



दु.क्र ०२०२४४७६९३८

Email-

sciencedept@maa.ac.in



महाराष्ट्र शासन

शालेय शिक्षण व क्रीडा विभाग

राज्य शैक्षणिक संशोधन व प्रशिक्षण परिषद, महाराष्ट्र
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प्रश्नपेढी (Question Bank) 2023

इयत्ता:- बारावी

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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.

Subject -BIOLOGY (56)

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1. REPRODUCTION IN LOWER AND HIGHER PLANTS

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

- 1 The outer layer of pollen grain is thick and made up of complex ,non-biodegradable substance called as.....
A. lignin
B. cellulose
C. pectin
D. Sporopollenin
- 2 Sporoderm is made up of
A. exosporium and endosporium
B. outer integuments and inner integument
C. testa and tegmen
D. exine and intine
- 3 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
D. 1 meiosis and 3 mitosis.
- 4 Identify the odd one with respect to pollinating agent.
A. Baobab
B. Bottle brush
C. Kadamb
D. Sausage
- 5 In vitro pollen germination and pollen tube elongation can be induced by—
A. boric acid
B. glucose
C. lactose
D. sucrose
- 6 Self-incompatibility is found in flowers of plants.....
A. *Calotropis*
B. maize
C. *Thea*
D. *Gloriosa*
- 7 Porogamy refers to the entry of a pollen tube through.....
A. integuments
B. chalaza
C. micropyle
D. stigma
- 8 is an example of helobial endosperm.
A. *Adoxa*
B. coconut
C. *Asphodelus*
D. sunflower
- 9 The single shield shaped cotyledon in monocot seed is known as
A. coleoptile
B. scutellum
C. aleurone layer
D. perisperm
- 10 The example of dicot endospermic seed is
A. castor B. pea
C. mango D. bean

- 11 Grafting is not possible in monocots because of ---
 A. scattered vascular bundles
 B. open vascular bundles
 C. radial vascular bundles
D. absence of cambium
- 12 Conidia formation is commonly seen in
 A. *Amoeba*
 B. *Paramecium*
 C. *Sponges*
D. *Penicillium*
- 13 Which of the following is not the method of asexual reproduction?
 A. Budding
 B. Fragmentation
C. Sowing
 D. Binary fission
- 14 The plant part used for raising stem in grafting is –
A. Scion
 B. Stock
 C. Leafy shoot
 D. Any plant part

VERY SHORT ANSWER QUESTIONS (1 MARK EACH)

- 1 What is reproduction?
2. What are clones?
- 3 Give example of organism which produces zoospore.
- 4 Why anther is called as tetrasporangiate structure?
- 5 At which stage pollen grains are shed from the anther in Angiosperms?
- 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 fertilization process in angiosperms is called as 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 embryo?
- 12 What is adventive polyembryony?
- 13 Name the hormone produced by an unfertilised ovary responsible for enlargement of ovary into fruit.

SHORT ANSWER TYPE (SA-I) QUESTIONS (2 MARK EACH)

- 1 Explain any two methods of asexual reproduction.
- 2 Explain grafting as a method of 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 gametophyte 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 example.
- 10 Give the significance of double fertilization.
- 11 Mention significance of fruit and seed formation.
- 12 Give an account of polyembryony.

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

- 1 Explain various methods of vegetative reproduction.
- 2 How cutting, grafting and tissue culture is useful to humans?
- 3 Describe 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 diagram.
- 9 Write a note on different types of endosperms in angiosperms.
- 10 Describe the development of dicot embryo in flowering plants.
- 11 Draw a well labelled diagram of monocot seed you have studied.
- 12 Explain various categories of apomixis.

LONG ANSWER TYPE (LA) QUESTIONS (4 MARKS EACH)

- 1 Explain various horticultural methods of vegetative reproduction with the help of labelled diagram.
- 2 Describe the structure of anatropus ovule with the help of labelled diagram.
- 3 Describe the development of female gametophyte of angiosperms with the help of diagram.
- 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.

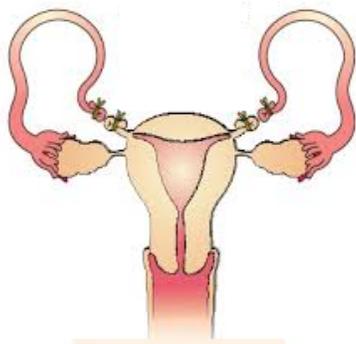
2. REPRODUCTION IN LOWER AND HIGHER ANIMALS
MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

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

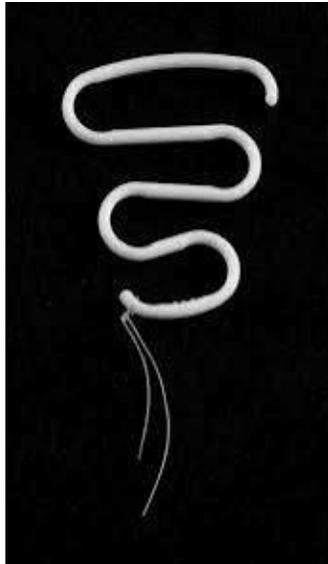
11. The animals produced by asexual reproduction are to their parents.
- genetically similar
 - morphologically similar
 - morphologically and genetically similar**
 - neither morphologically nor genetically similar
12. Asexual reproduction by gemmule formation occurs in
- Sponges**
 - Hydra*
 - Yeast
 - Planaria*
13. The aggregate of dormant cells capable of developing into new organism in gemmule is called as
- Archesporial cells
Archegonial cells
 - Archaeocytes**
 - Sporogenous tissue

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

- What is gemmule?
- By which method corals reproduce?
- Name the enzyme secreted by the prostate gland.
- What is glans penis?
- What is atresia with respect to ovary in human females?
- Name the hydrolytic enzyme secreted by the acrosome.
- What is morula?
- What is the function of inner cell mass?
- Name the embryonic layer from which heart, blood and blood vessels develop.
- Identify the permanent birth control method in the given diagram.

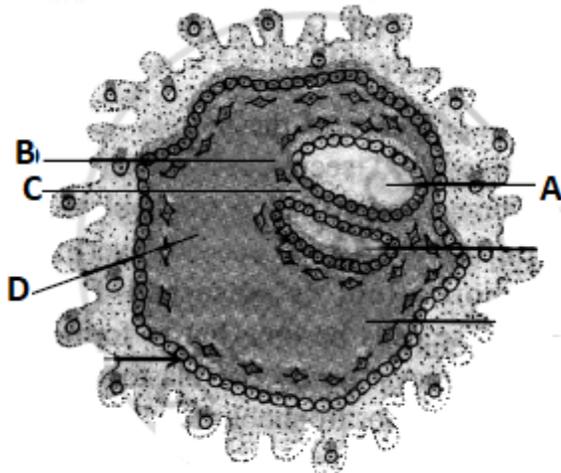


- What is the use of tablet 'Saheli'?
- Identify the IUD in the given diagram.



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

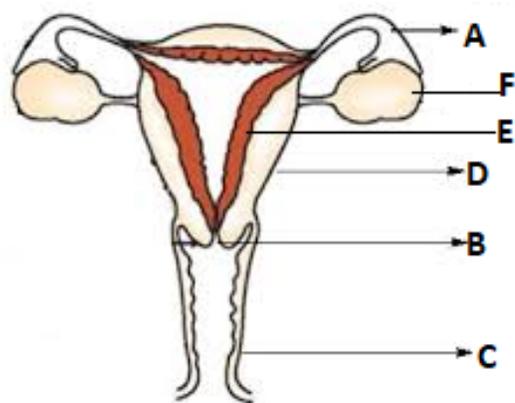
- 1 Draw a well labelled diagram of gemmule.
- 2 Write a note on budding.
- 3 Draw a well labelled diagram of L.S. human testis.
- 4 Describe the structure of Graafian follicle.
- 5 Write a short note on fallopian tube.
- 6 Give an account of external genitalia in human females.
- 7 Explain the structure of 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 RCH programme.
- 12 What is MTP? Upto which month it is permitted?

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

- 1 Explain various methods of asexual reproduction in lower animals.
- 2 Describe the histology of testis with help of labelled diagram.
- 3 Identify the labels from the given diagram.



- 4 Describe the histological structure of human ovary (diagram not expected).
- 5 Explain the structure of human sperm with labelled diagram.
- 6 Describe the process of oogenesis in human female.
- 7 Write a note on implantation.
- 8 Human pregnancy shows three prominent trimesters. Answer the following question based on these trimester.
 - i) What is morning sickness during first trimester?
 - ii) Name the hormone secrete in second trimester.
 - iii) The organ which secretes hormone in 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.

LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS EACH)

- 1 Write an account of seminal vesicle and bulbourethral gland 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.

3. INHERITANCE AND VARIATION

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

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

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

- 1 Define inheritance.
- 2 What is allelomorph?
- 3 What is test cross?
- 4 Define euploidy.
- 5 Give an example of complete linkage.
- 6 How many linkage groups are present in *Drosophila melanogaster*?
- 7 Which genes show straight inheritance?
- 8 How drones are produced in honey bees?
- 9 What is the reason for 21st trisomy?
- 10 Give the example of X- monosomy you have studied.

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

- 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 example.
- 5 Explain codominance in colour coat in cattle with checker board 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.

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

- 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 example.
- 3 Describe the structure of sex chromosomes with the help of labelled diagram.
- 4 What is autosomal inheritance? Explain different disorders due to autosomal inheritance.
- 5 Explain the inheritance pattern of colour blindness with suitable chart.
- 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 chart.
- 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.

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)

- 1 Define inheritance. Give statements for various laws of inheritance.
- 2 Explain intragenic and intergenic interaction with the help of example.
- 3 Explain structure of chromosomes with labelled diagram.
- 4 Give a detailed account of sex linked inheritance.
- 5 Give an account of one Mendelian and one chromosomal disorder you have studied.

4. MOLECULAR BASIS OF INHERITANCE

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

- Find the odd one out:
A H_2A
B H_3
C H_2B
D H_1
- What happened when heat killed S-cells along with live R-cells were injected into mice?
A Mice died and showed live S-cells
B Mice survived and showed live S-cells
C Mice died and showed live R-cells
D Mice died and showed dead R-cells
- Find out the double ring compound :
A Adenine
B Uracil
C Cytosine
D Thymine
- 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 50
C 30
D 100
- Semiconservative mechanism of DNA was detected using:
A ^{35}S
B ^{14}C
C ^{32}P
D ^{15}N
- A template strand of DNA has base sequence CATGATTAC. New strand synthesized on it will be :
A GATCAUATG
B GTACTAACG
C GAACTAATG
D GTACTAATG
- During DNA replication, the separated strands of DNA are prevented from recoiling by
A DNA primase
B Sigma factor
C Rho-factor
D SSBP
- In which of the following synthesis of DNA strand is not involved directly?
A m RNA
B t RNA
C Another DNA strand
D Protein
- Wobble hypothesis is related with
A Ambiguity in codon
B Purine pyrimidine equality
C Genetic code is triplet
D Degeneracy of genetic code and economy of tRNA molecules in the cell

- 10 During elongation of polypeptide chain, sigma factor is :
A Functionless
 B Retained for specific function
 C Released for re-use
 D Required during closing of chain
- 11 Enzyme required for peptide formation is :
 A Peptidase
B Peptidyl transferase
 C Nitrogenase
 D Nitrate reductase
- 12 Exon segments are reunited after splicing by
 A RNA primase
 B RNA protease
C RNA polymerase
 D RNA ligase
- 13 In lac operon, lactose acts as:
A Inducer
 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 Regulatory gene
 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 230
 C 75
 D 220

VERY SHORT ANSWER QUESTIONS (1 MARK EACH)

- 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^{++} 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 RNA primer?
- 13 What is the function of SSBP?
- 14 Define RFLP'
- 15 Define Heterochromatin

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

- 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 diagram of Nucleosome.
- 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's experiment in detail
- 10 Draw neat and labelled diagram of Replication Fork.

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

- 1 Explain the Griffith's experiment in detail with diagram.
- 2 Describe any three characteristics of Genetic code.
- 3 Mention any three objectives of Human Genome project.
- 4 Explain different step 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's 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.

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)

- 1 Describe the process of semiconservative replication of DNA with the help of neat and labelled diagram.
- 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.

5. ORIGIN AND EVOLUTION OF LIFE

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

- 1 _____ is considered as connecting link between ape and man.
A Australopithecus
B *Homo habilis*
C *Homo erectus*
D Neanderthal man
- 2 Humans are most closely related to _____.
A Marsupial
B Lemur
C Chimpanzees
D Tarsier
- 3 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 gene frequency
C gene flow
D genetic drift
- 4 Transfer of a part of chromosome or set of genes to a non-homologous chromosome is called _____.
A deletion
B duplication
C inversion
D translocation
- 5 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
D genetic drift
- 6 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
C. It is unable to explain the 'arrival of fittest'
D. Reproductive capacity of organism
- 7 The correct binomial expansion of $(p+q)^2$ for Hardy-Weinberg's principle is
A. $2p+pq+q^2$
B. $p^2+2pq+q$
C. $p^2+2pq+q^2$
D. p^2+pq+q^2
- 8 Homologous organs have
A. Dissimilar ancestry and dissimilar structure
B. Similar ancestry but similar or dissimilar functions
C. Dissimilar ancestry and dissimilar function
D. Dissimilar ancestry and similar functions
- 9 In which epoch rise of monocots was seen?
A. Miocene
B. Oligocene
C. Eocene
D. Palaeocene

- 10 Which of the following is not the vestigial organ?
 A. Third eye
 B. Coccyx
 C. Wisdom teeth
D. Brain
11. Wings of bird and wings of butterfly are-
 A. Vestigial organ
 B. Analogous organs
 C. homologous organs
 D. similar structures
- 12 The plant used by Lamarck to explain his postulates was
 A. Morning prime rose
 B. Pea plant
 C. Evening prime rose
 D. *Drosophila*

VERY SHORT ANSWER QUESTIONS (1MARK EACH)

- 1 What is abiogenesis?
- 2 Which theory explains the continuity of life but not the origin of life?
- 3 Why 'hot dilute soup' did 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 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 human also known as man with ape brain.
- 14 Name the ancestor of human nicknamed as Handy man
- 15 Whose fossils were discovered at the site of Shivalik hills, India?

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

- 1 Write a note on coacervates?
- 2 Draw a labelled diagram of Urey-Miller's experiment.
- 3 Mention any four points that support RNA world hypothesis.
- 4 Give various evidences 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 diagram.
- 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 evidences in support of organic evolution.
- 12 Differentiate between allopatric and sympatric species.
- 13 Mention any two developments in human 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 *Homo erectus* and Neanderthal man

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

- 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 premating isolating mechanisms.
- 6 Name any three types of postmating 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.

Ancestors	Special features
<i>Homo erectus</i>	
	Buried their dead
	Made tools from stones

- 11 Write a note on *Homo habilis*

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)

- 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. PLANT WATER RELATION

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

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

- C Combined Water
D Capillary Water
- 11 To carry put plasmolysis, a cell must be placed in
A. Pure water
B. Hypertonic water
C. Hypotonic solution
D. Hypertonic solution
- 12 The liquid adsorbed during imbibition is known as
A. Solid
B. Imbibant
C. Imbibate
D. Colloids
- 13 Water moves either by apoplast or symplast pathway across the root. Ultimately it becomes symplastic at.
A. Pericycle
B. Endodermis
C. Xylem
D. Phloem
- 14 The positive hydrostatic pressure which develops due to absorption of water is called as
A. Capillary force
B. Transpiration pull
C. Root pressure
D. Transpiration
- 15 The example of amphi-stomatic leaf is
A. Nerium
B. Lotus
C. Grass
D. opuntia

VERY SHORT ANSWER TYPE QUESTIONS(1 MARK EACH)

- 1 Why water acts 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 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?

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

- 1 Why water is called as '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 imbibate and imbibant.
- 8 Give importance of 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 structure of stomata.
- 13 Give advantages of transpiration.

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

- 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 morphological structure of root.
- 4 How roots can act as a water absorbing organ?
- 5 Why capillarity theory was 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.

LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS EACH)

- 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.

7. PLANT GROWTH AND MINERAL NUTRITION

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

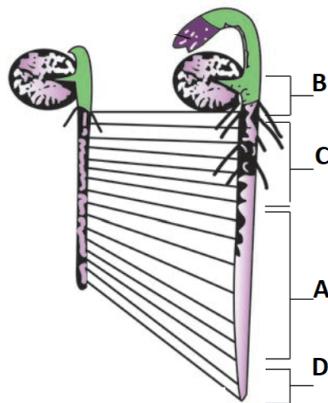
- 1 A farmer is fed up of weeds in his Wheat farm. Which of the following chemicals he can use to overcome the problem?
A IBA
B IAA
C NAA
D 2,4 – D
- 2 Gibberellins are synthesised from _____.
A Acetic acid
B Mevalonic acid
C Tryptophan
D Ethephon
- 3 First natural cytokinin was obtained from _____.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

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

- 1 What do you mean by indeterminate growth?
- 2 In which phase maximum growth is achieved?
- 3 What is the use of auxanometer?
- 4 Define dedifferentiation.
- 5 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.
- 6 Why is ABA known as antitranspirant?
- 7 Name the tissue that transports hormones within the plant body?
- 8 What is critical photoperiod?
- 9 Which pigment receives stimulus of light for flowering?
- 10 Which chemical stimulates vernalization?
- 11 What is critical concentration?
- 12 Which enzyme is activated by iron?
- 13 What is the site of nitrogen fixation in BGA?
- 14 Name the enzyme used in transamination?
- 15 Name the element that plays major role in determination of solute concentration.

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

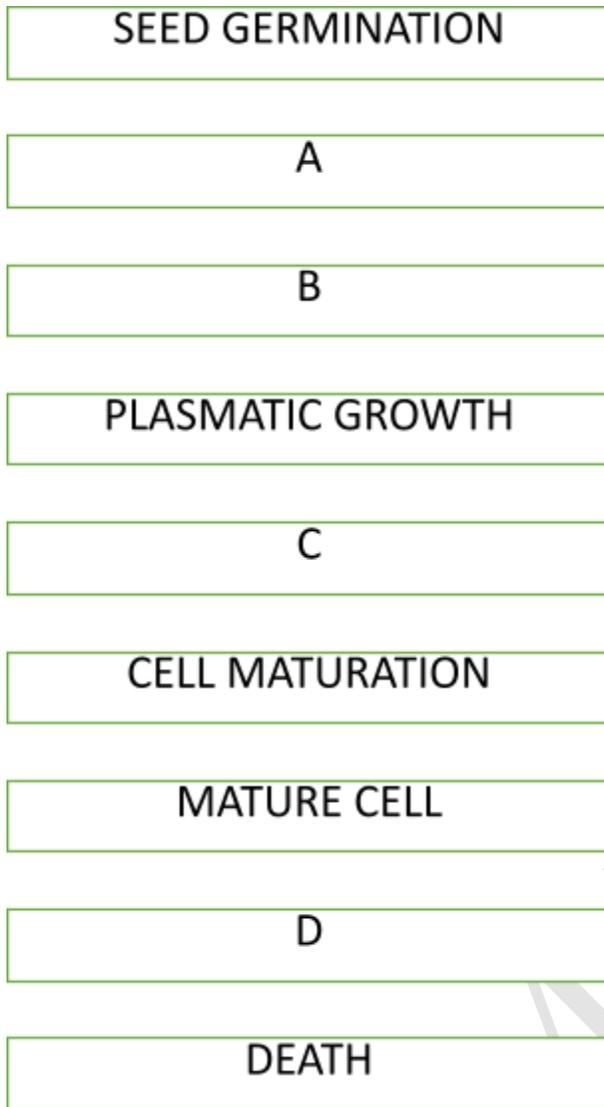
- 1 What type of changes take place during elongation phase?
- 2 Identify A,B,C and D in the given diagram,



- 3 Give any two points of difference between exponential and sigmoid growth curve.

4

Complete the given flowchart for development.



5 Differentiate between SDP and LDP.

6 Give an account of vernalization.

7 Explain any two deficiency symptoms of mineral found in plants.

8 Describe the process of amino acid synthesis.

9 Match the column A with B

A	B
i) Epinasty of flower	a)GA3
ii) Natural auxin	b)NAA
iii) Flowering in Litchi	c)IAA
iv) Bolting of Beet	d)Ethylene

10 A gardener wants to give bushy appearance to plants in our college campus.

i) What should he do to achieve the same?

ii) Which property of phytohormones he must be aware of?

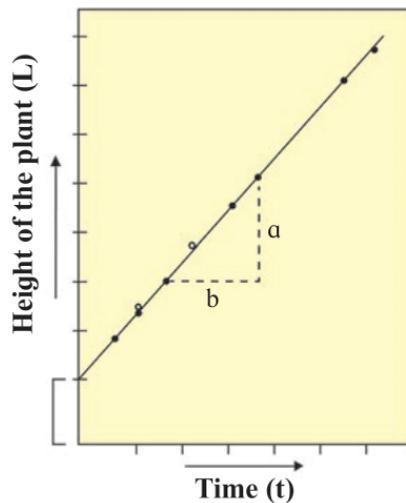
11 Give an account of nitrification.

12 Mention various functions of phosphorus in plants.

13. 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

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

- 1 Explain various phases of growth.
- 2 Observe the following graph and answer the following questions:-



- i. Which type of growth is indicated in the graph?
 - ii. What is the mathematical expression for this growth?
 - iii. Which plant part shows such type of growth?
- 3 Give the term for the following)
- a. Parenchyma in hydrophytes develops schizogenous interspaces for support and aeration-
 - b. Development of interfascicular cambium
 - c. Formation of secondary xylem and secondary phloem
- 4 Give an account of denitrification.
- 5 Draw a well labelled diagram of sigmoid growth curve.
What is grand period of growth?

6 Match the columns based on element and its role in plants.

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. Die back of shoots
5. Chlorine	e. Poor growth of plant
6. Manganese	f. malformed leaves.

- 7 Explain the concept of plasticity with suitable diagrams.
- 8 Give an account of Donnan's equilibrium.
- 9 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.
- 10 Write the name of _____
 - a) Gaseous growth hormone known to you.
 - b) Standard bio assay method for auxins.
 - c) Hormone that can overcome the requirement of vernalization.
 - d)

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS)

- 1 Write a note on photoperiodism with suitable examples.
- 2 Draw schematic representation of nitrogen cycle.
- 3 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
- 4 Write full form of-
 - a) IAA
 - b) IBA
 - c) NAA
 - d) 2,4-D

SCERTM, PUNE

8. RESPIRATION AND CIRCULATION

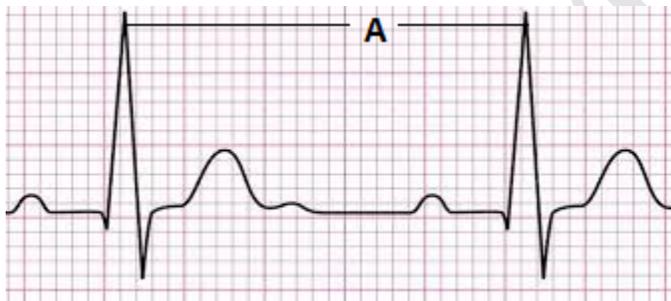
MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

- 1 In human respiration, chemical energy is released in the form of ____.
A) Acetyl co-enzyme A
B) ADP
C) ADPH₂
D) **ATP**
- 2 Alveoli provide the surface area for exchange of _____.
A) food
B) enzymes
C) **gases**
D) hormones
- 3 The movement of diaphragm, intercostal muscles and rib cage helps in _____.
A) digestion
B) circulation
C) excretion
D) **respiration**
- 4 The volume of air that remains in the lungs after maximum respiration is _____.
A) 1000 to 1100 ml
B) **1100 to 1200 ml**
C) 2000 to 3000 ml
D) 5200 to 5800 ml
- 5 Find out the example in which due to absence of respiratory pigment transport of respiratory gases does not takes place.
A) **Cockroach**
B) Scoliodon
C) Frog
D) Human
- 6 Which of the following has thickest wall?
A) Right auricle
B) Right ventricle
C) Left auricle
D) **Left ventricle**
- 7 The phase of contraction of heart is termed as _____.
A) diastole
B) **systole**
C) heart beat
D) heart sound
- 8 The free edges of cuspid valves are attached to the papillary muscles of the heart by fibres are called _____.
A) **chordae tendinae**
B) columnae carnae
C) connecting fibres
D) autorhythmic fibres
- 9 Ventricular depolarization is represented by _____.
A) P wave B) **QRS complex** C) T wave D) P and T waves

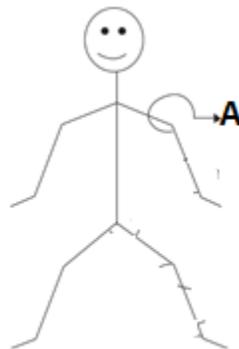
- 10 The erythropoietic tissue in adult is mainly found in _____.
- A) kidney
 B) liver
 C) **red bone marrow**
 D) spleen
- 11 The technique used to detect blockages in blood vessels is
- A. Angiography**
 B. ECG
 C. EEG
 D. sphygmomanometer

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

- 1 Name the cartilage which divides the nasal cavity into right and left nasal chambers.
- 2 Give the function of epiglottis.
- 3 Define total lung capacity.
- 4 Sachin shows symptoms of inflammation of the sinuses and mucous discharge due to viral and bacterial infection. Identify the disorder.
- 5 Define haematology.
- 6 Which type of blood flows through pulmonary veins?
- 7 In between which layers of pericardium, pericardial fluid is present?
- 8 How many molecules of haemoglobin are found in each erythrocyte?
- 9 Identify 'A' from the following ECG.



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



11. What is sinusitis?
 12 What is ventilator?
 13 Define heart transplant.
 14 Name the technique used to detect blockages in blood vessels.

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

1 Fill in the blanks with the help of 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 conducting system of human heart. Label SA node and bundle of His.

7 How a portal vein differs from normal vein?

8 Write an account of silent heart attack.

9 Write a note on symptoms of laryngitis.

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

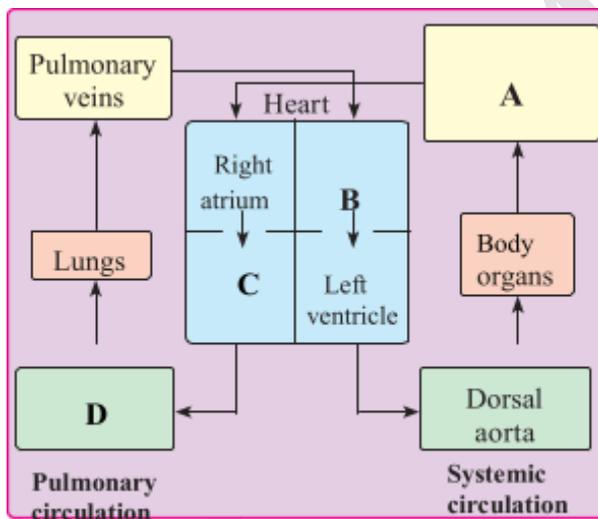
1 Distinguish between inspiration and expiration.

2 Write a note on 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.

LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS)

1. With the help of labelled diagram explain the exchange of gases between alveolus and capillary.

2. With the help of chart identify and write the function of any **four** leucocytes.

Type	Leucocytes	Name of cell	Function
Granulocytes		-----	-----
		-----	-----
		-----	-----
Agranulocytes		-----	-----
		-----	-----

3 Draw labelled diagram of internal structure of human heart.
 Label right atrium, mitral valve, left ventricle and pulmonary semilunar valve.
 Write a function of Eustachian and tricuspid valve found in human heart.

9. CONTROL AND COORDINATION

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

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

- B Secretin
- C Entero- gastrone**
- D Inhibin

VERY SHORT ANSWER TYPE QUESTIONS(1 MARK)

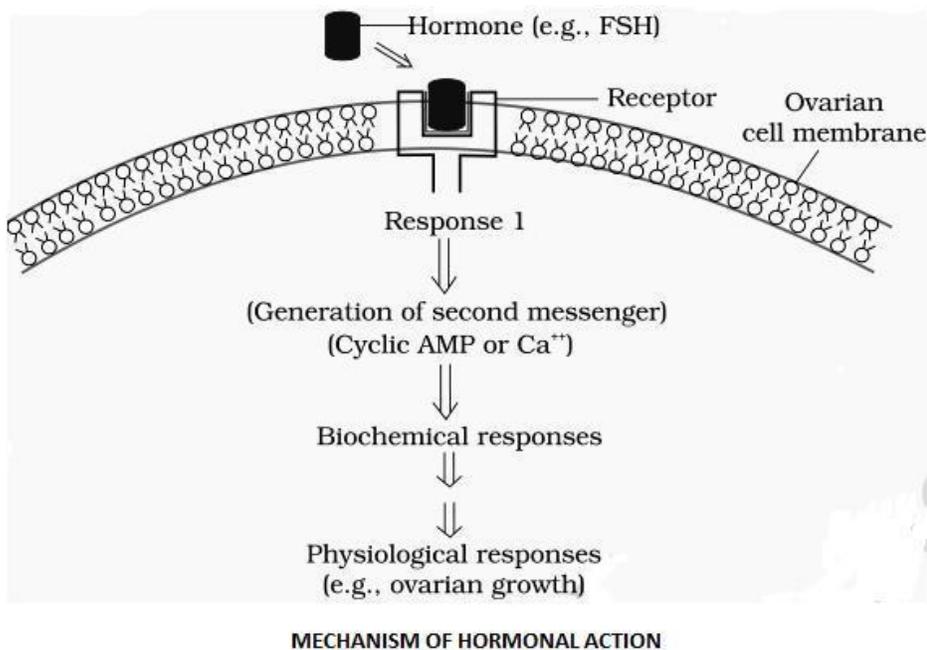
- 1 Which cells of PNS secrete myelin sheath around the nerves?
- 2 Give function of astrocytes in nervous system.
- 3 What is the covering of nerve fascicule called?
- 4 How electrical synapse differs from chemical synapse?
- 5 What is the function of red nucleus?
- 6 Define Saltatory conduction.
- 7 Name the hormone secreted by Pars intermedia in lower vertebrates.
- 8 Which disease is caused by hyper secretion of Glucocorticoids?
- 9 Which organ acts a temporary endocrine gland in females?
- 10 Give one role of hormone therapy.
11. Define reflex arc.
- 12 What is monosynaptic reflex?
13. Which exteroceptors is located in semi-circular canals?
- 14 Which receptor denotes the change in B.P.?
15. Which is the outermost layer of human eye?
- 16 Which cells of 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?

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

- 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 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 lens part of human eye.
- 11 Draw a well labelled diagram of Semi-circular canal to show cochlea and membranous labyrinth.
12. Write a note on rod cells and cone cells.

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

- 1 Write a note on meninges 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.



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

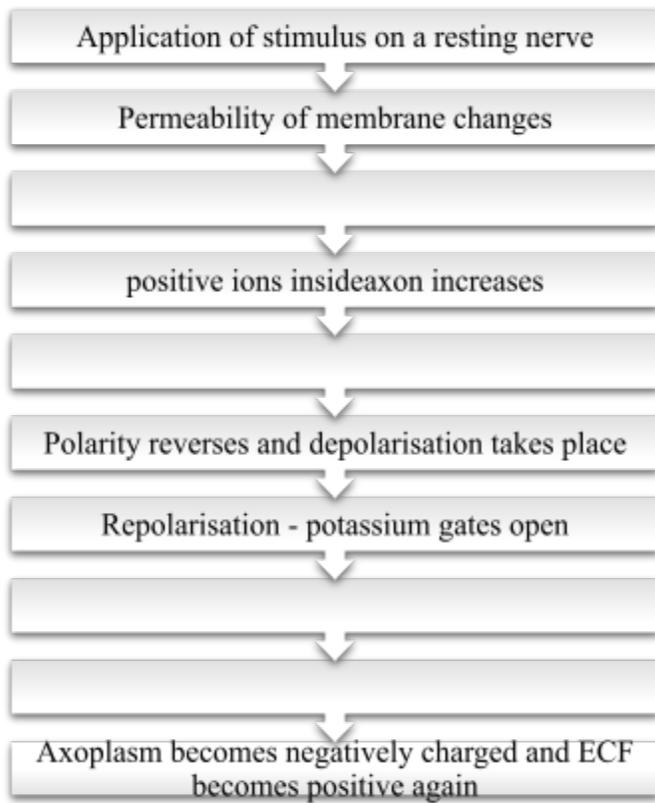
6 Complete the table based on disorders caused due to under secretion or over secretion of Thyroid gland.

Secretion	Adults	Children
Hypo secretion		
Hyper secretion		

- 7 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.
- 8 Differentiate between cranial reflex and spinal reflex.
- 9 Describe the structure of choroid / uvea.
- 10 Draw diagram of human eye showing pupil, vitreous humor, optic nerve, sclera, retina and choroid.

LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS)

- 1 Describe the functional areas of Cerebrum.
- 2 Distinguish between Sympathetic and parasympathetic nervous system.
- 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 human external ear.
7. Explain the structure of retina with the help of a labelled diagram.

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
 - D. Natural Acquired**
- 2 Passive immunity is _____.
- A. Acquired through natural overt or latent infection
 - B. Acquired through Vaccination
 - C. Acquired through readymade antibodies**
 - 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.
 - C. Disease causing organisms.**
 - D. Cells which kill the parasites
- 4 Which one of the following diseases is a communicable?
- A. Rickets
 - B. Malaria**
 - 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.
 - C. Health is a state of complete physical, mental and social well-being.**
 - D. Health is the symbol of economic prosperity.
- 6 AIDS is caused by _____
- A. Fungus
 - B. Virus**
 - 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
 - C. Typhoid**
 - D. Cancer
- 8 Carcinoma is cancer of _____ cells.
- A. Epithelial**
 - B. Connective tissue
 - C. Bone
 - D. Blood
- 9 Inactive gene that can cause cancer is called _____
- A. Transposon
 - B. Proto-oncogene**
 - C. Tumour promoter gene
 - D. Tumour suppressor gene
- 10 antiviral proteins released by cells infected by the virus are called _____
- A. histamines
 - B. interferons**
 - C. pyrogens
 - D. allergens

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

- 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 malarial pathogen.
- 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'.

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

- 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

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

- 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 under goes metastasis?
- 7 Explain the mode of transmission of HIV.

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)

- 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.

11. ENHANCEMENT OF FOOD PRODUCTION

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

- 1 Wheat -Atlas 66 has high contents of _____.
A protein
B vitamin
C carbohydrates
D Fats
- 2 Species of ____ is involved in cheese formation.
A Penicillium
B *Lactobacillus*
C *Saccharomyces*
D *Leuconostoc*
- 3 *Aspergillus niger* is used to prepare vit ____
A D
B B2
C B12
D C
- 4 *Saccharomyces cerevisiae* is used to produce enzyme ____.
A Invertase
B Pectinase
C Lipase
D Cellulase
- 5 Select the odd one from given herbicides.
A Cactoblastis
B *Alternaria*
C *Fusarium*
D *Phytophthora*
- 6 _____ associated with plants like *Azolla* and *Cycas* can be used as a biofertilizers.
A Anabaena
B Nostoc
C *Plectonema*
D *Oscillatoria*
- 7 Antibiotic Chloromycetin is obtained from _____.
A *Streptomyces erythreus*
B *Penicillium chrysogenum*
C Streptomyces venezuelae
D *Streptomyces griseus*
- 8 Indian curd is prepared by inoculating milk with _____.
A Lactobacillus acidophilus
B *Lactobacillus bulgaricus*
C *Penicillium roquefortii*
D *Penicillium camembertii*
- 9 Which of the following is not the variety of rice?
A. Jaya
B. Padma
C. Ratna
D. Parbhani- Kranti
- 10 Identify the variety of crop plant developed for resistance against black rot,
A. Pusa Sawani
B. Pusa Shubhra
C. Pusa Sadabahar

- D. Pusa Swarnim
- 11 The mother of bee hive is –
 A. Worker bee
 B. Drones
C. Queen bee
 D. Cater
- 12 Leaves of which plant are used to feed silkworm?
 A. Mango
 B. Tulsi
C. Mulberry
 D. Strawberry
13. Identify the marine water fish from the following-
 A. Common carp
 B. Catla
 C. Silver carp
D. Pomphret

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

- 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 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 little bee?

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

- 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 the column A with B and rewrite correct pairs.
- | A | B |
|------------------|------------|
| i. Atlas 66 | a) vit A |
| ii. Rice | b) vit C |
| iii. Spinach | c) protein |
| iv. bitter gourd | d) Iron |
- 5 Name two bacteria which are responsible for fermenting dough of idli, dosa.
- 6 Name two acids produced by using *Aspergillus niger*?
- 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 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.

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

- 1 Match the column A with B and rewrite correct pairs
- | A | B |
|----------------------------|------------------------|
| I. Mycoherbicides | a) <i>Cactoblastis</i> |
| II. Bacterial herbicides | b) <i>Alternaria</i> |
| 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 the column A with B and rewrite correct pairs.
- | 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 |
- 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.

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)

1 Match the column A with B and rewrite correct pairs.

A	B
a) <i>Penicillium roquefortii</i>	i) Alcohol
b) <i>Lactobacillus bulgaricus</i> .	ii) Cheese
c) <i>Lactobacillus acidophilus</i>	iii) Yoghurt
d) <i>Saccharomyces cerevisiae</i>	iv) curd

2 Explain the process of sewage water treatment before it can be discharged into natural bodies.

3 Match the column A with B and rewrite correct pairs.

A	B
i. Symbiotic N ₂ fixing bacteria	a) VAM
ii. Free-living N ₂ fixing bacteria	b) <i>Rhizobium</i>
ii. Phosphate solubilizer	c) <i>Nostoc</i>
iv. Endomycorrhizae	d) <i>Micrococcus</i>

4 Define plant breeding. Mention any three objectives of plant breeding.

5 Mention various advantages of single cell protein.

12. BIOTECHNOLOGY

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

- 1 The technique which involves addition or deletion of genes is....
A genetic engineering
B gene therapy
C gene splicing
D gene piracy
- 2 EcoRI is obtained from...
A *Escherichia coli* R13
B Escherichia coli Ry13
C *Escherichia coli* R225
D *Escherichia coli* RC
- 3 The enzyme restriction endonuclease ...
A cuts double strand of DNA
B joins strand of DNA
C cuts RNA strand
D cuts single stranded DNA
- 4 Ti plasmid being used for introducing genes in plants obtained from....
A *Agrobacterium rhizogenes*
B *Escherichia coli*
C *Agrobacterium* T20
D Agrobacterium tumefaciens
Polymerase chain reaction is most useful in....
A DNA amplification
B DNA synthesis
C protein synthesis
D selective replication of DNA
- 5 In Bt cotton a transgenic plant, Bt refers to....
A bold cotton
B Bacillus thuringiensis
C beta carotene
D tumor inducing bacteria
- 7 In transgenic crop substance provitamin A is obtained in....
A rice
B tomato
C canola
D sugarcane
- 8 In Anaemia the Recombinant protein....is produced by r-DNA technology.
A Relasein
B Insulin
C Erythroprotein
D Antoitrsin
- 9 In biotechnology GMO refers to....
A generation mediated organisms
B genetically modified organisms
C good modified organisms
D gross modified organisms
- 10 First biopatent to genetically engineered bacterium....
A Pseudomonas

- B *Agrobacterium*
- C *Azatobacter*
- D *E. coli*.

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

- 1 In which transgenic plant the substance Flavonoids obtained as antioxidants.
- 2 What is Germline therapy?
- 3 Which Recombinant proteins is obtained for Hepatitis-B by r-DNA technology.
- 4 What is plasmid?
- 5 What is 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 effect on the population of which butterfly?

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

- 1 What is Biopiracy? Explain it with respect to Turmeric.
- 2 How Biotechnology is 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 any one example.
- 6 Write a note on uses of somatic cell gene therapy.
- 7 Define vector? write any two examples.

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

- 1 Explain traditional use of Biotechnology.
- 2 Define biotechnology? Which are the basic principles and process 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 GM plant? Write its different advantages.

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS)

- 1 What is PCR? Explain different steps involved in it.
- 2 Explain the following terms with respect to rDNA technology
 - i) passanger DNA
 - ii) Chimeric DNA
 - iii) Transformed cell
 - iv) restriction site
- 3 Define biotechnology. Give any three application of it?
- 4 Which are different adverse effect of biotechnology on human health and environment?
- 5 Explain biopatent and Biopiracy with different examples?

13. ORGANISMS AND POPULATION

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

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

- 10 The number of deaths under ideal conditions is known as
A **Absolute mortality** B Realized mortality
C Absolute natality D Realized natality

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

- 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 Allen's rule indicates in adaptation?

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

- 1 Show the graphical representation of mean annual rainfall with respect to mean annual temperature.
- 2 Define the term Biome and population.
- 3 How Habitat differs 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

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

- 1 Define Niche with its different types.
- 2 Define mutualism. Explain its one type.
- 3 Explain any three important characteristics of population.
- 4 Explain different population interactions with examples.
- 5 What is Commensalism? Explain it with suitable example.
- 6 Explain the role of any three abiotic factors affecting the environment.
- 7 Explain different types of growth models.

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)

- 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

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

- 1 Lichens taking roots on bare rocks are an example of _____.
A. climax community
B. **pioneer species**
C. climax species
D. secondary succession
- 2 Growth of new grasses and shrubs on a patch of forest burnt down by forest fire, is an example of _____.
A. **secondary succession**
B. pioneer species
C. climax species
D. primary succession
- 3 All types of ecological succession whether on land or in water always reaches _____.
A. **climax community**
B. pioneer species
C. climax species
D. secondary succession
- 4 Secondary consumers are
A. herbivores
B. producers
C. **Carnivores**
D. autotrophs
- 5 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
C. **It always inverted**
D. It is always upright.
- 6 Which one of the following is not a functional unit of ecosystem?
A. energy flow
B. decomposition
C. productivity
D. **stratification**

7. Humus is
- dark coloured, amorphous , colloidal organic matter rich in nutrients
 - contains only cellulose
 - red coloured matter
 - product of photosynthesis

VERY SHORT ANSWER TYPE QUESTIONS(1 MARK EACH)

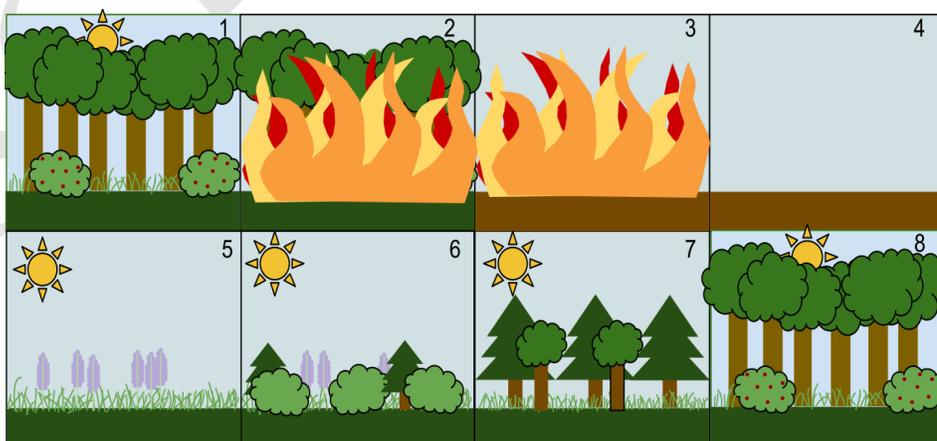
- What is 'Sere'?
- Define 'Ecological succession'
- What is 'Climax community'?
- Define zonation.
- Define gross primary productivity.
- What do you understand by the term PAR?
- What is 10% law of energy transfer?
- What is the reservoir of carbon on the earth?
- What is the cause of eutrophication?
- What is fragmentation?

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

- Name the types of succession of plants based on the nature of habitat.
- Give reasons – 'Primary succession is always slower than secondary succession'
- Differentiate between stratification and zonation.
- Explain grazing food chain with suitable example.
- Write a note on pyramid of numbers.
- Give reasons, 'pyramid of energy is always upright.
- Explain any three categories of ecosystem services.

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

- What are 'pioneer species'? Give two examples of them.
- Explain the following sequence of succession after a forest fire.



- Explain process of decomposition in detail.
- Write an account of carbon cycle.
- Describe the sedimentary cycle you have studied.

LONG ANSWER TYPE QUESTIONS (LA-) (4 MARKS)

- 1 Explain the progress of ecological succession in newly formed volcanic island.

15. BIODIVERSITY, CONSERVATION AND ENVIRONMENTLA ISSUES

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

- 1 Dodo bird, stellar sea cow and passenger pigeon are few examples of extinction due to _____.
- A habitat loss
 - B hunting
 - C Alien species invasion
 - D overexploitation.**
- 2 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.
 - C Crocodile bank of Chennai**
 - D Sacred groves
- 3 India boasts a handsome share of ____ % of total biodiversity wealth of the earth.
- A 2.4
 - B 8.1**
 - C 14
 - D 22
- 4 Measurement rate of O₂ consumption in unit volume of water is
- A. biogas generation
 - B. Biological oxygen demand**
 - C. Biosynthesis pathway
 - D. Fermentation
- 5 In a coal fired power plant, electrostatic precipitator is used to control emission of
- A. Oxides of nitrogen
 - B. SPM**
 - C. CO
 - D. oxides of sulphur
- 6 E. coli is used as an indicator to determine pollution of water with
- A. heavy metals
 - B. faecal matter**
 - C. industrial effluents
 - D. Pollen of aquatic plants
7. Which of the following is not the component of greenhouse gases?
- A. methane
 - B. carbon dioxide
 - C. CFC
 - D. ozone**

VERY SHORT ANSWER TYPE QUESTIONS(1 MARK EACH)

- 1 What is 'Hello Forest'?
- 2 Name the Japanese method of plantation adapted by our government.
- 3 A medicinal plant *Rauwolfia vomitoria* 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 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 effects of ozone?

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

- 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 precipitator.
- 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.

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

- 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.

LONG ANSWER TYPE QUESTIONS(LA) (4 MARKS)

- 1 Describe any four measures to achieve Mission Harit Maharashtra

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