

 <p>दु.क्र ०२०२४४७६९३८</p>	 <p>महाराष्ट्र शासन शालेय शिक्षण व क्रीडा विभाग राज्य शैक्षणिक संशोधन व प्रशिक्षण परिषद, महाराष्ट्र ७०८ सदाशिव पेठ, कुमठेकर मार्ग, पुणे ४११०३०.</p>	 <p>स्वातंत्र्याचा अमृत महोत्सव</p>
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### प्रश्नपेढी (Question Bank) 2024

इयत्ता:- बारावी

माध्यम:- इंग्रजी

विषय:- जीवशास्त्र (Biology)

सूचना-

1. सदर प्रश्नपेढी ही १००% अभ्यासक्रमावर तयार करण्यात आली आहे.
2. सदर प्रश्नपेढीतील प्रश्न हे अधिकच्या सरावासाठी असून प्रश्नसंचातील प्रश्न बोर्डाच्या प्रश्नपत्रिकेत येतीलच असे नाही, याची नोंद घ्यावी.



## INDEX

<b>Sr. No.</b>	<b>Name of Chapter</b>	<b>Page no.</b>
1.	<b>Reproduction In Lower And Higher Plants</b>	
2.	<b>Reproduction In Lower And Higher Animals</b>	
3.	<b>Inheritance And Variation</b>	
4.	<b>Molecular Basis of Inheritance</b>	
5.	<b>Origin And Evolution of Life</b>	
6.	<b>Plant Water Relation</b>	
7.	<b>Plant Growth and Mineral Nutrition</b>	
8.	<b>Respiration and Circulation</b>	
9.	<b>Control and Coordination</b>	
10.	<b>Human Health and Diseases</b>	
11.	<b>Enhancement of Food Production</b>	
12.	<b>Biotechnology</b>	
13.	<b>Organisms and Population</b>	
14.	<b>Ecosystems and Energy Transfer</b>	
15.	<b>Biodiversity, Conservation and Environmental Issues</b>	

**BIOLOGY (056)**

**QUESTION BANK**

**1. REPRODUCTION IN LOWER AND HIGHER PLANTS**

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	The outer layer of pollen grain is thick and made up of a complex, non - biodegradable substance called as..... A. lignin B. cellulose C. pectin <b>D. Sporopollenin</b>
<b>2</b>	Sporoderm is made up of ..... A. exosporium and endosporium B. outer integuments and inner integument C. testa and tegmen <b>D. exine and intine</b>
<b>3</b>	The number of meiotic and mitotic divisions necessary for development of female gametophyte in angiosperms is... A. 1 meiosis and 2 mitosis B. 1 mitosis and 3 meiosis C. 1 meiosis and 1 mitosis <b>D. 1 meiosis and 3 mitosis.</b>
<b>4</b>	Identify the odd one with respect to pollinating agents. A. Baobab <b>B. Bottle brush</b> C. Kadamb D. Sausage
<b>5</b>	In vitro pollen germination and pollen tube elongation can be induced by— A. boric acid B. glucose C. lactose <b>D. sucrose</b>
<b>6</b>	Self-incompatibility is found in flowers of plants..... A. <i>Calotropis</i> B. maize <b>C. Thea</b> D. <i>Gloriosa</i>
<b>7</b>	Porogamy refers to the entry of a pollen tube through..... A. integuments B. chalaza <b>C. micropyle</b> D. stigma
<b>8</b>	..... is an example of helobial endosperm. A. <i>Adoxa</i> B. coconut <b>C. Asphodelus</b> D. sunflower
<b>9</b>	The single shield shaped cotyledon in monocot seed is known as ..... A. coleoptile

	<p><b>B. scutellum</b> C. aleurone layer D. perisperm</p>
10	<p>The example of dicot endospermic seed is .... <b>A. castor</b> B. pea C. mango D. bean</p>
11	<p>Grafting is not possible in monocots because of --- A. scattered vascular bundles B. open vascular bundles C. radial vascular bundles <b>D. absence of cambium</b></p>
12	<p>Conidia formation is commonly seen in A. Amoeba B. Paramecium C. Sponges <b>D. Penicillium</b></p>
13	<p>Which of the following is not the method of asexual reproduction? A. Budding B. Fragmentation <b>C. Sowing</b> D. Binary fission</p>
14	<p>The plant part used for raising stem in grafting is – <b>A. Scion</b> B. Stock C. Leafy shoot D. Any plant part</p>
15.	<p>Megasporophyll is called ----- A. stamen <b>B. carpel</b> C. ovary D. stigma</p>
16.	<p>Lever mechanism for pollination is characteristic feature of---- A. Antirrhinum B. Cucurbita C. Calotropis <b>D. Salvia</b></p>
17.	<p>In <i>Angiosperms</i>, pollen tube develops from ----- A. generative cell <b>B. intine</b> C. vegetative cell D. exine</p>
18.	<p>Polyembryony occurs in----- A. <b>Citrus</b> B. Ficus C. Maize D. Mango</p>
<b>VERY SHORT ANSWER QUESTIONS (1 MARK EACH)</b>	
1	What is reproduction?
2.	What are clones?
3	Give an example of an organism which produces zoospore.
4	Why is it called a tetrasporangiate structure?
5	At which stage pollen grains are shed from the anther in <i>Angiosperms</i> ?
6	What is hilum with respect to ovule?
7	What is protandry?
8	Name any one plant in which double fertilization was discovered?

9	Why is the fertilization process in angiosperms called double fertilization?
10	Which is the most common type of endosperm in angiospermic families?
11	What is the role of suspensor during the development of an embryo?
12	What is adventive polyembryony?
13	Name the hormone produced by an unfertilised ovary responsible for enlargement of ovary into fruit.
14.	What is protogyny?
15.	Give an example of endospermic seed.
16.	Give the name of the lower most cell of the suspensor.
17.	which is the middle layer of pericarp?
	<b>SHORT ANSWER TYPE (SA-I) QUESTIONS (2 MARK EACH)</b>
1	Explain any two methods of asexual reproduction.
2	Explain grafting as an artificial method of vegetative reproduction.
3	Draw a well labelled diagram of T.S. anther.
4	Describe the structure of pollen grain.
5	Draw a well labelled diagram of male gametophyte of angiosperms.
6	Describe the structure of female gametophytes of angiosperms.
7	Mention various adaptations for wind pollination.
8	What are the different adaptations shown by bird pollinated flowers?
9	Explain heterostyly and herkogamy with suitable examples.
10	Give the significance of double fertilization.
11	Mention significance of fruit and seed formation.
12	Give an account of polyembryony.
13.	Explain the role of two male gametes
14.	Differentiate between geitonogamy and xenogamy.
15.	write a short note on dormancy of seed in angiosperms.
	<b>SHORT ANSWER TYPE (SA-II) QUESTIONS (3 MARKS EACH)</b>
1	Explain various methods of vegetative reproduction.
2	How cutting, grafting and tissue culture is useful to humans?
3	Describe the internal structure of anther (diagram is not expected).
4	Explain the development of male gametophyte in angiosperms (diagram is not expected).
5	Explain water pollination in detail with its types.
6	Give an account of any two biotic agents for pollination along with their adaptations.
7	Explain any two contrivances or outbreeding devices for pollination.
8	Describe the process of fertilization in angiosperms with the help of diagrams.
9	Write a note on different types of endosperms in angiosperms.
10	Describe the development of dicot embryos in flowering plants.
11	Draw a well labelled diagram of monocot seed you have studied.
12	Explain various categories of apomixis.
13.	Differentiate between microsporogenesis and megasporogenesis.
14.	Write a note on perisperm? What is its ploidy? Give one example of the same.
	<b>LONG ANSWER TYPE (LA) QUESTIONS (4 MARKS EACH)</b>
1	Explain various horticultural methods of vegetative reproduction with the help of labelled diagrams.
2	Describe the structure of anatropous ovule with the help of a labelled diagram.
3	Describe the development of female gametophytes of angiosperms with the help of diagrams.
4	Give an account of various abiotic agencies used in pollination along with their adaptations for pollination.
5	Give an account of pollen pistil interaction in detail.
6	Describe the process of double fertilization in angiosperms and add a note on its significance.
7.	Write a note on functions of various parts of the ovule you have studied.

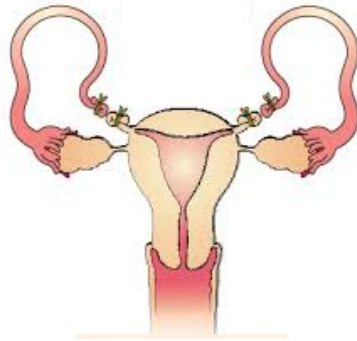
8.	Trace the sequence of events that occur from the time of pollination till the completion of fertilization.
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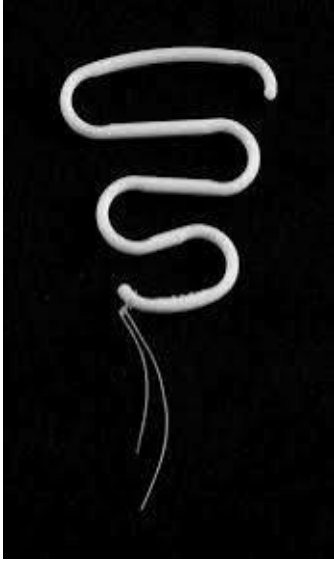
## 2. REPRODUCTION IN LOWER AND HIGHER ANIMALS

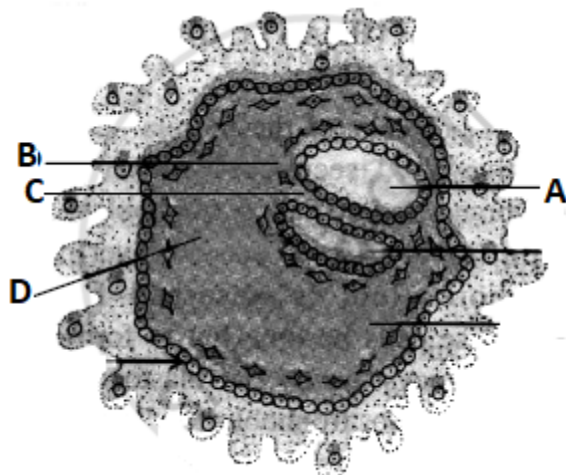
MULTIPLE CHOICE QUESTIONS (1 MARK EACH)	
1	The primary sex organ in human males is A. prostate gland B. seminal vesicle C. penis <b>D. testis</b>
2	Seminal fluid is ----- in nature. A. acidic B. neutral C. sugary <b>D. alkaline</b>
3	Which of the following is not a part of the uterus? A. body B. cervix C. fundus <b>D. cornua</b>
4	Menarche, menstrual cycle and menopause are controlled by----- A. thyrotropic hormone <b>B. gonadotropic hormone</b> C. somatotropic hormone D. corticotropin
5	Nebenkern is ----- A. acrosome of sperm B. neck of sperm C. middle piece of sperm <b>D. mitochondria of sperm</b>
6	Nervous system develops from..... of the embryonic layer. A. endoderm B. chorion <b>C. ectoderm</b> D. mesoderm
7	The average period of pregnancy in humans lasts for..... days of pregnancy. A. 280 B. 270 <b>C. 266</b> D. 290
8	..... is not a permanent method of birth control. A. vasectomy B. tubectomy <b>C. withdrawal</b> D. castration
9	The organism which causes Gonorrhoea is..... A. <i>Treponema</i> <b>B. Neisseria</b> C. <i>Entamoeba</i> D. <i>Salmonella</i>
10	How many pairs of testis are present in a human male? A. 2 pairs <b>B. 1 pair</b>

	C. only one testis D. only one ovary
11.	The animals produced by asexual reproduction are ..... to their parents. A. genetically similar B. morphologically similar <b>C. morphologically and genetically similar</b> D. neither morphologically nor genetically similar
12	Asexual reproduction by gemmule formation occurs in ..... <b>A. Sponges</b> B. <i>Hydra</i> C. Yeast D. <i>Planaria</i>
13	The aggregate of dormant cells capable of developing into new organism in gemmule is called as A. Archesporial cells B. Archegonial cells <b>C. Archaeocytes</b> D. Sporogenous tissue
14.	Human sperms undergo maturation in _____. A. seminiferous tubule B. urethra <b>C. epididymis</b> D. testes
15.	Human testes are _____ in origin. A. ectodermal <b>B. mesodermal</b> C. endodermal D. epidermal
16.	The ejaculatory duct passes through _____ and opens into the urethra. A. seminal vesicle <b>B. prostate gland</b> C. Cowper's gland D. scrotum
17.	_____ is the shortest phase of the menstrual cycle. A. Menstrual phase B. Follicular phase <b>C. Ovulatory phase</b> D. Luteal phase
18.	Developing secondary follicles secrete the hormone _____. A. FSH B. LH C. progesteron <b>D. estrogen</b>
<b>VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)</b>	
1	<b>What is a gemmule?</b>
2	<b>By which method corals reproduce?</b>
3	Name the enzyme secreted by the prostate gland.
4	What is glans penis?
5	What is atresia with respect to ovaries in human females?
6	Name the hydrolytic enzyme secreted by the acrosome.
7	What is morula?
8	What is the function of inner cell mass?
9	Name the embryonic layer from which heart, blood and blood vessels develop.
10	Identify the permanent birth control method in the given diagram.

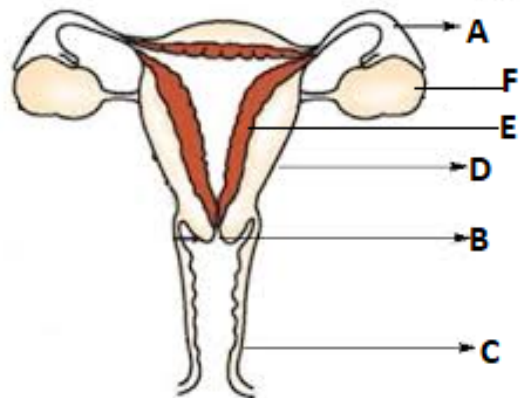




11	What is the use of the tablet 'Saheli'?
12	Identify the IUD in the given diagram. 
13.	Why are humans and apes called continuous breeders?
14.	Which cells are called 'cells of Rauber'?
15.	Name the brand of condom which is given free by the government?
16.	By which method sperm are stored in a sperm bank ?
17.	What is the lower age limit for a person to adopt a child?
18.	State the function of sertoli cells.
19.	What is 'Rete testis'?
20.	Name the only accessory duct of human reproductive system which is NOT in pairs
21.	What is the function of enzyme Acid Phosphatase present in prostatic fluid?
22.	What is Hymen?
23.	What is corpus albicans?
24.	What is the role of zona pellucida in implantation?
<b>SHORT ANSWER TYPE (SA-I) QUESTIONS (2 MARKS EACH)</b>	
1	Draw a well labelled diagram of gemmule.
2	Write a note on budding.
3	Draw a well labelled diagram of L.S. human testis.
4	Describe the structure of the Graafian follicle.
5	Write a short note on the fallopian tube.
6	Give an account of external genitalia in human females.
7	Explain the structure of the secondary oocyte.
8	Write an account of cleavage during embryonic development in humans.
9	Identify the parts labelled in the given diagram.



10	What is lactation? Which hormone is responsible for its regular secretion?		
11	Mention any two different goals of the RCH programme.		
12	What is MTP? Upto which month it is permitted?		
13	Write a short note on : Amniocentesis		
14	Write a short note on : MTP Act		
15	Enlist any two secondary sexual characteristics seen in each ,Human male and female.		
16	What is another term used for urethra? Why?		
17	What is cryptorchidism? What is its consequence?		
18	Identify the part of an oviduct. i) Fertilization of ovum takes place here. ii) This part is like a funnel.		
19.	Write a short note on : Mammary glands		
20.	What do you mean by the reproductive age of the female?		
21.	Name the stages of menstrual cycle in which Endometrium lining becomes a) about 1 mm thin b) up to 8-10 mm thick		
22.	State the function of enzymes- a) Hyaluronidase b) Fibrinolysin		
23.	To detect the pregnancy, a urine sample of a woman is tested .Why?		
24.	Suggest any two hygiene practices to be followed by a woman during her menstruation period.		
25.	Write a short note on : Colostrum		
26.	Match the hormones of columns A with their role in column B <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>A</p> <p>1. Testosterone</p> <p>2. LH</p> <p>3. FSH</p> <p>4. hCG</p> </td> <td style="width: 50%; vertical-align: top;"> <p>B</p> <p>a) extends the life of corpus luteum</p> <p>b) induces spermatogenesis</p> <p>c) develops secondary sex characters</p> <p>d) ruptures mature follicle</p> </td> </tr> </table>	<p>A</p> <p>1. Testosterone</p> <p>2. LH</p> <p>3. FSH</p> <p>4. hCG</p>	<p>B</p> <p>a) extends the life of corpus luteum</p> <p>b) induces spermatogenesis</p> <p>c) develops secondary sex characters</p> <p>d) ruptures mature follicle</p>
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<b>SHORT ANSWER TYPE QUESTIONS (SA-II) (3 MARKS EACH)</b>			
1	Explain various methods of asexual reproduction in lower animals.		
2	Describe the histology of testis with help of labelled diagrams.		
3	Identify the labels from the given diagram.		



4	Describe the histological structure of the human ovary (diagram not expected).								
5	Explain the structure of human sperm with labelled diagrams.								
6	Describe the process of oogenesis in human females.								
7	Write a note on implantation.								
8	Human pregnancy shows three prominent trimesters. Answer the following question based on these trimesters. i) What is morning sickness during the first trimester? ii) Name the hormone secreted in the second trimester. iii) The organ which secretes hormones in the second trimester is...								
9	Explain the process of parturition.								
10	Explain any three measures to achieve goals of RCH.								
11	Explain any three methods that can be used to overcome infertility.								
12.	Describe the structure and role of placenta in human reproductive system								
13.	Which physical problems a pregnant woman does face during her final trimester of pregnancy? What is the cause of these problems?								
14.	Complete the table showing homologous organs of male and female reproductive systems. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>MALE</th> <th>FEMALE</th> </tr> </thead> <tbody> <tr> <td>penis</td> <td>-----A-----</td> </tr> <tr> <td>Scrotum</td> <td>-----B-----</td> </tr> <tr> <td>-----C-----</td> <td>Bartholin's glands</td> </tr> </tbody> </table>	MALE	FEMALE	penis	-----A-----	Scrotum	-----B-----	-----C-----	Bartholin's glands
MALE	FEMALE								
penis	-----A-----								
Scrotum	-----B-----								
-----C-----	Bartholin's glands								
15.	'Bad habits like smoking and alcoholism from a young age may develop a chance of infertility in married life later'. Justify the statement.								
16.	Name the components of seminal fluid. State the function of each.								
17.	Name the muscles of the scrotum. State their significance.								
18.	Draw a diagram of mature Graffian follicle .Point out antrum and oocyte in it.								
19.	Describe in brief, three layers of uterine wall.								
<b>LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)</b>									
1	Write an account of seminal vesicles and bulbourethral glands in male reproductive system.								
2	Explain ovarian cycle with its different phases.								
3	Describe the process of spermatogenesis with the help of a diagram.								
4	Explain mechanism of fertilization in humans.								
5	Write in detail any four temporary methods of birth control.								
6.	'ZIFT and GIFT are blessings of modern science to infertile couples'.								
7.	Elaborate this statement in your own words.a) How does the compatibility reaction work during human fertilization ? b)How is polyspermy avoided during human fertilization?								
8.	Complete the given flow chart with respect to spermatogenesis.								

PRIMORDIAL CELLS



A



PRIMARY SPERMATOCYTES



B



C



D

D

### 3. INHERITANCE AND VARIATION

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	The three principles of Mendelism are <b>A. Dominance, segregation and independent assortment</b> B. Linkage, segregation and independent assortment C. Linkage, dominance and segregation D. Linkage, dominance and Independent assortment.
<b>2</b>	Which one of the following is the back cross? A. $F_1 \times F_1$ B. $F_1 \times$ Recessive parent C. $F_1 \times$ Dominant parent <b>D. <math>F_1 \times</math> Any parent</b>
<b>3</b>	RR (Red) Antirrhinum is crossed with white (WW) one. Offspring (RW) are pink. This is an example of A. Dominant -recessive <b>B. Incomplete dominance</b> C. Hybrid D. Supplementary genes
<b>4</b>	The word chromosome was coined by A. Benda <b>B. Waldeyer</b> C. Robert Hooke D. T.H.Morgan
<b>5</b>	Nullisomy is represented by..... A. $(2n-1)$ <b>B. <math>(2n-2)</math></b> C. $(2n+1)$ D. $(2n+2)$
<b>6</b>	Identify the odd one:- A. Monoploidy B. Diploidy C. Polyploidy <b>D. Hyperploidy</b>
<b>7</b>	In humans, the sex chromosome complement is <b>A. XX-XY</b> B. XX-XO C. ZZ-ZO D. ZW-ZZ
<b>8</b>	The family has five daughters and is expecting a sixth child. The chance of its being a son is ..... A. zero B. 25% <b>C. 50%</b> D. 100%
<b>9</b>	In human beings 45 chromosomes/single X/XO abnormality causes A. Down's syndrome B. Klinefelter's syndrome <b>C. Turner's syndrome</b> D. Edward's syndrome
<b>10</b>	Webbed neck is characteristic of ... syndrome. A. XXX B. YY C. XXY <b>D. XO</b>
<b>11.</b>	Colour blindness is a .....

	<p>A) Deficiency disease  B) <b>X-linked disease</b>  C)XY-linked disease  D) Y-linked disease</p>
12.	<p>If a centromere is situated at the middle position of chromatid ,the chromosome is called as.....</p> <p>A) <b>metacentric</b>  B) acrocentric  C)Sub-metacentric  D) telocentric</p>
13.	<p>Chromosome synapse during.....</p> <p>A) mitosis  B) linkage  C) <b>meiosis</b>  D) fertilization</p>
14.	<p>The Mendelian factors are now termed as.....</p> <p>A) proteins  B) polymers  C)<b>genes</b>  D) nucleosides</p>
<b>VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)</b>	
1	Define inheritance.
2	What is allelomorph?
3	What is a test cross?
4	Define euploidy.
5	Give an example of complete linkage.
6	How many linkage groups are present in <i>Drosophila melanogaster</i> ?
7	Which genes show straight inheritance?
8	How drones are produced in honey bees?
9	What is the reason for the 21st trisomy?
10	Give the example of X- monosomy you have studied.
11.	Define heredity.
12.	What is homozygous
13.	What is homologous chromosome
<b>SHORT ANSWER TYPE QUESTIONS (SA-I) (2 MARKS EACH)</b>	
1	Discuss any two points due to which Mendel got success in his experiment?
2	Give any two points of difference between homozygous and heterozygous.
3	Explain test cross with suitable example and state its ratios.
4	Give an account of incomplete dominance with suitable examples.
5	Explain codominance in colour coats in cattle with the checkerboard method.
6	Write an account of chromosomal theory of inheritance.
7	Write a note on sex linkage.
8	Differentiate between complete and incomplete linkage.
9	Explain mechanism of sex determination in birds.
10	Give a detailed account of thalassemia.
11.	Give any two differences in phenotype and genotype
12.	Define dihybrid cross and what is its phenotypic ratio
13.	Why the law of segregation is also called the law of purity of gametes.
<b>SHORT ANSWER TYPE QUESTIONS (SA-II) (3 MARKS EACH)</b>	

1	Enlist dominant and recessive characters in pea plant with respect to position of flower, colour of seed and colour of pod in tabulated form.
2	Give an account of pleiotropy with suitable examples.
3	Describe the structure of sex chromosomes with the help of labelled diagrams.
4	What is autosomal inheritance? Explain different disorders due to autosomal inheritance.
5	Explain the inheritance pattern of colour blindness with suitable charts.
6	Write a note on bleeder's disease and its inheritance with a suitable chart.
7	Explain the mechanism of sex determination in humans with suitable charts.
8	Write a note on Down's syndrome.
9	What are the different characters that develop due to Klinefelter's syndrome?
10	Give reasons for development of Turner's syndrome and also mention its symptoms.
11.	Explain Law of dominance with suitable example
12.	A heterozygous tall plant of pea is crossed with a dwarf plant of pea. Calculate the phenotypic ratio of the progeny
<b>LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)</b>	
1	Define inheritance. Give statements for various laws of inheritance.
2	Explain intragenic and intergenic interaction with the help of examples.
3	Explain structure of chromosomes with labelled diagrams.
4	Give a detailed account of sex linked inheritance.
5	Give an account of one Mendelian and one chromosomal disorder you have studied.
6.	What is Neo-Mendelism? What are the two types of gene interactions that result in deviations from Mendel's findings? Mention their examples.

#### 4. MOLECULAR BASIS OF INHERITANCE

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	Find the odd one out: A. H <sub>2</sub> A B. H <sub>3</sub> C. H <sub>2</sub> B <b>D. H<sub>1</sub></b>
<b>2</b>	What happened when heat killed S-cells along with live R-cells were injected into mice? <b>A. Mice died and showed live S-cells</b> B. Mice survived and showed live S-cells C. Mice died and showed live R-cells D. Mice died and showed dead R-cells
<b>3</b>	Find out the double ring compound: <b>A. Adenine</b> B. Uracil C. Cytosine D. Thymine
<b>4</b>	If a DNA has 20 Adenine and 30 cytosine bases. What will be the total number of purine bases in the given sample? A. 20 <b>B. 50</b> C. 30 D. 100
<b>5</b>	Semiconservative mechanism of DNA was detected using: A <sup>35</sup> S B <sup>14</sup> C C <sup>32</sup> P <b>D <sup>15</sup>N</b>
<b>6</b>	A template strand of DNA has base sequence CATGATTAC. New strand synthesized on it will be : A GATCAUATG B GTACTAACG C GAACTAATG <b>D GTACTAATG</b>
<b>7</b>	During DNA replication, the separated strands of DNA are prevented from recoiling by A DNA primase B Sigma factor C Rho-factor <b>D SSBP</b>
<b>8</b>	In which of the following synthesis of DNA strands is not involved directly? A m RNA B t RNA C Another DNA strand <b>D Protein</b>
<b>9</b>	Wobble hypothesis is related with A Ambiguity in codon B Purine pyrimidine equality C Genetic code is triplet <b>D Degeneracy of genetic code and economy of tRNA molecules in the cell</b>
<b>10</b>	During elongation of polypeptide chain, sigma factor is : <b>A Functionless</b> B Retained for specific function C Released for reuse



	D Required during closing of chain
11	Enzyme required for peptide formation is : A Peptidase <b>B Peptidyl transferase</b> C Nitrogenase D Nitrate reductase
12	Exon segments are reunited after splicing by A RNA primase B RNA protease <b>C RNA polymerase</b> D RNA ligase
13	In lac operon, lactose acts as: <b>A Inducer</b> B Co-inducer C Repressor D Co-repressor
14	A unit of lac-operon which in the absence of lactose, suppresses the activity of operator gene is : A Structural gene <b>B Regulatory gene</b> C Repressor protein D Promoter gene
15	A DNA segment has 75 cytosine and 40 thymine nucleotides. What shall be the total number of phosphates in the DNA segment? A 115 <b>B 230</b> C 75 D 220
16.	Which of the following is not a termination codon? A.UAG. B.UAA C. UGA <b>D. UAC</b>
17.	-----codons are needed to specify three amino acids. <b>A. 3</b> B. 6. C. 9. D. 12
18.	Formation of mRNA from DNA is called as <b>A. transcription</b> B. translation C. transformation D. translocation
<b>VERY SHORT ANSWER QUESTIONS ( 1 MARK EACH)</b>	
1	What is the principle of DNA profiling?
2	What is the use of southern blotting in DNA fingerprinting?
3	Enlist the genes in Lac operon
4	What is meant by an operon?
5	AUG codon gives _____ & _____ amino acids in prokaryotes & Eukaryotes respectively.
6	What is meant by activation of amino acids?
7	What is the role of Mg <sup>++</sup> in Translation?
8	What are the different types of mutations?
9	Enlist the names of enzymes used in semiconservative replication of DNA?
10	What is central dogma of molecular biology?
11	What type of isotopes used in semiconservative replication experiments?

12	What is the function of an RNA primer?
13	What is the function of SSBP?
14	Define RFLP'
15	Define Heterochromatin
16.	Give the function of an RNA primer.
17.	Define genetic code.
18.	Where does transcription occur in eukaryotes?
19.	Mention the function of non-histone protein.
	<b>SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS EACH)</b>
1	Differentiate between Heterochromatin & Euchromatin'
2	How t-RNA acts as an adapter molecule? Explain in detail with the help of a diagram.
3	Define mutation. State its two types
4	Describe Hershey-Chase experiment in detail.
5	Explain the role of Lactose as inducer in Lac-operon.
6	Draw neat and labelled diagrams of Nucleosomes.
7	Write a note on: packaging of DNA in prokaryotes.
8	Write a note on: packaging of DNA in Eukaryotes.
9	Explain Avery, McCarty and MacLeod experiment in detail
10	Draw neat and labelled diagram of Replication Fork.
11.	What are intron and exons ?
12.	Explain 'central dogma' of molecular biology.
13.	Distinguish between leading and lagging strands.
14.	What are VNTRs? Explain their use in DNA fingerprinting.
	<b>SHORT ANSWER TYPE QUESTIONS (SA-II) (3 MARKS EACH)</b>
1	Explain Griffith's experiment in detail with a diagram.
2	Describe any three characteristics of Genetic code.
3	Mention any three objectives of the Human Genome project.
4	Explain different steps involved in DNA Fingerprinting.
5	Draw a neat and labelled diagram of transcription and processing of hn-RNA
6	Draw a neat and labelled diagram explaining Meselson and Stahl's experiment.
7	How Meselson and Stahl explained the concept of Semiconservative Replication of DNA experimentally?
8	Explain the concept of operon.
9	Give diagrammatic representation of Lac-operon in the presence of an inducer.
10	Define Genomics. Give any two applications of genomics.
11.	Draw a diagrammatic representation of steps involved in DNA profiling.
12.	Give the mechanism of translation.
	<b>LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)</b>
1	Describe the process of semiconservative replication of DNA with the help of neat and labelled diagrams.
2	Describe the mechanism of translation with the help of a neat and labelled diagram.
3	Explain processing of hn-RNA with the help of neat and labelled diagrams.
4	With respect to lac- operon explain the following terms:- i) regulator gene ii) promoter gene iii) structural gene iv) inducer
5	Define DNA fingerprinting? State any three applications of it.
6.	With the help of a suitable diagram describing the structure of the nucleosome.
7.	Explain-a) regular gene b) promoter gene c)operator gene d)structural gene

## 5. ORIGIN AND EVOLUTION OF LIFE

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	_____ is considered a connecting link between ape and man. <b>A <u>Australopithecus</u></b> B <i>Homo habilis</i> C <i>Homo erectus</i> D Neanderthal man
<b>2</b>	Humans are most closely related to _____. A Marsupial B Lemur <b>C <u>Chimpanzees</u></b> D Tarsier
<b>3</b>	The proportion of an allele in the gene pool to the total number of alleles at a given locus is called _____. A gene pool <b>B <u>gene frequency</u></b> C gene flow D genetic drift
<b>4</b>	Transfer of a part of a chromosome or set of genes to a non-homologous chromosome is called _____. A deletion B duplication C inversion <b>D <u>translocation</u></b>
<b>5</b>	Any random fluctuation in allele frequency, occurring in the natural population by pure chance is called _____. A gene pool B gene mutation C genetic recombination <b>D <u>genetic drift</u></b>
<b>6</b>	One major criticism against Darwin's theory is that It does not A. Does not explain survival of fittest B. The better adapted individuals are selected by nature <b>C. It is unable to explain the 'arrival of fittest'</b> D. Reproductive capacity of organism
<b>7</b>	The correct binomial expansion of $(p+q)^2$ for Hardy-Weinberg's principle is A. $2p+pq+q^2$ B. $p^2+2pq+q$ <b>C. <math>p^2+2pq+q^2</math></b> D. $p^2+pq+q^2$
<b>8</b>	Homologous organs have ..... A. Dissimilar ancestry and dissimilar structure <b>B. Similar ancestry but similar or dissimilar functions</b> C. Dissimilar ancestry and dissimilar function D. Dissimilar ancestry and similar functions
<b>9</b>	In which epoch the rise of monocots was seen? A. Miocene <b>B. Oligocene</b> C. Eocene D. Palaeocene
<b>10</b>	Which of the following is not the vestigial organ? A. Third eye B. Coccyx

	C. Wisdom teeth <b>D. Brain</b>
11.	Wings of bird and wings of butterfly are- A. Vestigial organ <b>B. Analogous organs</b> C. homologous organs D. similar structures
12	The plant used by Lamarck to explain his postulates was A. Morning primrose B. Pea plant <b>C. Evening primrose</b> D. <i>Drosophila</i>
13.	Formation of _____ is considered a landmark in the origin of life. a) water b) Methane c) Ammonia <b>d) proteins</b>
14.	Seymouria is a connecting link between _____ . a) invertebrates and vertebrates <b>b) amphibians and reptiles</b> c) reptiles and birds d) birds and mammals
	<b>VERY SHORT ANSWER QUESTIONS (1 MARK EACH)</b>
1	What is abiogenesis?
2	Which theory explains the continuity of life but not the origin of life?
3	Why did 'hot dilute soup' not show any degradation?
4	What are protobionts?
5	What was the proportion of methane, ammonia and hydrogen in Urey and Miller's experiment?
6	What is the major evidence in support of the RNA world hypothesis?
7	Define natural selection.
8	Define mutation.
9	What is speciation?
10	Which epoch represents 'age of mammals'?
11	Define the term 'Mendelian population'.
12	Define Gene pool.
13	Name the ancestor of humans also known as man with ape brain.
14	Name the ancestor of human nicknamed as Handyman
15	Whose fossils were discovered at the site of Shivalik hills, India?
16	What does cosmozoic theory say about life on the earth.?
17.	Name the theory of evolution which states that all living organisms are created by a super –natural power.
18.	What was the name of the apparatus designed by Urey and Miller ?
19.	What was the conclusion of the Urey and Miller experiment?
20.	Define Genetic drift.
21.	Define Gene flow.
	<b>SHORT ANSWER TYPE QUESTIONS (SA-I) ( 2 MARKS EACH)</b>
1	Write a note on coacervates?
2	Draw a labelled diagram of Urey-Miller's experiment.
3	Mention any four points that support the RNA world hypothesis.
4	Give various evidence in support of Darwinism.
5	Enlist various objections to Darwin's theory.
6	What are the main features of mutation theory?

7	Write a note on genetic drift.								
8	Explain directional selection with the help of labelled diagrams.								
9	Explain any two types of fossils and mention two points of significance of palaeontology.								
10	Differentiate between analogous and homologous organs.								
11	Explain various molecular evidence in support of organic evolution.								
12	Differentiate between allopatric and sympatric species.								
13	Mention any two developments in humans which helped him to move around safely on land.								
14	Distinguish New world and old-world monkeys based on their tail along with their examples.								
15	What is hybrid sterility?								
16	What led to better utilization of hands for holding objects effectively and better motor skills?								
17	Describe modern man.								
18	Distinguish between Australopithecus and Neanderthal man								
19	Distinguish between <i>Homo erectus</i> and Neanderthal man.								
20.	What are protobionts and eobionts?								
21.	According to Darwin, evolution is 'descent with modification. Describe the experiment performed by August Weismann to disprove this.								
22.	What is point mutation? State its consequences.								
23.	Which organs are called vestigial ? Give two examples.								
	<b>SHORT ANSWER TYPE QUESTIONS (SA-II) ( 3 MARKS EACH)</b>								
1	Explain various postulates of Darwinism.								
2	Give an account of Hardy-Weinberg's principle with suitable example.								
3	Explain archaeopteryx as a connecting link between reptiles and aves.								
4	Give an account of rudimentary organs with suitable examples.								
5	Name any three types of pre-mating isolating mechanisms.								
6	Name any three types of post-mating isolating mechanisms.								
7	Explain Geographical Isolation								
8	Write down the three main concepts of modern synthetic theory.								
9	What is chromosomal aberration? Give any two types of aberrations found in the population.								
10	Complete the table based on the special features of Human ancestors showing their cultural and social development. <table border="1" data-bbox="295 1653 1320 1862"> <thead> <tr> <th>Ancestors</th> <th>Special features</th> </tr> </thead> <tbody> <tr> <td><i>Homo erectus</i></td> <td></td> </tr> <tr> <td></td> <td>Buried their dead</td> </tr> <tr> <td></td> <td>Made tools from stones</td> </tr> </tbody> </table>	Ancestors	Special features	<i>Homo erectus</i>			Buried their dead		Made tools from stones
Ancestors	Special features								
<i>Homo erectus</i>									
	Buried their dead								
	Made tools from stones								
11	Write a note on <i>Homo habilis</i>								
12.	What is the Sewall Wright effect and founder effect?								
13.	State any three points of significance of paleontology.								
14.	Match the column A with B <table data-bbox="295 2091 1128 2279"> <tbody> <tr> <td>A</td> <td>B</td> </tr> <tr> <td>a. Darwin</td> <td>i) self-assembly theory</td> </tr> <tr> <td>b. Hugo de Vries</td> <td>ii) survival of the fittest</td> </tr> <tr> <td>c. Oparin-Haldane</td> <td>iii) mutation theory</td> </tr> </tbody> </table>	A	B	a. Darwin	i) self-assembly theory	b. Hugo de Vries	ii) survival of the fittest	c. Oparin-Haldane	iii) mutation theory
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b. Hugo de Vries	ii) survival of the fittest								
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	<b>LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)</b>								
1	Explain any two types of natural selection.								
2	Explain various palaeontological evidence in support of organic evolution.								
3	How homology and analogy of organs support evolution, explain.								
4	What is genetic variation? Explain any three factors responsible for genetic variation.								

5	Explain the concept of Natural Selection with the example of Industrial Melanism.
6.	What did you understand about the process of formation of 'hot dilute soup' with respect to the origin of life on the earth?
7.	Draw diagrams to show different types of chromosomal aberrations. Label each type.
8.	With the help of a neat labelled diagram and an example, describe the concept of Disruptive natural selection.
9.	Define speciation. Name the type and one example of each mode of speciation.

## 6. PLANT WATER RELATION

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	<p><b>Water present in the form of hydrated oxides of Silicon, Aluminium is called _____</b></p> <p>A Hygroscopic Water            B Gravitational Water            C <u>Combined Water</u>            D Capillary Water</p>
<b>2</b>	<p><b>Most plant cells and tissues constitutes _____ % water</b></p> <p>A <u>90-95 %</u>            B 70-80 %            C 10-25 %            D 0-20 %</p>
<b>3</b>	<p><b>_____ type of tissues are present in epiphytic roots</b></p> <p>A Meristematic            B Parenchyma            C <u>Velamen</u>            D Epithelial</p>
<b>4</b>	<p><b>In the zone of absorption, epidermal cells form unicellular hair like extensions called _____</b></p> <p>A Epiblema cells            B Roots            C <u>Root hairs</u>            D Velamen tissues</p>
<b>5</b>	<p><b>Outer layer of root hair is made up of _____</b></p> <p>A Cellulose            B Lignin            C Starch            D <u>Pectin</u></p>
<b>6</b>	<p><b>Inner layer of root hair is made up of _____</b></p> <p>A <u>Cellulose</u>            B Lignin            C Starch            D Pectin</p>
<b>7</b>	<p><b>Cell wall is _____</b></p> <p>A Selectively Permeable            B <u>Freely Permeable</u>            C Non Permeable            D Impermeable</p>
<b>8</b>	<p><b>Plasma Membrane is _____</b></p> <p>A <u>Selectively Permeable</u>            B Freely Permeable            C Non Permeable            D Impermeable</p>
<b>9</b>	<p>Root hair is _____ extension of epiblema cells</p> <p>A <b>Cytoplasmic</b>            B Protoplasmic            C Nucleoplasmic            D Cellulosic</p>
<b>10</b>	<p><b>Fine soil particles imbibe or absorb water and hold it. This is called as _____</b></p> <p>A <b><u>Hygroscopic Water</u></b>            B Gravitational Water            C Combined Water            D Capillary Water</p>
<b>11</b>	<p>To carry put plasmolysis, a cell must be placed in</p>

	<p>A. Pure water  B. Hypertonic water  C. Hypotonic solution  <b>D. Hypertonic solution</b></p>
12	<p>The liquid adsorbed during imbibition is known as  A. Solid  B. Imbibant  <b>C. Imbibate</b>  D. Colloids</p>
13	<p>Water moves either by apoplast or symplast pathway across the root. Ultimately it becomes symplastic at.  A. Pericycle  <b>B. Endodermis</b>  C. Xylem  D. Phloem</p>
14	<p>The positive hydrostatic pressure which develops due to absorption of water is called as  A. Capillary force  B. Transpiration pull  <b>C. Root pressure</b>  D. Transpiration</p>
15	<p>The example of amphi-stomatic leaf is  A. Nerium  B. Lotus  <b>C. Grass</b>  D. opuntia</p>
	<p>16. Plasmolysis occurs in plant cells when the outer solution is.....  A) isotonic  <b>B) hypertonic</b>  C)hypotonic  D) mesotonic</p>
	<p>17. The first step in water absorption is .....  <b>A) Imbibition</b>  B) Active absorption  C)Passive absorption  D) Osmosis</p>
	<p>18. Movement of food material from leaves to other parts of the plant takes place through.....  A) Xylem  <b>B) Phloem</b>  C)Meristem  D) Endodermis</p>
	<p>19. Maximum transpiration occurs through.....  <b>A) Stomata</b>  B) Cuticle  C)Lenticel  D) Bark</p>
	<b>VERY SHORT ANSWER TYPE QUESTIONS(1 MARK EACH)</b>
1	Why does water act as a thermal buffer?
2	Define : Root hair
3	What is meant by Gravitational water?
4	What is meant by Hygroscopic water?
5	What is meant by Combined water?
6	What is meant by Capillary water?



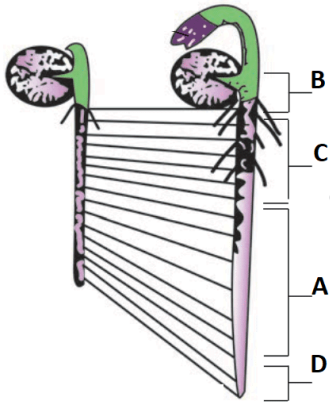
7	What is the composition of the outer layer of root hair?
8	What is the composition of inner layer of root hair
9	From which type of cells, root hair is originated
10	Which type of tissue is present in epiphytic roots?
11	Define imbibition.
12.	What is DPD?
13	Which symbol is used to denote water potential?
14	What do you understand by the term lateral conduction of food?
15	Which organ is mainly involved in guttation?
16.	Name the condition in which the protoplast of the cell shrinks.
17.	Define chemical potential
18.	Which type of solution will bring about de-plasmolysis
<b>SHORT ANSWER TYPE QUESTIONS (SA-I) (2 MARKS EACH)</b>	
1	Why is water called the 'Elixir of Life'?
2	What are the different types of water?
3	Draw a neat and labelled diagram of "Structure of Root hair".
4	Explain the structure of root hair.
5	In which forms water is available to roots for absorption?
6	Explain the different properties of water.
7	Define imbibe and imbibant.
8	Give importance to diffusion to plants.
9	Differentiate between exosmosis and endosmosis.
10	Mention various factors affecting water absorption.
11	Give various objections to root pressure theory.
12	Draw a well labelled diagram of the structure of the stomata.
13	Give advantages of transpiration.
14.	What is symplast pathway
15.	What is cuticular transpiration?
16.	What is passive absorption of water
17.	write significance of transpiration
<b>SHORT ANSWER TYPE QUESTIONS (SA-II) (3 MARKS EACH)</b>	
1	Draw a neat and labelled diagram of Root tip showing root hair zone.
2	Draw a neat and labelled diagram of Root hair.
3	Write a note on the morphological structure of the root.
4	How can roots act as a water absorbing organ?
5	Why was capillarity theory discarded?
6	Explain the concept of water potential.
7	Explain various types of transpiration.
8	Describe the path of water across the root with the help of labelled diagram
9	Differentiate between passive and active absorption.
10.	Explain in detail osmotic and nonosmotic water absorption.
11.	Explain Cohesion theory for translocation of water
<b>LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS EACH)</b>	
1	Explain the structure of root hair with the help of neat and labelled diagrams.
2	Explain transpiration pull theory for ascent of sap.
3	Explain the mechanism of transport of food through phloem with suitable diagram,

4	Explain the mechanism of opening and closing of stomata.
5.	Explain in detail three types of transpiration of water
6.	Draw a neat labelled diagram and describe the structure of stomata.

## 7. PLANT GROWTH AND MINERAL NUTRITION

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	A farmer is fed up with weeds in his Wheat farm. Which of the following chemicals can he use to overcome the problem? A. IBA B. IAA C. NAA D. <b><u>2,4 – D</u></b>
<b>2</b>	Gibberellins are synthesised from _____. A. Acetic acid <b>B. Mevalonic acid</b> C. Tryptophan D. Ethephon
<b>3</b>	First natural cytokinin was obtained from _____. A. Rice plants B. Tobacco callus <b>C. Maize grains</b> D. Human urine
<b>4</b>	The plant growth is often described as localized due to <b>A. Meristem</b> B. Permanent tissue C. Parenchyma only D. D. Xylem only
<b>5</b>	Actual visible growth is seen during A. phase of division B. phase of maturation <b>C. phase of cell elongation</b> D. D. phase of differentiation
<b>6</b>	The correct equation for arithmetic growth is <b>A. <math>L_t = L_0 + rt</math></b> B. $W_1 = W_0 \cdot e^{rt}$ C. $L_0 = L_t + rt$ D. D. $L_0 = W_0 \cdot e^{rt}$
<b>7</b>	The tissues formed by redifferentiation are A. Secondary xylem and Secondary epidermis B. Secondary meristem C. Primary xylem and primary phloem <b>D. D. Secondary xylem and secondary phloem</b>
<b>8</b>	Loss or non-development of chlorophyll resulting in yellowing of leaf is called as A. Stunting B. necrosis <b>C. Chlorosis</b> D. D. Mottling
<b>9</b>	The element required in phosphorylation reaction is <b>A. P</b> B. Ca C. Fe. D. D. Mo
<b>10</b>	Nitrification is not carried out by the bacterium A. <i>Nitrosomonas</i>

	<p>B. <i>Nitrosococcus</i>  <b>C. <i>Nitrobacter</i></b>  D. <i>E. coli</i></p>
11.	<p>When a young seedling is kept horizontally, why its roots grow towards the gravity and shoot away from it, because</p> <p>A. Root and shoot have different likings  <b>B. Root and shoot have different concentration optima for auxin action</b>  C. Root are attracted by water and shoot by air  D. Stimulus of gravity</p>
12.	<p>How does pruning help in making the hedge dense?</p> <p>a) It releases wound hormone  b) It induces the differentiation of new shoots from the root stock  <b>c) It frees axillary buds from apical dominance</b>  d) The apical shoot grows faster after pruning</p>
13.	<p>Farmers in a particular region were concerned that premature yellowing of leaves of a pulse crop might cause a decrease in the yield. Which treatment could be most beneficial to obtain maximum seed yield?</p> <p>a) application of iron and magnesium to promote synthesis of chlorophyll  b) frequent irrigation of the crop  <b>c) treatment of the plants with cytokinin along with a small dose of nitrogenous fertilizers</b>  d) removal of all yellow leaves and spraying the remaining green leaves with 2,4,5 trichlorophenoxy acetic acid</p>
14.	<p>Mobilization of stored food in germinating seeds is triggered by</p> <p>a) auxin  b) cytokinin  <b>c) gibberellin</b>  d) ethylene</p>
15.	<p>The correct chronological sequence of developmental stages in plant is</p> <p>a) flowering-fruitlet-juvility-germination  <b>b) germination-juvility-flowering-fruitlet</b>  c) juvility-flowering-germinating -fruitlet  d) fruitlet-flowering-juvility-germinating</p>
<b>VERY SHORT ANSWER TYPE QUESTIONS ( 1 MARK EACH)</b>	
<b>1</b>	What do you mean by indeterminate growth?
<b>2</b>	In which phase maximum growth is achieved?
<b>3</b>	What is the use of an auxanometer?
<b>4</b>	Define dedifferentiation.
<b>5</b>	Buyers often complain that a particular fruit merchant uses some chemical to ripen fruits in his shop. Name the chemical he must be using to do so.
<b>6</b>	Why is ABA known as an antitranspirant?
<b>7</b>	Name the tissue that transports hormones within the plant body?
<b>8</b>	What is critical photoperiod?
<b>9</b>	Which pigment receives the stimulus of light for flowering?
<b>10</b>	Which chemical stimulates vernalization?
<b>11</b>	What is critical concentration?
<b>12</b>	Which enzyme is activated by iron?
<b>13</b>	What is the site of nitrogen fixation in BGA?
<b>14</b>	Name the enzyme used in transamination?
<b>15</b>	Name the element that plays a major role in determination of solute concentration.

16.	In a wheat field some broad-leaved weeds were seen by a farmer. Which plant hormone would you suggest to get rid of the same?
17.	Which growth is also called apparent growth?
18.	Name any one hormone which increases femaleness in plants?
19.	How light affects germination in pea and onion plants?
20.	Which plant hormone is named anti-ageing hormone?
<b>SHORT ANSWER TYPE QUESTIONS (SA-I) (2 MARKS)</b>	
1	What type of changes take place during the elongation phase?
2	Identify A,B,C and D in the given diagram, 
3	Give any two points of difference between exponential and sigmoid growth curve.
4	Complete the given flowchart for development. <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">SEED GERMINATION</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">A</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">B</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">PLASMATIC GROWTH</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">C</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">CELL MATURATION</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">MATURE CELL</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">D</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; text-align: center;">DEATH</div>
5	Differentiate between SDP and LDP.
6	Give an account of vernalization.
7	Explain any two deficiency symptoms of minerals found in plants.
8	Describe the process of amino acid synthesis.
9	Match the column A with B

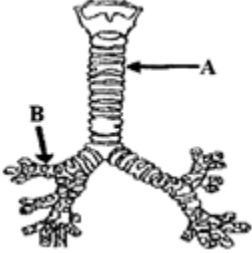
	<p>A</p> <p>i) Epinasty of flower</p> <p>ii) Natural auxin</p> <p>iii) Flowering in Litchi</p> <p>iv) Bolting of Beet</p>	<p>B</p> <p>a)GA3</p> <p>b)NAA</p> <p>c)IAA</p> <p>d)Ethylene</p>										
10	<p>A gardener wants to give a bushy appearance to plants on our college campus.</p> <p>i) What should he do to achieve the same?</p> <p>ii) Which property of phytohormones he must be aware of?</p>											
11	<p>Give an account of nitrification.</p>											
12	<p>Mention various functions of phosphorus in plants.</p>											
13.	<p>Different elements are required by the plant for its growth and development. These are absorbed in various forms. Some elements are mentioned below, write the form in which they are absorbed, Boron, molybdenum, phosphorus and nitrogen.</p>											
14.	<p>What do you understand by growth regulators and Phyto-hormones?</p>											
15.	<p>Till when a seed remains viable?</p>											
16.	<p>List at least four special characteristics of hormones.</p>											
17.	<p>Can you alter the rate of growth in an organism? If so, how?</p>											
	<p><b>SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS EACH)</b></p>											
1	<p>Explain various phases of growth.</p>											
2	<p>Observe the following graph and answer the following questions:-</p> <div style="text-align: center;"> </div> <p>i. Which type of growth is indicated in the graph?</p> <p>ii. What is the mathematical expression for this growth?</p> <p>iii. Which plant part shows such type of growth?</p>											
3	<p>Give the term for the following)</p> <p>a. Parenchyma in hydrophytes develops schizogenous interspaces for support and aeration-</p> <p>b. Development of interfascicular cambium</p> <p>c. Formation of secondary xylem and secondary phloem</p>											
4	<p>Give an account of denitrification.</p>											
5	<p>Draw a well labelled diagram of sigmoid growth curve.</p> <p>What is the grand period of growth?</p>											
6	<p><b>Match the columns based on element and its role in plants.</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Column 'a'</th> <th style="width: 50%; text-align: center;">Column 'b'</th> </tr> </thead> <tbody> <tr> <td>1. Molybdenum</td> <td>a. grey spots on leaves</td> </tr> <tr> <td>2. Zinc</td> <td>b. Brown heart disease</td> </tr> <tr> <td>3. Copper</td> <td>c. slight retardation of growth</td> </tr> <tr> <td>4. Boron</td> <td>d. Dieback of shoots</td> </tr> </tbody> </table>		Column 'a'	Column 'b'	1. Molybdenum	a. grey spots on leaves	2. Zinc	b. Brown heart disease	3. Copper	c. slight retardation of growth	4. Boron	d. Dieback of shoots
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	5. Chlorine	e. Poor growth of plant
	6. Manganese	f. malformed leaves.
<b>7</b>	Explain the concept of plasticity with suitable diagrams.	
<b>8</b>	Give an account of Donnan's equilibrium.	
<b>9</b>	Write the name of _____ a) First hormone discovered in plants. b) Biological name of fungus from which Gibberellins were first isolated. c) The name given to the first cytokinin by Skoog and Miller.	
<b>10</b>	Write the name of _____ a) Gaseous growth hormone known to you. b) Standard bioassay method for auxins. c) Hormone that can overcome the requirement of vernalization.	
	<b>LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS)</b>	
<b>1</b>	Write a note on photoperiodism with suitable examples.	
<b>2</b>	Draw schematic representation of the nitrogen cycle.	
<b>3</b>	Name the phytohormone related with the given phenomenon a) Apical dominance b) Bolting of Cabbage c) Artificial ripening of fruit d) Acts as Antitranspirant by closing stomata	
<b>4</b>	Write full form of- a) IAA b) IBA c) NAA d) 2,4-D	
5.	Explain the biological meaning of growth. In what essential ways does plant growth differ from animal growth	
6.	Explain how the method of science operated in the discovery of auxin	
7.	Mention any two causes of seed dormancy. Add a note on the significance of this phenomenon.	

## 8. RESPIRATION AND CIRCULATION

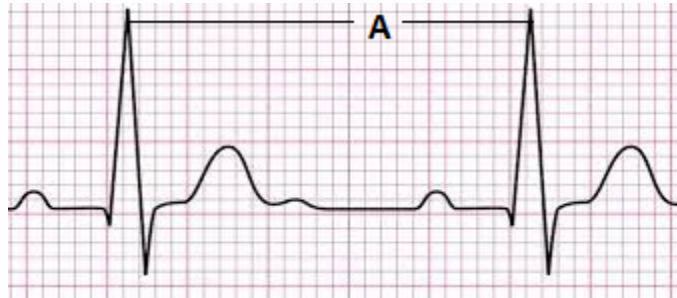
<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	In human respiration, chemical energy is released in the form of _____. A) Acetyl co-enzyme A B) ADP C) ADPH <sub>2</sub> D) <b><u>ATP</u></b>
<b>2</b>	Alveoli provide the surface area for exchange of _____. A) food B) enzymes C) <b><u>gases</u></b> D) hormones
<b>3</b>	The movement of diaphragm, intercostal muscles and rib cage helps in _____. A) digestion B) circulation C) excretion D) <b><u>respiration</u></b>
<b>4</b>	The volume of air that remains in the lungs after maximum respiration is _____. A) 1000 to 1100 ml B) <b><u>1100 to 1200 ml</u></b> C) 2000 to 3000 ml D) 5200 to 5800 ml
<b>5</b>	Find out the example in which due to absence of respiratory pigment transport of respiratory gases does not take place. A) <b><u>Cockroach</u></b> B) Scoliodon C) Frog D) Human
<b>6</b>	Which of the following has the thickest wall? A) Right auricle B) Right ventricle C) Left auricle D) <b><u>Left ventricle</u></b>
<b>7</b>	The phase of contraction of the heart is termed as _____. A) diastole B) <b><u>systole</u></b> C) heart beat D) heart sound
<b>8</b>	The free edges of cuspid valves are attached to the papillary muscles of the heart by fibres are called _____. A) <b><u>chordae tendinae</u></b> B) columnae carneae C) connecting fibres D) autorhythmic fibres
<b>9</b>	Ventricular depolarization is represented by _____. A) P wave B) <b><u>QRS complex</u></b> C) T wave D) P and T waves
<b>10</b>	The erythropoetic tissue in adults is mainly found in _____. A) kidney



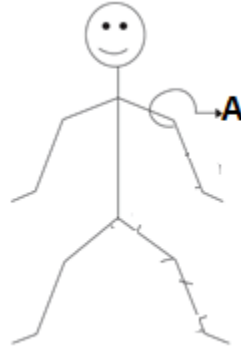
	<p>B) liver  <b>C) red bone marrow</b>  D) spleen</p>																								
11	<p>The technique used to detect blockages in blood vessels is  <b>A. Angiography</b>  B. ECG  C. EEG  D. sphygmomanometer</p>																								
12.	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>In the given figure, label A and B represent. _____</p> <p><b>A) A- Trachea, B- Bronchus</b>  B) A- Alveolus, B- Bronchiole  C) A- Bronchiole, B- Trachea  D) A- Trachea, B- Bronchiole</p> </div> </div>																								
13.	<p>Match the disorders given in column-I with symptoms under column-II. Choose the answer which gives the correct combination of alphabets with numbers.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Column-I</th> <th></th> <th>Column-II</th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>Asthma</td> <td>I.</td> <td>Inflammation of nasal tract</td> </tr> <tr> <td>B.</td> <td>Bronchitis</td> <td>II.</td> <td>Spasm of bronchial muscles</td> </tr> <tr> <td>C.</td> <td>Rhinitis</td> <td>III</td> <td>Fully blown out alveoli</td> </tr> <tr> <td>D.</td> <td>Emphysema</td> <td>IV.</td> <td>Inflammation of bronchi</td> </tr> <tr> <td></td> <td></td> <td>V.</td> <td>Cough with blood stained sputum</td> </tr> </tbody> </table> <p>A) A-IV, B-II, C-V, D-I  B) A-V, B-III, C-II, D-I  C) A-III, B-I, C-V, D-IV  <b>D) A-II, B-IV; C-I, D-III</b></p>		Column-I		Column-II	A.	Asthma	I.	Inflammation of nasal tract	B.	Bronchitis	II.	Spasm of bronchial muscles	C.	Rhinitis	III	Fully blown out alveoli	D.	Emphysema	IV.	Inflammation of bronchi			V.	Cough with blood stained sputum
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14.	<p>In expiration, diaphragm becomes _____.</p> <p>A) Flattened  B) Contract  C) Straightened  <b>D) Arched</b></p>																								
15.	<p>Arrange the given steps of respiration in the sequence of events they occur. Choose the correct options given below.</p> <p>(i) Diffusion of gases, O<sub>2</sub> and CO<sub>2</sub> across the alveolar membrane.  (ii) Transport of gases by the blood.  (iii) Utilization of O<sub>2</sub> by the cells for catabolic reactions and the resultant releases of CO<sub>2</sub>  (iv) Pulmonary ventilation by which atmospheric air is drawn in and CO<sub>2</sub> rich alveolar air is released out.  (v) Diffusion of O<sub>2</sub> and CO<sub>2</sub> between the blood and tissue.</p> <p>A) (iii), (v), (ii), (i), (iv)  B) (iii), (ii), (v), (i), (iv)  C) (v), (iv), (iii), (ii), (i)</p>																								

	<b>D) (iv), (i), (ii), (v), (iii)</b>										
16.	<p>Which of the given statements are incorrect?</p> <p>(i) A healthy human on an average breathes 2 times/minute.  (ii) The volume of air involved in the breathing movements can be estimated by a spirometer.  (iii) Diaphragm is very useful in both inspiration and expiration.</p> <p>A) (i) and (ii)  <b>B) (ii) and (iii)</b>  C) (i) and (iii)  D) None of the above</p>										
17.	<p>In an old science fiction movie, the hero tried to drown a giant ant by holding its head under water. Would this work? Why?</p> <p>A) Yes, Ants use lungs to breathe much as we do.  B) Yes, The skin surface, covered with water, could not get O<sub>2</sub> from the air.  C) No, Ants use gills for respiration, like crabs do.  <b>D) No, Ants breathe through holes in the sides of their bodies</b></p>										
18.	<p>Emphysema, a chronic disorder, is high in cigarette smokers. In such cases the _____ of the person is/are found damaged.</p> <p>A. Plasma membrane  <b>B. Alveolar walls</b>  C. Bronchioles  D. Respiratory muscles</p>										
	<p>19. Match the terms given under Column 'A' with their functions given under Column 'B' and select the answer from the options given below:</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><b>Column A</b></td> <td style="text-align: center;"><b>Column B</b></td> </tr> <tr> <td>A. Lymphatic System</td> <td>i. Carries oxygenated blood</td> </tr> <tr> <td>B. Pulmonary vein</td> <td>ii. Immune Response</td> </tr> <tr> <td>C. Thrombocytes</td> <td>iii. To drain back the tissue fluid to the circulatory system</td> </tr> <tr> <td>D. Lymphocytes</td> <td>iv. Coagulation of blood</td> </tr> </table> <p>a. A-ii, B-i, C-iii, D-iv  b. A-iii, B-i, C-iv, D-ii  <b>c. A-iii, B-i, C-iii, D-iv</b>  d. A-ii, B-i, C-iii, D-iv</p> <p>20. In the ABO system of blood groups, if both antigens are present but no antibody, the blood group of the individual would be:</p> <p>A) B      B) 0      <b>C) AB</b>      D) A</p>	<b>Column A</b>	<b>Column B</b>	A. Lymphatic System	i. Carries oxygenated blood	B. Pulmonary vein	ii. Immune Response	C. Thrombocytes	iii. To drain back the tissue fluid to the circulatory system	D. Lymphocytes	iv. Coagulation of blood
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21 .	<p>Haematocrit value is the expression of:</p> <p>A) Ratio of oxyhaemoglobin and reduced haemoglobin in blood.  B) Ratio of normal and abnormal haemoglobin in blood.  C) Ratio of red blood corpuscles to plasma in blood.  D) Ratio of red blood corpuscles to the total volume of blood.</p>										
22.	<p>Myocardial Infarction is caused by:</p> <p>A) Hardening of arteries.</p>										

	<p>B) Lumpy thickness develops in the inner walls of arteries.</p> <p>C) Clot which may occur in the lumen of a coronary artery.</p> <p><b>D) Sudden interruption in blood flow towards a portion of heart.</b></p>																								
23.	<p>In an ECG, 'QRST' is related with:</p> <p><b>A) Ventricular contraction or depolarization</b></p> <p>B) Auricular contraction</p> <p>C) Auricular relaxation</p> <p>D) Cardiac cycle</p>																								
24.	<p>Match the blood vessels of the human heart listed under column-I with the functions given under column-II; choose the answer which gives the correct combination of both columns.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 45%;">Column-I (Blood vessel)</th> <th style="width: 5%;"></th> <th style="width: 45%;">Column-II (Function)</th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>Superior vena cava</td> <td>I.</td> <td>Carries deoxygenated blood to lungs</td> </tr> <tr> <td>B.</td> <td>Inferior vena cava</td> <td>II.</td> <td>Carries oxygenated blood to lungs</td> </tr> <tr> <td>C.</td> <td>Pulmonary artery</td> <td>III.</td> <td>Brings deoxygenated blood from lower Part of the body to the right atrium</td> </tr> <tr> <td>D.</td> <td>Pulmonary vein</td> <td>IV.</td> <td>Brings oxygenated blood to the left atrium</td> </tr> <tr> <td></td> <td></td> <td>V.</td> <td>Brings oxygenated blood from upper parts of the body into the right atrium</td> </tr> </tbody> </table> <p><b>A) A-V; B-I; C-III; D-II</b></p> <p>B) A-V; B-III; C-I; D-IV</p> <p>C) A-IV; B-V; C-III; D-I</p> <p>D) A-V; B-I; C-II; D-III</p>		Column-I (Blood vessel)		Column-II (Function)	A.	Superior vena cava	I.	Carries deoxygenated blood to lungs	B.	Inferior vena cava	II.	Carries oxygenated blood to lungs	C.	Pulmonary artery	III.	Brings deoxygenated blood from lower Part of the body to the right atrium	D.	Pulmonary vein	IV.	Brings oxygenated blood to the left atrium			V.	Brings oxygenated blood from upper parts of the body into the right atrium
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<b>VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)</b>																									
<b>1</b>	Name the cartilage which divides the nasal cavity into right and left nasal chambers.																								
<b>2</b>	Give the function of epiglottis.																								
<b>3</b>	Define total lung capacity.																								
<b>4</b>	Sachin shows symptoms of inflammation of the sinuses and mucus discharge due to viral and bacterial infection. Identify the disorder.																								
<b>5</b>	Define haematology.																								
<b>6</b>	Which type of blood flows through pulmonary veins?																								
<b>7</b>	In between which layers of pericardium, pericardial fluid is present?																								
<b>8</b>	How many molecules of haemoglobin are found in each erythrocyte?																								
<b>9</b>	Identify 'A' from the following ECG.																								



10 Identify the pulse point 'A' from below given diagram.



11. What is sinusitis?

12 What is a ventilator?

13 Define heart transplant.

14 Name the technique used to detect blockages in blood vessels.

15. Define the term 'Tidal volume'.

16. A fluid filled double membranous layer surrounds the lungs. Name it and mention its important function.

17. Name the primary site of exchange of gases in our body?

18. A major percentage (97%) of O<sub>2</sub> is transported by RBCs in the blood. How does the remaining percentage (3%) of O<sub>2</sub> transported?

19. Arrange the following terms based on their volumes in an ascending order

- Tidal Volume (TV)
- Residual Volume (RV)
- Inspiratory Reserve Volume (IRV)
- Expiratory Capacity (EC)

20. Which coronary artery disease is caused due to narrowing of the lumen of arteries?

**SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS)**

1 Fill in the blanks with the help of a chart.

Organism	Habitat	Respiratory surface/ organ
Coelenterates	-----	-----
Spiders	-----	-----

2 Define Bohr effect and Haldane effect.

3 Give any two effects of carbon monoxide poisoning.

4 Define intracellular transport and extracellular transport.

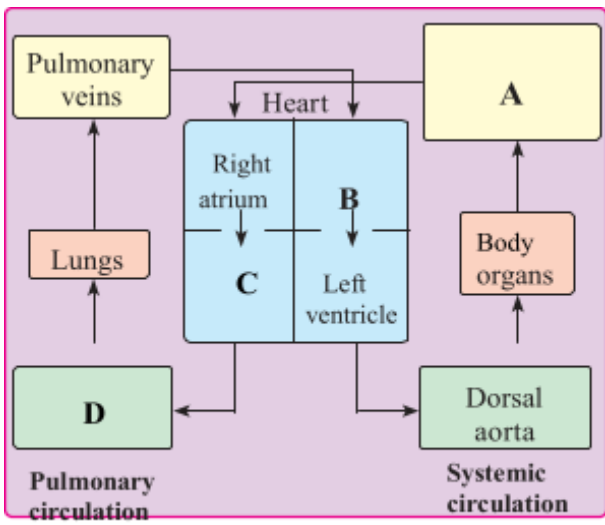
5 Name the pigment and enzyme found in erythrocytes?




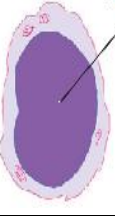




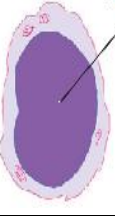




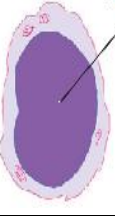

6 Draw diagram of the conducting system of the human heart. Label SA node and bundle of His.

7 How does a portal vein differ from a normal vein?

8 Write an account of a silent heart attack.

9 Write a note on symptoms of laryngitis.

10.	The walls of ventricles are much thicker than atria. Explain.
11.	Differentiate between a. Blood and Lymph b. Basophils and Eosinophils
12.	Name the organs of respiration in the following organisms: a. Flatworm - _____ b. Birds - _____ c. Frog- _____ d. Cockroach - _____
13.	Explain the following terms and give their location? a. Purkinje fibre b. Bundle of His
14.	Complete the missing word in the statement given below: a. Plasma without _____ is called serum. b. _____ and monocytes are phagocytic cells. c. Eosinophils are associated with _____ reaction. d. _____ ions play a significant role in clotting.
15.	Given below are the abnormal conditions of blood circulation. Name the disorders. a. Acute chest pain due to failure of O <sub>2</sub> supply to heart muscles b. Increased systolic pressure
16.	What physiological circumstances lead to erythroblastosis fetalis?
17.	Write the features that distinguish between the Open and closed circulatory system
<b>SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS)</b>	
1	Distinguish between inspiration and expiration.
2	Write a note on the Hering-Breuer reflex.
3	Define Hamburger's phenomenon. Add a note on it.
4	Draw the chart of double circulation and label A, B, C and D. 
5	Write a note on coagulation of blood.
6	Define hypertension. Explain coronary artery disease and angina pectoris.
7	Draw diagrammatic representation of cardiac cycle. Explain ventricular systole.
8.	Write symptoms, causes and treatment for pneumonia.

9.	Explain the different modes of CO <sub>2</sub> transport in blood.																					
10.	Explain the advantage of the complete partition of ventricle among birds and mammals and hence leading to double circulation.																					
11.	What is the significance of the hepatic portal system in the circulatory system?																					
12.	<p>Answer the following.</p> <p>a. Name the major site where RBCs are formed.</p> <p>b. Which part of the heart is responsible for initiating and maintaining its rhythmic activity?</p> <p>c. What is specific in the heart of crocodiles among reptilians?</p>																					
<b>LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS)</b>																						
1	With the help of labelled diagrams explain the exchange of gases between alveolus and capillary.																					
2	<p>With the help of a chart identify and write the function of any <b>four</b> leukocytes.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Type</th> <th style="width: 25%;">Leucocytes</th> <th style="width: 25%;">Name of cell</th> <th style="width: 35%;">Function</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center; vertical-align: middle;"><b>Granulocytes</b></td> <td style="text-align: center;"></td> <td style="text-align: center;">----- -----</td> <td style="text-align: center;">----- -----</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">-----</td> <td style="text-align: center;">----- -----</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">-----</td> <td style="text-align: center;">----- -----</td> </tr> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;"><b>Agranulocytes</b></td> <td style="text-align: center;"></td> <td style="text-align: center;">-----</td> <td style="text-align: center;">----- -----</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">-----</td> <td style="text-align: center;">----- -----</td> </tr> </tbody> </table>	Type	Leucocytes	Name of cell	Function	<b>Granulocytes</b>		----- -----	----- -----		-----	----- -----		-----	----- -----	<b>Agranulocytes</b>		-----	----- -----		-----	----- -----
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3	<p>Draw a labelled diagram of the internal structure of the human heart.</p> <p>Label right atrium, mitral valve, left ventricle and pulmonary semilunar valve.</p> <p>Write a function of Eustachian and tricuspid valve found in human heart</p>																					
4.	<p>State the functions of the following in blood</p> <p>a. Fibrinogen</p> <p>b. Globulin</p> <p>c. Neutrophils</p> <p>d. Lymphocytes</p>																					

5.	Explain the mechanism of breathing with neat labelled sketches.
6.	Describe the events in the cardiac cycle. Explain “double circulation”.

## 9. CONTROL AND COORDINATION

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	Diffused type of nervous system is seen in _____. <b>A <u>Hydra</u></b> B <i>Planaria</i> C Cockroach D Earthworm
<b>2</b>	Planaria shows _____ type of nervous system. A nerve net. <b>B <u>ladder</u></b> C ganglionated D brain
<b>3</b>	In order for a stimulus to be effective, the stimulus must have a minimum intensity called _____ stimulus. A subliminal B depolarised <b>C <u>threshold</u></b> D polarised
<b>4</b>	The resting potential of a neuron is _____. A 30 millivolts B -30 millivolts C 70 millivolts <b>D <u>-70 millivolts</u></b>
<b>5</b>	The third ventricle of the brain is connected to the fourth ventricle of the brain through _____. A Foramen of Monro <b>B <u>Duct of Sylvius</u></b> C Metacoel D Eustachian tube
<b>6</b>	Degeneration of dopamine producing neurons in the CNS causes _____. A ADHD B Alzheimer's <b>C <u>Parkinson's</u></b> D Fever
<b>7</b>	_____ is a mineralocorticoid secreted by Adrenal gland. <b>A <u>Aldosterone</u></b> B Cortisol C Corticoid D Androgen
<b>8</b>	_____ has an important role in the development of the immune system by maturation of T lymphocytes. A Thyroxine <b>B <u>Thymosin</u></b> C Aldosterone D Parathormone
<b>9</b>	Hypersecretion of growth hormone in childhood causes _____. A Acromegaly B Dwarfism <b>C <u>Gigantism</u></b> D Goitre
<b>10</b>	_____ shows gastric contractions and inhibits the secretion of gastric juice. A Gastrin B Secretin <b>C <u>Entero- gastrone</u></b> D Inhibin



11.	<p>Match the column-I (various phase of an action potential) with column-II (ionic activity associated) and choose the correct option.</p> <table border="1" data-bbox="365 209 1453 895"> <thead> <tr> <th></th> <th>Column-I</th> <th></th> <th>Column-II</th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>Resting stage of a neuron</td> <td>I.</td> <td>Opening and then closing of the</td> </tr> <tr> <td>B.</td> <td>Depolarisation phase in the generation of action potential.</td> <td>II.</td> <td>All voltage gated sodium and potassium channels are closed.</td> </tr> <tr> <td>C.</td> <td>Repolarisation phase in the generation of action potential</td> <td>III.</td> <td>The sodium channels remain open.</td> </tr> <tr> <td>D.</td> <td>Absolute refractory phase.</td> <td>IV.</td> <td>Opening of potassium gates and the rushing of potassium</td> </tr> </tbody> </table> <p>A) A-II; B-I; C-IV; D-III                      B) A-I; B-II; C-III; D-IV  C) A-III; B-IV; C-I; D-II                      D) A-IV; B-II; C-III; D-I</p>		Column-I		Column-II	A.	Resting stage of a neuron	I.	Opening and then closing of the	B.	Depolarisation phase in the generation of action potential.	II.	All voltage gated sodium and potassium channels are closed.	C.	Repolarisation phase in the generation of action potential	III.	The sodium channels remain open.	D.	Absolute refractory phase.	IV.	Opening of potassium gates and the rushing of potassium
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12.	<p>Nerve fibres are surrounded by an insulating fatty layer called:</p> <p>A) Adipose sheath  <b>B) Myelin sheath</b>  C) Hyaline sheath  D) Peritoneum</p>																				
13.	<p>Which of the following disorders of eyes are caused by UV radiations?</p> <p>A) Cataract  <b>B) Glaucoma</b>  C) Dilation pupil  D) Some defect of retina</p>																				
14.	<p>The accompanying diagram shows the structure of neurons. Identity 1 to 5.</p> <div data-bbox="755 1505 1023 1921" data-label="Diagram"> </div> <p>A) 1. Nerve fibre 2. Cyton or cell body 3. Schwann cell 4. Node of Ranvier 5. Synaptic Knob  <b>B) 1. Dendrites 2. Cyton or cell body 3. Schwann cell 4. Node of Ranvier 5. Synaptic Knob</b>  C) 1. Dendrites 2. Nucleus 3. Schwann cell 4. Node of Ranvier 5. Synaptic Knob  D) 1. Dendrites 2. Cyton or cell body 3. Nerve cell 4. Node of Ranvier 5. Synaptic Knob</p>																				
15.	<p>Select the correct match of the parts of the eye given in column-I with its peculiarity in column-II.</p>																				

			Column-I		Column-II
	A.	Sclera	I.	The visible coloured portion of the eye.	
	B.	Choroid	II.	Its diameter is regulated by the muscle fibers of iris.	
	C.	Pupil	III.	Composed of a dense connective tissue	
	D.	Fovea	IV.	Portion of the retina where only the cones are densely packed	
	E.	Iris	V.	Contains many blood vessels and looks bluish in colour	
	A) A-I; B-II; C-III; D-IV; E-V		B) A-III; B-V; C-II; D-IV; E-I		
	C) A-IV; B-I; C-V; D-II; E-III		D) A-V; B-IV; C-III; D-I; E-II		
16.	The set of mixed nerve is: A) Optic, auditory, olfactory B) Auditory, trigeminal, hypoglossal C) Oculomotor, pathetic, abducens D) Vagus, facial, trigeminal				
17.	Match the parts of the ear given terms in column-I with their respective functions in column-II.				
		Column-I		Column-II	
	A.	Semicircular canal	I.	Spiral organ of Corti	
	B.	Vestibule	II.	Fluid found in the scala vestibuli and scala tympani.	
	C.	Cochlea	III.	Evaluates rotational motion	
	D.	Perilymph	IV.	Fluid found within the Organ of Corti	
	E.	Endolymph	V.	Responds to gravity and movements of the head	
	A) A-III; B-V; C-I; D-II; E-IV B) A-I; B-II; C-III; D-IV; E-V C) A-II; B-III; C-IV; D-V; E-I D) A-IV; B-I; C-V; D-II; E-III				
18.	"Jumping of the action potential" at the nodes of Ranvier is known as: A) <b>Saltatory conduction</b> B) Neurotransmission C) Recovery phase D) Active phase				
19.	The rods and cones of the eye retinal layer are modified: A) Hair B) Unipolar neurons C) <b>Bipolar neurons</b> D) multipolar neurons				
20.	Secretin and cholecystinin are digestive hormones. They are secreted in: A) Pyloric stomach B) <b>Duodenum</b> C) Ileum D) Oesophagus				
21.	Match Endocrine glands in column-I with their respective hormones in column-II and select the correct answer using the codes given below.				
		Column-I		Column-II	
	A.	Hypothalamus	I.	Relaxin	

	<table border="1"> <tbody> <tr> <td>B.</td> <td>Anterior pituitary</td> <td>II.</td> <td>Estrogen</td> </tr> <tr> <td>C.</td> <td>Testis</td> <td>III.</td> <td>FSH and LH</td> </tr> <tr> <td>D.</td> <td>Ovary</td> <td>IV.</td> <td>Androgens</td> </tr> <tr> <td></td> <td></td> <td>V.</td> <td>Gonadotropin releasing Hormone</td> </tr> </tbody> </table> <p>A) A-V; B-III; C-IV; D-II  B) A-V; B-III; C-II; D-IV  C) A-I; B-II; C-IV; D-III  <b>D) A-III; B-V; C-IV; D-II</b></p>	B.	Anterior pituitary	II.	Estrogen	C.	Testis	III.	FSH and LH	D.	Ovary	IV.	Androgens			V.	Gonadotropin releasing Hormone								
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22.	<p>Jet lag occurs when a person moves rapidly from one time zone to another, causing conflict between the body's biological rhythm and the new cycle of light and dark. Some scientists suspect that jet lag may result from disruption of a daily hormone cycle. Which of the following hormones do you think is the most likely suspect?</p> <p>A) Epinephrine  B) Insulin  <b>C) Melatonin</b>  D) Estrogen</p>																								
23.	<p>Blood calcium levels are maintained because the bones act as a calcium sink in which calcium can either be stored or procured based on the body's needs. If a person secretes too much parathyroid hormone (one possible factor in the bone disease osteoporosis), what happens to calcium levels in the body?</p> <p>A) Bone stores are depleted and the kidney move calcium.  B) Bone stores are increased and the kidney's retain calcium.  <b>C) Blood levels of calcium may read high</b>  D) Blood levels of calcium may read low</p>																								
	<p>24. When an egg is fertilized and pregnancy occurs, which of the following is correct regarding hormone concentrations?</p> <p>A) Progesterone levels drop, whereas estrogen levels remain high.  B) Both progesterone and estrogen levels drop.  C) Both progesterone and estrogen levels rise.  <b>D) Progesterone levels remain high, whereas estrogen levels drop.</b></p>																								
	<p>25. Match hormones in column-I with their functions in column-II.</p> <table border="1"> <thead> <tr> <th></th> <th>Column-I</th> <th></th> <th>Column-II</th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>Adrenaline</td> <td>I.</td> <td>Myxoedema</td> </tr> <tr> <td>B.</td> <td>Hyperparathyroidism</td> <td>II.</td> <td>Accelerates heart beat</td> </tr> <tr> <td>C.</td> <td>Oxytocin</td> <td>III.</td> <td>Salt-water balance</td> </tr> <tr> <td>D.</td> <td>Hypothyroidism</td> <td>IV.</td> <td>Childbirth</td> </tr> <tr> <td>E.</td> <td>Aldosterone</td> <td>V.</td> <td>Demineralisation</td> </tr> </tbody> </table> <p>A) <b>A-II; B-V; C-IV; D-I; E-III</b>  B) A-III; B-IV; C-V; D-I; E-II  C) A-V; B-III; C-II; D-IV; E-I  D) A-II; B-III; C-IV; D-V; E-I</p>		Column-I		Column-II	A.	Adrenaline	I.	Myxoedema	B.	Hyperparathyroidism	II.	Accelerates heart beat	C.	Oxytocin	III.	Salt-water balance	D.	Hypothyroidism	IV.	Childbirth	E.	Aldosterone	V.	Demineralisation
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	<b>VERY SHORT ANSWER TYPE QUESTIONS(1 MARK)</b>																								
<b>1</b>	Which cells of PNS secrete myelin sheath around the nerves?																								
<b>2</b>	Give function of astrocytes in the nervous system.																								
<b>3</b>	What is the covering of the nerve fascicule called?																								
<b>4</b>	How does electrical synapse differ from chemical synapse?																								
<b>5</b>	What is the function of the red nucleus?																								
<b>6</b>	Define Saltatory conduction.																								
<b>7</b>	Name the hormone secreted by Pars intermedia in lower vertebrates.																								
<b>8</b>	Which disease is caused by hypersecretion of Glucocorticoids?																								
<b>9</b>	Which organ acts as a temporary endocrine gland in females?																								
<b>10</b>	Give one role of hormone therapy.																								
<b>11.</b>	Define reflex arc.																								

12.	What is a monosynaptic reflex?
13.	Which exteroceptors are located in semicircular canals?
14.	Which receptor denotes the change in B.P.?
15.	Which is the outermost layer of the human eye?
16.	Which cells of the retina are responsible for scotopic vision?
17.	Name the structure that connects the middle ear to pharynx.
18.	What is cochlea?
19.	Name the membrane that covers the cornea?
20.	Which one of the following four glands is correctly matched with my accompanying description? A) Thyroid - Hyperactivity in young children causes cretinism. B) Thymus - Starts undergoing atrophy after puberty. C) Parathyroid - Secretes parathormone which promotes movement of sodium ions from blood into bones during calcification. D) Pancreas - Delta cells of Islets of Langerhans secrete a hormone which stimulates glycolysis in liver.
21.	Which of the following statements is not correct for the hormones? A) They act on target organs away from the source glands. B) They are secreted directly into the blood. C) They are used again and again like catalysts. D) They are produced in very minute quantities and are biologically very active.
22.	Which of the following statements is correct in relation to the endocrine system? A) Organs in the body like gastrointestinal tract, heart, kidney and liver do not produce any hormones. B) Non-nutrient chemicals produced by the body in trace amounts that act as intercellular messenger are known as hormones. C) Releasing and inhibitory hormones are produced by the pituitary gland. D) Adenohypophysis is under direct neural regulation of the hypothalamus.
23.	Which cells of the retina enable us to see coloured objects around us?
24.	There are many endocrine glands in human body. Name the endocrine gland which is absent in male and the one absent in female.
25.	What do grey and white matter in the brain represent?
26.	While travelling at a higher altitude, a person complains of dizziness and vomiting sensation. Which part of the inner ear is disturbed during the journey?
27.	Which sensory organ is involved in vertigo (sensation of oneself or objects spinning around)?
28.	A patient complains of constant thirst, excessive passing of urine and low blood pressure. When the doctor checked the patients' blood glucose and blood insulin level, the levels were normal or slightly low. The doctor diagnosed the condition as diabetes insipidus. But he decided to measure one more hormone in patients' blood. Which hormone does the doctor intend to measure?
29.	What is the function ascribed to the Eustachian tube?
<b>SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS)</b>	
1	'Injury to the medulla oblongata causes sudden death' Explain.
2	Which two hormones are responsible for the regulation of calcium and phosphorus in the blood?
3	Describe any two hormones produced by the ovaries
4	Name the glucocorticoid used in treatment of allergy and why?
5	Which hormone is secreted by the Pineal gland? What is its function?
6	Sketch and label T.S of Spinal cord.
7	Sketch and label V.S of Pituitary gland.
8	Explain any two exteroceptors with location and function.

9	Explain baroreceptors with their location and function.
10	Write a note on the lens part of the human eye.
11	Draw a well labelled diagram of Semicircular canal to show cochlea and membranous labyrinth.
12.	Write a note on rod cells and cone cells.
13.	Comment upon the role of the ear in maintaining the balance of the body and posture.
14.	Name the structures involved in the protection of the brain.
15.	What is erythropoiesis? Which hormone stimulates it?
16.	Name the only hormone secreted by pars intermedia of the pituitary gland.
17.	Name the endocrine gland that produces calcitonin and mention the role played by this hormone.
18.	Name the hormone that helps in the cell – mediated immunity.
19.	What is the role of the second messenger in the mechanism of protein hormone action?
20.	What is the difference between electrical transmission and chemical transmission?
21.	What is the role-played by luteinizing hormones in males and females respectively?
22.	What is the role of the second messenger in hormone action?
23.	George comes on a vacation to India from the US. The long journey disturbs his biological system and he suffers from jet lag. What is the cause of his discomfort?
24.	Inflammatory responses can be controlled by a certain steroid. Name the steroid, its source and also its other important functions.
25.	Mention the difference between hypothyroidism and hyperthyroidism.

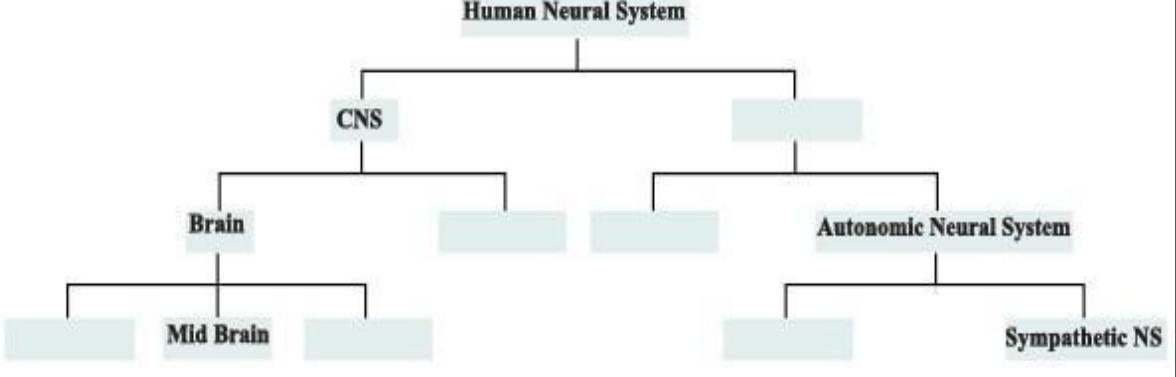
**SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS)**

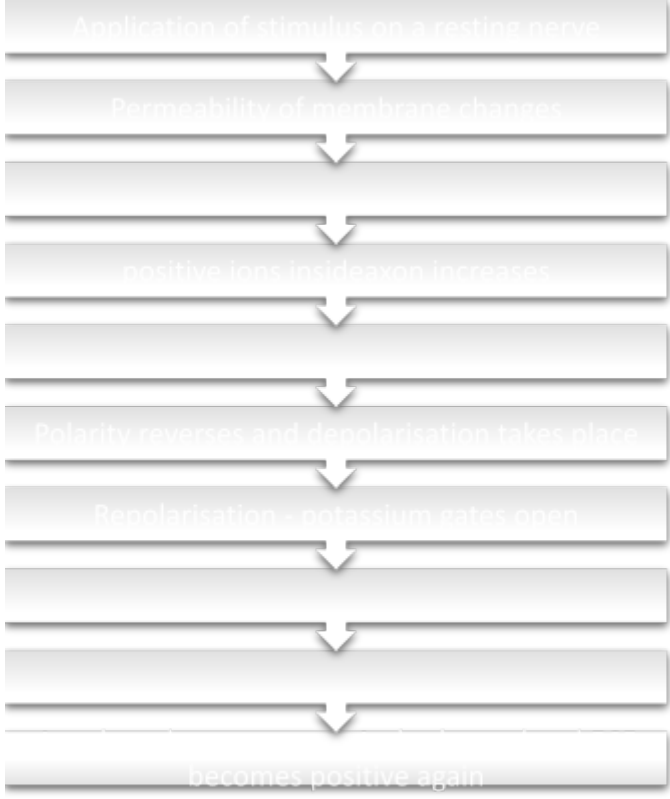
1	Write a note on the meanings of Brain.
2	Describe any three functions of hypothalamus.
3	Name three Mixed cranial nerves along with their numbers.
4	Distinguish between Cerebrum and Cerebellum.

5 Answer the questions after observing the diagram given below.

The diagram shows a cross-section of an ovarian cell membrane. A hormone molecule (represented as a black oval) is shown binding to a specific receptor protein embedded in the membrane. This binding event is labeled 'Response 1'. Below the membrane, a vertical arrow points to the text '(Generation of second messenger) (Cyclic AMP or Ca<sup>2+</sup>)'. A second vertical arrow points to 'Biochemical responses', and a final vertical arrow points to 'Physiological responses (e.g., ovarian growth)'. The entire diagram is captioned 'MECHANISM OF HORMONAL ACTION'.

- 1) What acts as the first messenger?
- 2) Why can't hormones like catecholamines enter their target cells through plasma membranes?
- 3) Name the mode of hormone action shown in the diagram.

<p><b>6</b></p>	<p>Complete the table based on disorders caused due to under secretion or over secretion of Thyroid gland.</p> <table border="1" data-bbox="272 182 873 408"> <thead> <tr> <th>Secretion</th> <th>Adults</th> <th>Children</th> </tr> </thead> <tbody> <tr> <td>Hypo secretion</td> <td></td> <td></td> </tr> <tr> <td>Hyper secretion</td> <td></td> <td></td> </tr> </tbody> </table>	Secretion	Adults	Children	Hypo secretion			Hyper secretion		
Secretion	Adults	Children								
Hypo secretion										
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<p><b>7</b></p>	<p>Give the names of the hormones released by neurohypophysis. A boy shows excessive thirst and micturition because of deficiency of a hormone secreted by neurohypophysis. Name the disease he is suffering from.</p>									
<p><b>8</b></p>	<p>Differentiate between cranial reflex and spinal reflex.</p>									
<p><b>9</b></p>	<p>Describe the structure of choroid / uvea.</p>									
<p><b>10</b></p>	<p>Draw diagram of human eye showing pupil, vitreous humor, optic nerve, sclera, retina and choroid.</p>									
<p>11.</p>	<p>The major parts of the human nervous system are shown below. Fill in the empty boxes with appropriate words.</p> 									
<p>12.</p>	<p>On an educational trip to Uttaranchal, Ketki and her friends observed that many local people were having swollen necks. Please help Ketki and her friends to find out the solutions to the following questions.</p> <ol style="list-style-type: none"> <li>Which probable disease are these people suffering from?</li> <li>How is it caused?</li> <li>What effect does this condition have on pregnancy?</li> </ol>									
<p>13.</p>	<p>State whether true or false:</p> <ol style="list-style-type: none"> <li>Gastrointestinal tract, kidney and heart also produce hormones.</li> <li>Pars distalis produces six trophic hormones.</li> <li>Insulin resistance results in a disease called diabetes mellitus.</li> </ol>									
<p>14.</p>	<p>Neural system and computers share certain common features. Comment in five lines. (Hint: CPU, input-output devices).</p>									
<p>15.</p>	<p>Correct the following statements by replacing the term underlined.</p> <ol style="list-style-type: none"> <li>Insulin is a <u>steroid</u> hormone.</li> <li><u>TSH</u> is secreted from the corpus luteum</li> <li><u>Tetraiodothyronine</u> is an emergency hormone.</li> </ol>									
<p>16.</p>	<p>Arrange the following in the order of reception and transmission of sound wave from the ear drum: Cochlear nerve, external auditory canal, ear drum, stapes, incus, malleus, cochlea.</p>									
<p>17.</p>	<p>A sample of urine was diagnosed to contain high content of glucose and ketone bodies. Based on this observation, answer the following:</p> <ol style="list-style-type: none"> <li>Which endocrine gland and hormone is related to this condition?</li> </ol>									

	b. Name the cells on which this hormone acts. c. What is the condition called and how can it be rectified?
	<b>LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS)</b>
1	Describe the functional areas of Cerebrum.
2	Distinguish between Sympathetic and parasympathetic nervous systems.
3	Describe any four hormones secreted by Adenohypophysis.
4	Write a note on the four different kinds of cell in Pancreas.
5	Complete the flowchart of the process of conduction of nerve impulse.  
6	Describe the structure of the human external ear.
7.	Explain the structure of the retina with the help of a labelled diagram.
8.	Name the parts of the human forebrain indicating their respective functions.
9.	Explain the structure of the middle and internal ear with the help of a diagram.
10.	Calcium plays a very important role in the formation of bones. Write on the role of endocrine glands and hormones responsible for maintaining Calcium homeostasis.
11.	Illustrate the differences between the mechanism of action of a protein and a steroid hormone.
12.	Hypothalamus is a super master endocrine gland. Elaborate.





## 10. HUMAN HEALTH AND DISEASES

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)	
1	Immunity acquired after an infection is _____ immunity A. Artificial Acquired B. Passive C. Innate <b>D. <u>Natural Acquired</u></b>
2	Passive immunity is _____. A. Acquired through natural overt or latent infection B. Acquired through Vaccination <b>C. <u>Acquired through readymade antibodies</u></b> D. Acquired by activating immune system of the body
3	'Pathogens' are _____ A. Substances produced against any disease. B. Chemical substances produced by the host cells to kill the parasite animal. <b>C. <u>Disease causing organisms.</u></b> D. Cells which kill the parasites
4	Which one of the following diseases is communicable? A. Rickets <b>B. <u>Malaria</u></b> C. Diabetes D. Scurvy
5	Which one of the following is the most accurate definition of the term 'health'? A. Health is the state of body and mind in a balanced condition. B. Health is the reflection of a smiling face. <b>C. <u>Health is a state of complete physical, mental and social well-being.</u></b> D. Health is the symbol of economic prosperity.
6	AIDS is caused by _____ A. Fungus <b>B. <u>Virus</u></b> C. Bacterium D. Helminth worm
7	A person preparing food in an unhygienic place can be a major source of spread of disease _____ A. Pneumonia B. Syphilis <b>C. <u>Typhoid</u></b> D. Cancer
8	Carcinoma is cancer of _____ cells. <b>A. <u>Epithelial</u></b> B. Connective tissue C. Bone D. Blood
9	Inactive gene that can cause cancer is called _____ A. Transposon <b>B. <u>Proto-oncogene</u></b> C. Tumour promoter gene D. Tumour suppressor gene

10	antiviral proteins released by cells infected by the virus are called _____ A. histamines <b>B. interferons</b> C. pyrogens D. allergens
11.	Smack is another name of ---- a) hashish <b>b) heroin</b> c) Atropa d) ganja
12.	The disease-causing agent is called as--- <b>a) pathogen</b> b) carrier c) vector d) vaccine
13.	Both B-cells and T-cells are derived from----- a) lymph nodes b) thymus gland c) liver <b>d) stem cells in bone marrow</b>
14.	Cancer of cervix is caused by <b>a) Human Papillomavirus</b> b) pep pills c) Epstein Barr virus d) fatty diet
	<b>VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)</b>
1	Define 'Health', as given by WHO.
2	What are Non-communicable diseases?
3	Name the causative pathogen of Ascariasis.
4	What is 'serology'?
5	Name the vector of malaria pathogens.
6	What are congenital diseases?
7	Name the vector of pathogen responsible for filariasis.
8	When a drug addict is not allowed to take drugs he shows certain typical symptoms. What are these symptoms termed as?
9	What is 'Leukemia'?
10	Define 'Adolescence'.
11.	Name the fish used to control mosquito larvae.
12.	Name the oral vaccine used for prevention of typhoid.
13.	What is Antigen?
	<b>SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS)</b>
1	Enlist the four types of T- lymphocytes, responsible for immune response of our body

2	Enlist any four barriers that contribute to innate immunity.
3	Enlist any four therapies used to treat a cancer patient.
4	Give any four the symptoms of Ascariasis.
5	State the significance of mother's milk to a new-born.
6	Enlist any two features of Acquired immunity.
7	Sketch and label – Structure of Antibody
8.	Draw schematic representation of the life cycle of Ascaris.
9.	Mention any four symptoms of Ascariasis.
10.	Explain carcinoma and lymphoma as types of cancer.
11.	Draw a well labelled diagram of HIV.
12.	Mention any four causes of drug addiction.
13.	Give any two modes of transmission of typhoid.
<b>SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS)</b>	
1	When the ELISA test was conducted on an immune-suppressed person, he tested positive for a pathogen. a) Identify the disease the patient is suffering from. b) Name the causative entity. c) Mention the cells of the body that are attacked by the pathogen.
2	Explain the importance of epithelial surface in innate immunity.
3	Explain any three causes of substance abuse during adolescence.
4	Explain the three stages of adolescence.
5	Give the preventive measures of AIDS
6	a) How is a tumor formed in the body? b) What are the two types of tumor? c) Which of these undergoes metastasis?
7	Explain the mode of transmission of HIV.
8.	Explain three main functions of free antibodies.
9.	Differentiate between active immunity and passive immunity
10.	Give various symptoms of malaria.
<b>LONG ANSWER TYPE QUESTIONS (LA) ( 4 MARKS EACH)</b>	
1	Explain the various types of acquired immunity.
2	Explain the clinical manifestation of AIDS.
3	Explain any four therapies used in treatment of cancer.
4.	Explain any four preventive measures for Slim disease.



	<p>B. Drones  <b>C. Queen bee</b>  D. Cater</p>
12	<p>Leaves of which plant are used to feed silkworm?  A. Mango  B. Tulsi  <b>C. Mulberry</b>  D. Strawberry</p>
13.	<p>Identify the marine water fish from the following-  A. Common carp  B. Catla  C. Silver carp  <b>D. Pomphret</b></p>
14.	<p>The percentage of methane in biogas is about  a) 30-40%  b) 0-3%  <b>c) 50-60%</b>  d) 60-70%</p>
15.	<p>Mule is produced through-----  a) inbreeding  b) artificial insemination  <b>c) Interspecific hybridisation</b>  d) outbreeding</p>
16.	<p>Microbial source of vitamin C is  <b>a) <i>Aspergillus niger</i></b>  b) <i>Pseudomonas denitrificans</i>  c) <i>Neurospora gossypi</i>  d) Yeast</p>
17.	<p>--- is a variety of wheat developed against leaf and stripe rust.  a) Pusa Sadabahar  b) Pusa Shubhra  c) Pusa Swarnim  <b>d) Hingiri</b></p>
<b>VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)</b>	
1	What is biofortification?
2	Name biofortified wheat variety for high protein content.
3	What is the main function of a fermenter?
4	Name the chamber in which the suspended objects are filtered and removed during sewage treatment?
5	What is mycorrhiza?
6	Name the tank to which the sewage water is passed after the preliminary treatment?
7	What are flocs with respect to sewage treatment
8	Small part of activated sludge is passed back into the primary sedimentation tank. If the above statement is correct then rewrite as it is and in case it is incorrect then reframe it.

9	When was plant breeding started?												
10	Define germplasm collection.												
11	Which sugarcane variety is grown in north India?												
12	Name the variety of flat bean developed for insect and pest resistance.												
13	What is explant?												
14	What is MOET?												
15	Aspergillosis and Favus are poultry diseases. What is the causative agent for these diseases?												
16	What is monoculture fishery?												
17	Define breed.												
18	What is the biological name of a little bee?												
19.	What is heterosis?												
20.	Name the technique used to increase the herd size.												
21.	Name the microbe used to produce cellulase enzymes.												
<b>SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS)</b>													
1	Rearrange the names of tanks used in sewage treatment as per the flow of procedure. a) settling tank b) Grit Chamber c) aeration tanks d) primary sedimentation tank.												
2	Give names of two organisations which provide most commonly used models of biogas plants.												
3	A young girl is health conscious. Her dietician advised her to include mushrooms in her diet. What must be the reason?												
4	Match column A with B and rewrite correct pairs. <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> </tr> <tr> <td>i. Atlas 66</td> <td>a) vit A</td> </tr> <tr> <td>ii. Rice</td> <td>b) vit C</td> </tr> <tr> <td>iii. Spinach</td> <td>c) protein</td> </tr> <tr> <td>iv. bitter gourd</td> <td>d) Iron</td> </tr> </table>	A	B	i. Atlas 66	a) vit A	ii. Rice	b) vit C	iii. Spinach	c) protein	iv. bitter gourd	d) Iron		
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5	Name two bacteria which are responsible for fermenting dough of idli, dosa.												
6	Name two acids produced by using <i>Aspergillus niger</i> ?												
7	Name two amino acids found in fortified Maize variety?												
8	Explain plant breeding for disease resistance with suitable examples.												
9	Differentiate between callus culture and suspension culture.												
10	Enlist various steps involved in hybridization technique in sequence.												
11	Give any two advantages of micropropagation.												
12	SCP is useful and is a source of protein. Give two examples of bacteria used as a source of SCP.												
13	Give an account of dairy farm management.												
14	Draw a diagram of artificial bee hive to show any two of honey super, entrance reducer, queen excluder and hive bodies.												
15	Give an account of lac culture.												
16	Physiological, biochemical and morphological characters of crop plants provide resistance. Explain this with suitable examples												
17	Match the columns poultry disease and causative agent:- <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Poultry disease</th> <th style="width: 50%;">Causative agent</th> </tr> </thead> <tbody> <tr> <td>1) Chronic respiratory disease</td> <td>A) Fungal disease</td> </tr> <tr> <td>2) Favus and thrush</td> <td>B) Parasitic disease</td> </tr> <tr> <td>3) Caecal worm infection</td> <td>C) Viral disease</td> </tr> <tr> <td>4) Coccidiosis</td> <td>D) Bacterial disease</td> </tr> <tr> <td></td> <td>E) Protozoan disease</td> </tr> </tbody> </table>	Poultry disease	Causative agent	1) Chronic respiratory disease	A) Fungal disease	2) Favus and thrush	B) Parasitic disease	3) Caecal worm infection	C) Viral disease	4) Coccidiosis	D) Bacterial disease		E) Protozoan disease
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	E) Protozoan disease												

18 Identify the stages of life cycle of silkworm in the following diagram,

19 Fruit orchards and flowering plants largely depend on gibberellins. Can you explain this?

20 Complete the following table with respect to microbes and any one of their hosts:-

Column-I	Column –II
1) <i>Bacillus thuringiensis</i>	a)
2) <i>Zoothora radicans</i>	b)
3) <i>Nosema locustae</i>	c)
4) <i>Granulovirus</i>	d)

21. Identify A, B, C, and D in the following:-

**SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS)**

1	Match the column A with B and rewrite correct pairs								
	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 50%;">A</td> <td style="text-align: center; width: 50%;">B</td> </tr> <tr> <td>I. Mycoherbicides</td> <td>a) <i>Cactoblastis</i></td> </tr> <tr> <td>II. Bacterial herbicides</td> <td>b) <i>Alternaria</i></td> </tr> <tr> <td>III. Insects as herbicides</td> <td>c) <i>Xanthomonas</i></td> </tr> </table>	A	B	I. Mycoherbicides	a) <i>Cactoblastis</i>	II. Bacterial herbicides	b) <i>Alternaria</i>	III. Insects as herbicides	c) <i>Xanthomonas</i>
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III. Insects as herbicides	c) <i>Xanthomonas</i>								
2	State any three benefits of using Biogas.								
3	Write chemical reactions to represent Methanogenesis.								
4	Describe the structure of a biogas plant.								
5	State any three benefits of mycorrhiza.								
6	State any three benefits of Biofertilizers.								
7	Match column A with B and rewrite correct pairs.								
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> </tr> </thead> <tbody> <tr> <td>1) citric acid</td> <td>a) in medicine for solubility of <math>Ca^{++}</math></td> </tr> <tr> <td>2) fumaric acid</td> <td>b) confectionary</td> </tr> <tr> <td>3) gluconic acid</td> <td>c) in resins as wetting agents</td> </tr> </tbody> </table>	A	B	1) citric acid	a) in medicine for solubility of $Ca^{++}$	2) fumaric acid	b) confectionary	3) gluconic acid	c) in resins as wetting agents
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8	Write an account of Indian hybrid crops.												
9	Write an account of mutation breeding.												
10	How aseptic conditions are maintained in tissue culture?												
11	Explain sericulture in detail.												
12.	<p>Identify A, B and C in the following diagram and answer the following questions:-</p> <div style="text-align: center;"> </div> <p>i) ----- is responsible for maintenance of bee hives, collection of pollen and nectar.  ii) The mother of the beehive is -----.  iii) Which one of the above is less in number and develops parthenogenetically ?</p>												
13.	Differentiate between callus culture and suspension culture.												
14.	<p>Complete the following table based on pest resistant varieties of plants,</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Crop</th> <th>Variety</th> <th>Insect pest</th> </tr> </thead> <tbody> <tr> <td>1) Brassica</td> <td>a) -----</td> <td>i) Aphids</td> </tr> <tr> <td>2) Flat bean</td> <td>b) curl blight black rot</td> <td>ii) -----</td> </tr> <tr> <td>3) -----</td> <td>c) Pusa A-4</td> <td>iii) shoot and fruit borer</td> </tr> </tbody> </table>	Crop	Variety	Insect pest	1) Brassica	a) -----	i) Aphids	2) Flat bean	b) curl blight black rot	ii) -----	3) -----	c) Pusa A-4	iii) shoot and fruit borer
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2	Explain the process of sewage water treatment before it can be discharged into natural bodies.												
3	<p>Match column A with B and rewrite correct pairs.</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><b>A</b></td> <td style="text-align: center;"><b>B</b></td> </tr> <tr> <td>i. Symbiotic N<sub>2</sub> fixing bacteria</td> <td>a) VAM</td> </tr> <tr> <td>ii. Free-living N<sub>2</sub> fixing bacteria</td> <td>b) Rhizobium</td> </tr> <tr> <td>ii. Phosphate solubilizer</td> <td>c) Nostoc</td> </tr> <tr> <td>v. Endomycorrhizae</td> <td>d) Micrococcus</td> </tr> </table>	<b>A</b>	<b>B</b>	i. Symbiotic N <sub>2</sub> fixing bacteria	a) VAM	ii. Free-living N <sub>2</sub> fixing bacteria	b) Rhizobium	ii. Phosphate solubilizer	c) Nostoc	v. Endomycorrhizae	d) Micrococcus		
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4	Define plant breeding. Mention any three objectives of plant breeding.												
5	<p>Mention various advantages of single cell protein.  6. Mention different advantages of micropropagation.  7. Complete the following table based on antibiotic and its microbial source.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Antibiotic produced</th> <th>Microbial source</th> </tr> </thead> <tbody> <tr> <td>1) Terramycin</td> <td>a)</td> </tr> <tr> <td>2) Griseofulvin</td> <td>b)</td> </tr> <tr> <td>3) Erythromycin</td> <td>c)</td> </tr> <tr> <td>4) Streptomycin</td> <td>d)</td> </tr> </tbody> </table>	Antibiotic produced	Microbial source	1) Terramycin	a)	2) Griseofulvin	b)	3) Erythromycin	c)	4) Streptomycin	d)		
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## 12. BIOTECHNOLOGY

<b>MULTIPLE CHOICE QUESTIONS ( 1 MARK EACH)</b>	
<b>1</b>	The technique which involves addition or deletion of genes is.... <b>A <u>genetic engineering</u></b> B gene therapy C gene splicing D gene piracy
<b>2</b>	ECoRI is obtained from... A <i>Escherichia coli</i> R13 <b>B <u>Escherichia coli Ry13</u></b> C <i>Escherichia coli</i> R225 D <i>Escherichia coli</i> RC
<b>3</b>	The enzyme restriction endonuclease ... <b>A <u>cuts double strand of DNA</u></b> B joins strand of DNA C cuts RNA strand D cuts single stranded DNA
<b>4</b>	Ti plasmid being used for introducing genes in plants obtained from.... A <i>Agrobacterium rhizogenes</i> B <i>Escherichia coli</i> C <i>Agrobacterium</i> T20 <b>D <u>Agrobacterium tumefaciens</u></b>
<b>5</b>	Polymerase chain reaction is most useful in.... <b>A <u>DNA amplification</u></b> B DNA synthesis C protein synthesis D selective replication of DNA
<b>6</b>	In Bt cotton a transgenic plant, Bt refers to.... A bold cotton <b>B <u>Bacillus thuringiensis</u></b> C beta carotene D tumor inducing bacteria
<b>7</b>	In transgenic crop substance provitamin A is obtained in.... <b>A <u>rice</u></b> B tomato C canola D sugarcane
<b>8</b>	In Anaemia the Recombinant protein....is produced by r-DNA technology. A Relasein <b>B <u>Insulin</u></b> C Erythroprotein D Antoittrpsin
<b>9</b>	In biotechnology GMO refers to.... A generation mediated organisms <b>B <u>genetically modified organisms</u></b> C good modified organisms D gross modified organisms
<b>10</b>	First biopatent to genetically engineered bacterium.... <b>A <u>Pseudomonas</u></b> B <i>Agrobacterium</i> C <i>Azatobacter</i> D <i>E. coli</i> .
<b>11.</b>	For improved nutritional qualities, the genes for ferritin protein isolated from ..... & .....have been transferred to rice. A cotton, Tomato

	<p><b>B soybean, <i>Phaseolus</i></b>  C soybean , carrot  D rice, sugar beet</p>
12.	<p>In the tomato the enzyme ..... breaks down the cell wall constituent-pectin, leading to softening of fruit during ripening. Thus, the fruits are easily bruised and damaged on shipment.  <b>A polygalacturonase</b>  B Laccase  C Esterase  D Peroxidase</p>
13.	<p><b>Insulin</b> is a peptide hormone produced by ..... of islets of Langerhans of pancreas.  A. <math>\alpha</math> – cells  B. <b><math>\beta</math>-cells</b>  C. <math>\delta</math> –cells  D. All of the above</p>
14.	<p>Bacteriophage refers to the .....  A. Bacterium that kills virus  B. <b>Virus that attacks bacterial cells</b>  C. Viruses  D. A special type of DNA found in a few bacterial cells.</p>
15.	<p><b>Assertion:</b> Restriction endonucleases cut the DNA at the specific sites called restriction sites.  <b>Reason:</b> All restriction enzymes have the same restriction sites.  A. Both assertion and reason are true and reason is the correct explanation of assertion.  B. Both assertion and reason are true, but reason is not the correct explanation of assertion.  C. <b>Assertion is correct but the reason is incorrect.</b>  D. Both Assertion and reason are incorrect.</p>
16.	<p>The results of PCR reactions are usually made visible by  <b>A. Gel electrophoresis</b>  B. DNA fingerprinting  C. Southern blotting  D. DNA sequencing</p>
17.	<p>Which of the following is incorrectly matched pair:  A. PCR Primers- short pieces of Single stranded DNA  B. <b>Extension- 3' to 5'</b>  C. Denaturation- Breaks the hydrogen bond to make DNA single stranded  D. dNTPs- for the synthesis of DNA strand</p>
	<p><b>VERY SHORT ANSWER TYPE QUESTIONS ( 1 MARK EACH )</b></p>
1	In which transgenic plant the substance Flavonoids obtained as antioxidants.
2	What is Germline therapy?
3	Recombinant proteins are obtained for Hepatitis-B by r-DNA technology.
4	What is plasmid?
5	What is a Palindromic sequence?
6	Alu-I is obtained from which organism?
7	What is the role of Taq-polymerase in PCR technology?
8	Bt-cotton shows adverse effects on the population of which butterfly?
9.	Name a transgenic food crop used to reduce vitamin A deficiency disease.
10.	Which vector is the most used in rDNA technology in plants ?

11.	Name the organization which makes decisions regarding the validity of research involving GMOs and addresses the safety of GMOs introduced for public use
12.	Explain the term : <b>Chimeric DNA</b>
13.	Give one advantage of the edible vaccines received from transgenic plants
14.	Which plasmid vector is generally used for carrying new DNA into many types of plants?
15.	Which Bond from a polynucleotide chain is the target of restriction enzymes?
<b>SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS)</b>	
1	What is Biopiracy? Explain it with respect to Turmeric.
2	How is Biotechnology applicable with respect to Genomics?
3	Explain how transgenic fish is commercially beneficial.
4	Write any two human disorders and to cure which recombinant proteins are produced?
5	For production of edible vaccines plants are used. Explain this in any one example.
6	Write a note on uses of somatic cell gene therapy.
7	Define vectors? write any two examples,
8.	Explain the term bio patent. Add a note on three parts of a patent.
9.	Give examples of common foods which are proposed for edible vaccine delivery.
10.	Write a note on somatic cell gene therapy.
11.	Write a note on germline gene therapy.
12.	Give applications of gene therapy
13.	Which enzyme is commonly called 'molecular scissor' of genetic engineering? Give one example also
14.	Write a note on restriction enzymes.
15.	Enlist the techniques used for transfer of Recombinant DNA into suitable competent hosts.
16.	Enlist any four main objectives for improved animal breeding programs coupled with rDNA technology.
17.	Explain the recognition site of restriction enzyme with one example
<b>SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS)</b>	
1	Explain traditional use of Biotechnology.
2	Define biotechnology? Which are the basic principles and processes of biotechnology?
3	What is gene cloning? Explain different tools used for it.
4	Explain types of enzymes used in biotechnology?
5	What is Recognition sequence? Explain in brief.
6	Define Biotechnology? How it is used in production of Human insulin.
7	What is a GM plant? Write its different advantages.
<b>LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS)</b>	
1	What is PCR? Explain different steps involved in it.
2	Explain the following terms with respect to rDNA technology i) passenger DNA ii) Chimeric DNA iii) Transformed cell iv) restriction site
3	Define biotechnology. Give any three applications of it?
4	Which are the different adverse effects of biotechnology on human health and environment?
5	Explain biopatent and Biopiracy with different examples?

### 13. ORGANISMS AND POPULATION

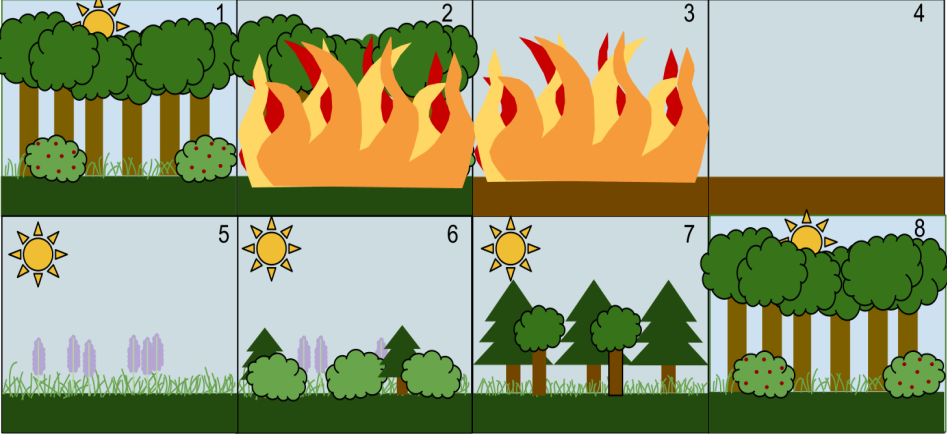
<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	<p>An association of individuals of different species living in the same habitat and having functional interactions is called as...</p> <p><b>A <u>biotic community.</u></b>            B population.            C ecosystem.            D tropical niche.</p>
<b>2</b>	<p>Community is defined as....</p> <p>A Group of similar Angiosperms.  <b>B <u>interacting populations.</u></b>            C interacting ecosystem            D group of mangroves.</p>
<b>3</b>	<p>Regional and local variations within each biome lead to the formation of variety of...</p> <p><b>A <u>Habitats</u></b>            B niches            C species            D genus</p>
<b>4</b>	<p>Maximum absorption of rainfall water is done by....</p> <p><b>A <u>tropical evergreen forest.</u></b>            B tropical deciduous forest.            C coniferous forest.            D deserts</p>
<b>5</b>	<p>The cattle egret and grazing cattle in close association is a classic example of...</p> <p>A. Mutualism.            B. Parasitism.  <b>C. <u>Commensalism.</u></b>            D. Competition</p>
<b>6</b>	<p>The ecological niche of the population is a ...</p> <p>A geographical area where it lives.  <b>B <u>set of conditions and resources that it uses.</u></b>            C habitat of organisms            D place of origin of organisms</p>
<b>7</b>	<p>Tropical dense forests are due to...</p> <p>A high rainfall and low temperature  <b>B <u>high rainfall and warm temperature</u></b>            C low rainfall and high temperature            D low rainfall and low temperature</p>
<b>8</b>	<p>Polar bears show hibernation during...</p> <p><b>A <u>winter</u></b>            B summer            C rainy season            D favourable conditions</p>
<b>9</b>	<p>In the Logistic growth curve lag phase shows...</p> <p>A fast growth  <b>B <u>initial stage of growth</u></b>            C stationary phase of growth            D diminishing phase of growth</p>
<b>10</b>	<p>The number of deaths under ideal conditions is known as</p> <p><b>A. <u>Absolute mortality</u></b>  <b>B. Realized mortality</b></p>

	<p>C. Absolute natality D. Realized natality</p>
11.	<p>Select incorrect pair in terms of adaptations in animals: a. Aestivation: Some snails b. Conformer: Polar bear c. Migration: All birds d. Hibernation: All fishes</p>
12.	<p>Select the unit for measurement of salinity of a waterbody. A. .ppm B. mg of Hg C. units/cc D. ppt</p>
13.	<p>Which of the following processes will lead to decrease in population density? a. New births and emigration b. Death and immigration c. New births and immigration d. <b>Death and emigration</b></p>
	<p>14. Which of the following birds is called parasitic? a. Hariyal b. Baya c. <b>Asiatic koel</b> d. White peacock</p>
<b>VERY SHORT ANSWER TYPE QUESTIONS ( 1 MARK EACH)</b>	
1	Define Absolute Mortality.
2	How absolute Natality differs from Realized Natality.
3	What is population ecology?
4	Define the term spatial niche.
5	What is ESS?
6	Define the term Habitat.
7	Rearrange the terms population, Biome, Community and Organisms in ecological hierarchy
8	What does Allen's rule indicate in adaptation?
9.	Give example of co-evolution
10.	At which stage of lifecycle does the monarch butterfly acquire distasteful chemical
11.	Why do exotic species turn invasive?
12.	State any two means by which plants protect themselves from herbivores.
<b>SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS)</b>	
1	Show the graphical representation of mean annual rainfall with respect to mean annual temperature.
2	Define the term Biome and population.
3	How does Habitat differ from Niche?
4	How 'Temperature' as an abiotic factor plays a role in ecology?
5	Define the term Adaptation. State its two advantages.
6	What is Mortality? What are its two types?
7	Define the term population interactions. State its two types
8.	Predators in nature are 'prudent'. Give a reason.
9.	Which are the efficient reproductive strategies adapted by the animals under certain set of selection pressures? Give examples of the same.
<b>SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS)</b>	
1	Define Niche with its different types.
2	Define mutualism. Explain its one type.
3	Explain any three important characteristics of the population.
4	Explain different population interactions with examples.

5	What is Commensalism? Explain it with suitable examples.
6	Explain the role of any three abiotic factors affecting the environment.
7	Explain different types of growth models.
	<b>LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)</b>
1	Define population growth. Explain different types of age pyramids.
2	Which are different biotic and abiotic factors involved in ecology and how they play their role?
3	What is population interaction? Explain the interactions in Mutualism and Competition.

## 14. ECOSYSTEMS AND ENERGY TRANSFER

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	Lichens taking roots on bare rocks are an example of _____. A. climax community <b>B. pioneer species</b> C. climax species D. secondary succession
<b>2</b>	Growth of new grasses and shrubs on a patch of forest burnt down by forest fire, is a an example of _____. A. <b>secondary succession</b> B. pioneer species C. climax species D. primary succession
<b>3</b>	All types of ecological succession whether on land or in water always reaches _____. A. <b>climax community</b> B. pioneer species C. climax species D. secondary succession
<b>4</b>	Secondary consumers are A. herbivores B. producers <b>C. Carnivores</b> D. autotrophs
<b>5</b>	Which of the following statements is incorrect for the energy pyramid? A. It shows energy content of different trophic levels B. Its base is broad <b>C. It always inverted</b> D. It is always upright.
<b>6</b>	Which one of the following is not a functional unit of the ecosystem? A. energy flow B. decomposition C. productivity <b>D. stratification</b>
<b>7.</b>	Humus is <b>A. dark coloured, amorphous, colloidal organic matter rich in nutrients</b> B. contains only cellulose C. red coloured matter D. product of photosynthesis
<b>8.</b>	Animal assisted therapies are categorized under _____ services of ecosystems. a. supportive <b>b. cultural</b> c. regulating d. provisioning
<b>9.</b>	Which of the following groups of living beings are not given a place in ecological pyramids? a. Omnivores b. Heterotrophs <b>c. Saprophytes</b> d. Detritivores
<b>10.</b>	Which biogeochemical cycle can be a part of eutrophication? a. Water b. Carbon c. Nitrogen <b>d. Phosphorus</b>

11.	Select an odd one out in terms of stratification in open seas. a. benthic b. epipelagic <b>c. littoral</b> d. mesopelagic
<b>VERY SHORT ANSWER TYPE QUESTIONS(1 MARK EACH)</b>	
1	What is 'Sere'?
2	Define 'Ecological succession'
3	What is 'Climax community'?
4	Define zonation.
5	Define gross primary productivity.
6	What do you understand by the term PAR?
7	What is the 10% law of energy transfer?
8	What is the reservoir of carbon on the earth?
9	What is the cause of eutrophication?
10	What is fragmentation?
11.	State two major causes of increase in CO <sub>2</sub> levels in the atmosphere.
12.	What are the two types of nutrient cycles?
13.	Where do we find inverted biomass pyramids?
14.	State the forms of zonation found at the edge of a large lake.
<b>SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS)</b>	
1	Name the types of succession of plants based on the nature of habitat.
2	Give reasons – 'Primary succession is always slower than secondary succession'
3	Differentiate between stratification and zonation.
4	Explain grazing food chains with suitable examples.
5	Write a note on the pyramid of numbers.
6	Give reasons, ' pyramid of energy is always upright.
7	Explain any three categories of ecosystem services.
8.	Explain the stratification found in a forest and in an open sea.
9.	What are artificial ecosystems? Explain with examples.
10.	Food chains are always interconnected to form a food web. Justify.
11.	Differentiate between Carbon cycle and Phosphorus cycle.
<b>SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS)</b>	
1	What are 'pioneer species'? Give two examples of them.
2	Explain the following sequence of succession after a forest fire. 
3	Explain the process of decomposition in detail.
4	Write an account of the carbon cycle.
5	Describe the sedimentary cycle you have studied.
<b>LONG ANSWER TYPE QUESTIONS (LA-) (4 MARKS)</b>	
1	Explain the progress of ecological succession in newly formed volcanic islands.



## 15. BIODIVERSITY, CONSERVATION AND ENVIRONMENTAL ISSUES

<b>MULTIPLE CHOICE QUESTIONS (1 MARK EACH)</b>	
<b>1</b>	Dodo birds, stellar sea cows and passenger pigeons are few examples of extinction due to _____. A habitat loss B hunting C Alien species invasion <b>D overexploitation.</b>
<b>2</b>	Select the odd example with respect to types of conservation strategies. A Pawra tribals in Satpuda have protected varieties of corn with different coloured kernels. B Kanha forest as tiger reserve. <b>C Crocodile bank of Chennai</b> D Sacred groves
<b>3</b>	India boasts a handsome share of ____ % of the total biodiversity wealth of the earth. A 2.4 <b>B 8.1</b> C 14 D 22
<b>4</b>	Measurement rate of O <sub>2</sub> consumption in unit volume of water is A. biogas generation <b>B. Biological oxygen demand</b> C. Biosynthesis pathway D. Fermentation
<b>5</b>	In a coal fired power plant, electrostatic precipitator is used to control emission of A. Oxides of nitrogen <b>B. SPM</b> C. CO D. oxides of sulphur
<b>6</b>	E. coli is used as an indicator to determine pollution of water with A. heavy metals <b>B. faecal matter</b> C. industrial effluents D. Pollen of aquatic plants
<b>7.</b>	Which of the following is not the component of greenhouse gases? A. methane B. carbon dioxide C. CFC <b>D. ozone</b>
	<b>8.</b> Community is defined as.... a) Group of similar Angiosperms. <b>b) interacting population</b> c) interacting ecosystem d) group of mangroves
	9. Regional and local variations within each biome lead to the formation of variety of <b>a) habitats</b> b) niches c) species d) genus
	10. Maximum absorption of rainfall water is done by <b>a) tropical evergreen forest</b> b) tropical deciduous forest c) coniferous forest

	d) desert
	11. Polar bears show hibernation during a) winter b) summer c) rainy season d) favourable conditions
	<b>VERY SHORT ANSWER TYPE QUESTIONS(1 MARK EACH)</b>
1	What is 'Hello Forest'?
2	Name the Japanese method of plantation adapted by our government.
3	A medicinal plant <i>Rauwolfia vomitoria</i> shows variations in concentration of reserpine from location to location. What type of level of biodiversity is this?
5	What is CPCB?
6	What is the use of a catalytic converter?
7	What is thermal pollution?
8	What does high level of BOD of water indicate?
9	Name the gas emitted by the fire extinguisher?
10	Which radiations are responsible for snow blindness?
11	Which treaty was signed in Canada about the effects of ozone?
12.	In IUCN Red List 2004, what does 'Red' represent?
13.	What is sacred grove?
14.	A lake in a city was examined for its water qualities. It was found that the BOD value was very high for that lake water. What can you predict about the water quality of the lake?
	<b>SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS)</b>
1	Write full form of ___ i) IUCN ii) NBA
2	Give any four factors that favour high speciation at lower altitudes.
3	With the help of any one example explain Alien species invasion as one of the causes of Biodiversity losses.
4	Mention various effects of air pollution.
5	Explain working of electrostatic precipitators.
6	Write a note on noise pollution.
7	Write a note on global warming.
8	Explain any two methods to reduce sewage water.
9	Draw a flow chart showing eutrophication.
10	What is deforestation? Mention any two effects of deforestation
11.	How can an electrostatic precipitator be used to control air pollution?
12.	State various ill effects of ozone depletion
13.	Write a note on natality.
14	Give an account of predation.
15	Mutualism is positive interaction. Explain with examples.
16.	Define a niche. Explain its different types.
17	Explain the role of light and water on the environment.
	<b>SHORT ANSWER TYPE QUESTIONS(SA-II) (3 MARKS)</b>
1	Enlist any six categories into which a given species is placed once it has been thoroughly evaluated by IUCN.
2	The reasons for conservation of biodiversity can be classified into three categories. Name them and describe each in brief.
3	Write an account of global warming.
4.	Explain the terms:- regulate, confirm and migrate
5.	Write a note on Ex-situ conservation with its limitations.
6.	Explain various types of extinction?
	<b>LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS)</b>
1	Describe any four measures to achieve Mission Harit Maharashtra

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