 'I' control ABO blood groups in humans? Write the effect the gene has on the structure of red blood cells.	2												
	SECTION - C													
38	Morgan carried out several dihybrid crosses in <i>Drosophila</i> and found F ₂ - ratios deviated very significantly from the expected Mendelian ratio. Explain his findings with the help of one example.	3												
39	Both Haemophilia and Thalassemia are blood related disorders in humans. Write their causes	3												

	and the difference between the two. Name the category of genetic disorder they both come under.																					
40	(a) Name the genetic disorder in a human female having 44 + XO karyotype. Mention the diagnostic features of the disorder. (b) Explain the cause of such chromosomal disorder.	3																				
41	Why is haemophilia rare in human females? Mention a clinical symptom for the disease.	3																				
42	Identify <i>a</i> , <i>b</i> , <i>c</i> , <i>d</i> , <i>e</i> and <i>f</i> in the table given below. <table border="1"><thead><tr><th>No.</th><th>Syndrome</th><th>Cause</th><th>Characteristics of affected individuals</th><th>Sex male/female/both</th></tr></thead><tbody><tr><td>1.</td><td>Down's</td><td>Trisomy of 21</td><td>'a' (i) (ii)</td><td>'b'</td></tr><tr><td>2.</td><td>'c'</td><td>XXY</td><td>Overall masculine development</td><td>'d'</td></tr><tr><td>3.</td><td>Turner's</td><td>45 with XO</td><td>'e' (i) (ii)</td><td>'f'</td></tr></tbody></table>	No.	Syndrome	Cause	Characteristics of affected individuals	Sex male/female/both	1.	Down's	Trisomy of 21	'a' (i) (ii)	'b'	2.	'c'	XXY	Overall masculine development	'd'	3.	Turner's	45 with XO	'e' (i) (ii)	'f'	3
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3.	Turner's	45 with XO	'e' (i) (ii)	'f'																		
43	Explain the mechanism of 'sex determination in birds. How does it differ from that of human beings?  Study the given pedigree chart showing the pattern of blood group inheritance in a family. (a) Give the genotype of the following: (i) parents (ii) the individual 'X' in second generation (b) Stat the possible blood groups of the individual 'Y' in third generation.	3																				
SECTION - D																						
44	What is the inheritance pattern observed in the size of starch grains and seed shape of <i>Pisum sativum</i> ? Workout the monohybrid cross showing the above traits. How does this pattern of inheritance deviate from that of Mendelian law of dominance?	5																				
45	Differentiate between the following: (a) Polygenic inheritance and pleiotrophy.	5																				

	(b) Dominance, co-dominance and incomplete dominance.	
46	<p>(a) A garden pea plant bearing terminal, violet flowers, when crossed with another pea plant bearing axial, violet flowers, produced axial, violet flowers and axial, white flowers in the ratio of 3 : 1. Work out the cross showing the genotypes of the parent pea plants and their progeny.</p> <p>(b) Name and state the law that can be derived from this cross and not from a monohybrid cross.</p>	5
47	Why is thalassemia categorised as a Mendelian disorder? Write the symptoms and explain the cause of the disease. How does it differ from sickle cell anaemia?	5
48	<p>(a) How does a chromosomal disorder differ from a Mendelian disorder?</p> <p>(b) Name any two chromosomal aberration associated disorders.</p> <p>(c) List the characteristics of the disorders mentioned above that help in their diagnosis.</p>	5



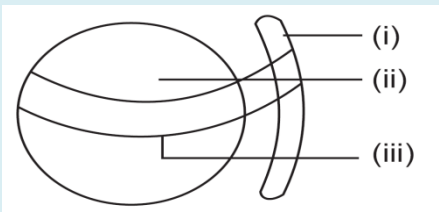
ITL PUBLIC SCHOOL
Biology Assignment (2023-24)

Class: XII

Chapter -5
(Molecular Basis of Inheritance)

	SECTION - A	
1	<p>Given below are the observations drawn in HGP. Select the option that shows the correct observations.</p> <p>(i) The human genome contains 3164.7 billion base pairs.</p> <p>(ii) The average gene consists of 3000 bases.</p> <p>(iii) Less than 2% of the genome codes for proteins.</p> <p>(iv) Chromosome one has most genes (2698).</p> <p>(a) (i) and (ii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i) and (iii)</p>	1
2	<p>The phosphoester linkage in the formation of a nucleotide involves the bonding between</p> <p>(a) Phosphate group and OH of 3'C of a nucleoside</p> <p>(b) Phosphate group and OH of 5'C of a nucleoside</p> <p>(c) Phosphate group and H of 3'C of a nucleoside</p> <p>(d) Phosphate group and H of 5'C of a nucleoside</p>	1
3	<p>The switching 'on' and 'off' of the lac operon in prokaryotes is regulated by</p> <p>(a) Glucose (b) Galactose (c) Lactose (d) Fructose</p>	1
4	<p>For 'in-vitro' DNA replication, which one of the following substrates need to be added along with the necessary enzymes, the DNA template and specific conditions?</p> <p>(a) Ribonucleotide triphosphate (b) Deoxyribonucleoside triphosphate</p> <p>(c) Deoxyribonucleotide triphosphate (d) Ribonucleoside triphosphate</p>	1
5	<p>Which one of the following factor will associate transiently with RNA polymerase to terminate transcription in prokaryotes?</p> <p>(a) sigma factor (b) Rho factor (c) delta factor (d) theta factor</p>	1

6	Choose the correct pair of codon with its corresponding amino acid from the following list: (a) UAG : Glycine (b) AUG : Arginine (c) UUU : Phenylalanine (d) UGA : Methionine	1
7	During elongation process of translation, the peptide bond formation between amino acids is catalysed (a) ribosomal RNA (b) protein in small subunit of ribosome (c) protein in large subunit of ribosome (d) transfer RNA	1
8	A region of coding strand of DNA has the following nucleotide sequence: 5' – TGCGCCA – 3' The sequence of bases on mRNA transcribed by this DNA stand would be: (a) 3' – ACGCGGT – 5' (b) 5' – ACGCGGT – 3' (c) 5' – UGCGCCA – 3' (d) 3' – UGCGCCA – 5'	1
9	A DNA molecule is 160 base pairs long. It has 20% adenine. How many cytosine bases are present in this DNA molecule? (a) 192 (b) 96 (c) 64 (d) 42	1
10	A template strand in a bacterial DNA has the following base sequence: 5' – TTAAACGAGG – 3' What would be the RNA sequence transcribed from this template DNA? (a) 5' – AAATTGCTCC – 3' (b) 3' – AAATTGCTCC – 5' (c) 3' – AAUUGCUCC – 3' (d) 5' – CCUCGUUAAA – 3'	1
11	tRNA has an _____ that has bases complementary to the codon. Its actual structure is a compact molecule which looks like _____. Select the option that has correct choices for the two 'blanks'. (a) amino acid acceptor end, clover-leaf (b) anticodon loop, clover-leaf (c) amino acid acceptor end, inverted L (d) anticodon loop, inverted L	1
12	Which type of RNA is correctly paired with its function? (a) small nuclear RNA : Processes rRNA (b) transfer RNA : attaches to amino acid (c) ribosomal RNA : involved in transcription (d) micro RNA : involved in translation	1

13	<p>The figure given below has labellings (i), (ii) and (iii), which two labellings in the given figure are components of a nucleosome? Select the correct option: (i)</p>  <p>(a) (i) – H1 histone, (ii) – DNA (b) (i) – DNA, (ii) – Histone Octamer (c) (ii) – DNA, (iii) – H1 Histone (d) (ii) – Histone octamer, (iii) – DNA</p>	1
14	Why is RNA more reactive in comparison to DNA?	1
15	Mention one difference to distinguish an exon from an intron.	1
16	Write the function of RNA polymerase II.	1
17	Give an example of a codon having dual function.	1
18	How does a degenerate code differ from an unambiguous one?	1
19	Name the transcriptionally active region of chromatin in a nucleus.	1
20	Name the negatively charged and positively charged components of a nucleosome.	1
21	Name the source of energy for the replication of DNA.	1
	<p>Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R).</p> <p>Answer these questions selecting the appropriate option given below:</p> <p>A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true and R is not the correct explanation of A. C. A is true but R is false. D. A is False but R is true.</p>	
23	<p>Assertion (A): Lactose in <i>lac</i> operon is promoter gene.</p> <p>Reason (R): Lactose inactivates the repressor gene.</p>	1
24	<p>Assertion (A): UAA, UAG and UGA terminate protein synthesis.</p> <p>Reason (R): They are not recognised by tRNA</p>	1
25	<p>Assertion (A): tRNA acts as an acceptor molecule.</p> <p>Reason (R): tRNA recognizes codon sequence of mRNA during translation.</p>	1

26	<p>Assertion (A): R-type of <i>Pneumococcus</i> is nonvirulent.</p> <p>Reason (R): R-type of <i>Pneumococcus</i> can be virulent by having transformation with S-type of <i>Pneumococcus</i>.</p>	1
27	<p>Assertion (A): Sequences of bases in one polynucleotide chain of DNA can determine the sequence of bases in the other chain.</p> <p>Reason (R): In a DNA, amount of adenine equals that of thymine and amount of guanine equals that of cytosine, <i>i.e.</i>, A = T and C = G.</p>	1
	Case Study Based Question	
29	<p>The process of copying genetic information from template strand of DNA into RNA is called transcription. It is mediated by RNA polymerase. Transcription takes place in the nucleus of eukaryotic cells. In transcription, only a segment of DNA and only one of the strands is copied into RNA.</p> <p>(i) What are the regions of transcription unit in a DNA molecule, and also define the location of such region .</p> <p>(ii) Define monocistronic structural gene .</p> <p>(iii) how transcription in Prokaryotes is different from Eukaryotes.</p>	2+1+1
	SECTION - B	
30	Write the full form of VNTR. How is VNTR different from 'Probe'?	2
31	<p>(a) Name the scientist who suggested that the genetic code should be made of a combination of three nucleotides.</p> <p>(b) Explain the basis on which he arrived at this conclusion.</p>	2
32	One of the salient features of the genetic code is that it is nearly universal from bacteria to humans. Mention two exceptions to this rule. Why are some codes said to be degenerate?	2
33	Explain the structure of a tRNA and state why it is known as an adaptor molecule.	2
34	Which human chromosome has (a) maximum number of genes, and which one has (b) fewest genes?	2
35	State the difference between the structural genes in a transcription unit of prokaryotes and eukaryotes.	2
36	Although a prokaryotic cell has no defined nucleus, yet DNA is not scattered throughout the cell. Explain.	2
37	Differentiate between the genetic codes given below:	2

	(a) Unambiguous and Universal (b) Degenerate and Initiator	
	SECTION - C	
38	(a) Why did Hershey and Chase use radioactive sulfur and radioactive phosphorus in their experiment? (b) Write the conclusion they arrived at and how?	3
39	It is established that RNA is the first genetic material. Explain giving three reasons.	3
40	Answer the following questions based on Meselson and Stahl's experiment: (a) Write the name of the chemical substance used as a source of nitrogen in the experiment by them. (b) Why did the scientists synthesis the light and the heavy DNA molecules in the organism used in the experiment? (c) How did the scientists make it possible to distinguish the heavy DNA molecule from the light DNA molecule? Explain. (d) Write the conclusion the scientists arrived at after completing the experiment?	3
41	(a) Differentiate between a template strand and coding strand of DNA. (b) Name the source of energy for the replication of DNA.	3
42	How are the structural genes activated in the lac operon in <i>E. coli</i> ?	3
43	(a) A DNA segment has a total of 1,500 nucleotides, out of which 410 are Guanine containing nucleotides. How many pyrimidine bases this segment possesses? (b) Draw a diagrammatic sketch of a portion of DNA segment to support your answer.	3
	(a) What do 'Y' and 'B' stand for in 'YAC' and 'BAC' used in Human Genome Project (HGP). Mention their role in the project. (b) Write the percentage of the total human genome that codes for proteins and the percentage of discovered genes whose functions are known as observed during HGP. (c) Expand 'SNPs' identified by scientists in HGP.	
	SECTION - D	
44	Following the collision of two trains a large number of passengers are killed. A majority of them are beyond recognition. Authorities want to hand over the dead to their relatives. Name a modern scientific method and write the procedure that would help in the identification of kinship.	5

45	List the criteria a molecule that can act as genetic material must fulfill. Which one of the criteria are best fulfilled by DNA or by RNA thus making one of them a better genetic material than the other? Explain.	5
46	<p>(a) Describe the experiment which demonstrated the existence of “transforming principle”.</p> <p>(b) How was the biochemical nature of this “transforming principle” determined by Avery, MacLeod and McCarty?</p>	5
47	<p>(a) Describe the structure and function of a t-RNA molecule. Why is it referred to as an adapter molecule?</p> <p>(b) Explain the process of splicing of hn-RNA in a eukaryotic cell.</p>	5
48	<p>(a) What is an operon?</p> <p>(b) Explain how a polycistronic structural gene is regulated by a common promoter and a combination of regulatory genes in a lac operon.</p>	5