"Comprehensive Support Learning Material for Students In Biology Subject Seeking to Overcome Past Setbacks."

SUBJECT:- BIOLOGY (056)

Prepared by: State Council of Educational Research and Training, Maharashtra, Pune -30

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"Comprehensive Support Learning Material for Students in Biology subject Seeking to Overcome Past Setbacks."

‘QUESTION BANK’

SUBJECT :- BIOLOGY (056)

OBJECTIVES OF THE QUESTION BANK :

This **QUESTION BANK** is prepared for the help of the students who will be appearing for the Supplementary Examination to be held in July 2024 and thereafter too. It is prepared as such students could not score the minimum score to pass in the written examination or even to score marks required for eligibility in entrance examination.

This **QUESTION BANK** is designed to boost the confidence of the students. It will definitely help them to score good marks in the forthcoming examination. It will be a great support for the students who lack behind others.

It is prepared in a systematic and easiest way by the expert teachers. The students are aware of the textbook as well as the examination pattern (four different sections). Still, this **QUESTION BANK** elaborates every segment in detail. It considers the level of the students.

By preparing questions in the **QUESTION BANK**, we are quite sure that the students will be able to score good marks.

The main objectives can be summarized as under:

1) To facilitate the essential questions that will help students to understand similar questions in the examination.
2) To help every average and the below average student to achieve 100% success at the HSC Board Examination.
3) To motivate the below average students to score more than their expectation in the Biology Subject which they find as most difficult.
4) To help the teachers to reach out to students who struggle to pass in the Biology subject at the HSC Board Exam with the help of this material.
5) Sample papers based on each chapter with hints and answers are given.
6) Model question paper will definitely help students.

INTRODUCTION

Dear Students,

It does not matter if you did not score well in the regular examination held in February 2024. Remember, "every setback is a setup for a comeback." Your previous attempt must have taught you something valuable. We believe in your potential to overcome this hurdle and excel in your upcoming exams.

After a comprehensive analysis of the results, SCERT, Pune has taken an initiative for the upliftment of students who could not achieve the minimum passing score.

Use this QUESTION BANK, seek help when needed, and stay committed to your studies. Underline all answers in your textbook. This material will also prove to be extremely useful for teachers as they assist students in preparing for the supplementary examination. It will boost your confidence to appear for the exam once again. New students in the coming years can also benefit from this QUESTION BANK.

Best wishes for your journey ahead.

-:Content:-

Maharashtra State Board of Secondary and Higher Secondary Education, Pune

Std. XII Sub. : Biology (56)

Chapter wise Distribution of Marks				
Unit	**Ch. No.**	**Chapter**	**Marks**	**Marks with option**
1.Reproduction	1	Reproduction in Lower and Higher Plants	6	8
	2	Reproduction in Lower and Higher Animals	6	8
2. Genetics and Evolution	3	Inheritance and Variation	4	6
	4	Molecular Basis of Inheritance	4	6
	5	Origin and Evolution of Life	4	6
3. Physiology	6	Plant Water Relation	5	7
	7	Plant Growth and Mineral Nutrition	5	7
	8	Respiration and Circulation	7	10
	9	Control and Co-ordination	8	11
4 Applied Biology	10	Human Health and Diseases	3	4
	11	Enhancement of Food Production	4	6
	12	Biotechnology	5	7
5.Ecology and Environment	13	Organisms and Populations	3	4
	14	Ecosystems and Energy Flow	3	4
	15	Biodiversity, Conservation and Environmental Issues	3	4
		Total :	**70**	**98**

Weightage According to Learning Objectives			
Sr. No.	**Objectives**	**Total Weightage (With Option)**	**Percentage**
1.	Knowledge	29 Marks	30%
2.	Understanding	41 Marks	42%
3.	Application & Skill	28 Marks	28%
	Total	**98 Marks**	**100%**
Weightage According to Difficulty level of the questions			
Sr. No.	**Level**	**Total Weightage (With Option)**	**Percentage**
1.	Easy	29 Marks	30%
2.	Average	49 Marks	50%
3.	Difficult	20 Marks	20%
	Total	**98 Marks**	**100%**

Weightage According to types of questions			
Type of questions	**Marks for each questions**	**Number of questions**	**Total Marks**
MCQ	1 Mark each	Q. No. 1 (i to x)	10 Marks
VSA	1 Mark each	Q. No. 2 (i to viii)	08 Marks
SA- I	2 Marks each	Q. No. 3 to 14	24 Marks
SA -II	3 Marks each	Q. No. 15 to 26	36 Marks
LA	4 Marks each	Q. No. 27 to 31	20 Marks
Total		**31 questions**	**98 Marks**

Question Paper Format for Annual Examination

(Year 2020-2021 Onwards)

Biology (56)

Time- 3 hrs **Total Marks -70**

General Instructions:

(1) Section A :

Q. No. 1 contains Ten multiple choice questions carrying one mark each.

Q. No. 2 contains Eight very short answer types of questions carrying one mark each.

(2) Section B :

Q. No. 3 to Q. No. 14 are short answer types of questions carrying two marks each.

(3) Section C :

Q. No. 15 to Q. No. 26 are short answer types of questions carrying Three marks each.

(4) Section D :

Q. No. 27 to Q. No. 31 are long answer types of questions carrying Four marks each.

(5) Figures to the right indicate full marks.

(6) For each MCQ, the correct answer must be written along with its alphabet.

e.g., (a)…. / (b) …../(c)…… / (d)……. Only the first attempt will be considered for evaluation.

Section A

Q. No. 1 Select and Write the correct answer:(10)

(i) to (x) MCQ

Q. No. 2 Answer the following:(08)

(i) to (viii) VSA

Section B

Attempt any Eight:(16)

Q. No. 3 to Q. No. 14 SA - I

Section C

Attempt any Eight:(24)

Q. No.15 to Q. No. 26 SA - II

Section D

Attempt any Three:(12)

Q. No.27 to Q. No. 31 LA

Model Question Paper (Chapter wise)

BIOLOGY (056)

CONTENT

CHAPTER – 1 : REPRODUCTION IN LOWER AND HIGHER PLANTS

Marks :- 25 **Time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- (04)

1. Which of the sequences is correct for embryogenesis in dicots ?

(a) Zygote→Globular stage →Proembryo →Heart shaped stage →Matured embryo

(b) Zygote →Heart shaped stage → Globular stage → Matured embryo

(c) Zygote →Proembryo →Heart shaped stage →Globular stage → Matured embryo

(d) Zygote →Proembryo →Globular stage → Heart shaped stage →Matured embryo

2. All of the following include outbreeding devices except -

(a) Unisexuality of flowers, self-incompatibility

(b) Pollen release and stigma receptivity are not synchronized

(c) Anthers and stigma are placed at different position

(d) Bisexuality, homogamy, Cleistogamy

3. Which is the most common type of embryo sac in angiosperms ?

(a) Bisporic with two sequential mitotic divisions

(b) Tetrasporic with one mitotic stage of divisions

(c) Monosporic with three sequential mitotic divisions

(d) Monosporic with two sequential mitotic divisions

4 .An organic substance that can withstand environmental extremes and cannot be degraded by any enzyme is :

(a) Cuticle **(b) Sporopollenin** (c) Lignin (d) Cellulose

QN.2) ANSWER THE FOLLOWING: - (03)

1) Define germ pore.

Ans : The places at which the exine is very thin showing thin areas is called germ pore.

2) Name the cell which is responsible for producing anther wall layers.

Ans : Parietal cells produce anther wall layers.

3) Define embryogenesis.

Ans : The process of development of zygote into an embryo is called embryogenesis.

SECTION-B

ATTEMPT ANY FOUR: - **(08)**

QN.3) Write a note on free nuclear endosperms.

Ans :

1. It is the most common type of endosperm in angiospermic families.
2. Primary endospermic nucleus repeatedly divides mitotically without wall formation to produce a large number of nuclei.
3. A big central vacuole develops in the centre which pushes the nuclei to the peripheral part.
4. Later on development of cell walls takes place and multicellular endosperm is formed.
5. Wall formation may remain incomplete in some cases.
6. The common example of free nuclear endosperm is coconut.

QN.4) What is the fate of the lower tier and upper tier of the octant stage of an embryo?

Ans :

A) Lower tier:- The four cells of this region give rise to hypocotyl and radicle.

B) Upper tier:- The four cells of this region give rise to plumule and one or twocotyledons.

QN.5) Mention two important points of difference between geitonogamy and xenogamy.

Ans :

Geitonogamy	**Xenogamy**
1. It is self-pollination.	1. It is cross pollination.
2. Two different flowers present on the same plant are involved.	2. Two different flowers present on two different plants are involved.
3. No genetic variation is produced.	3. It produces genetic variation.

QN.6) Explain dichogamy with suitable examples.

Ans :

1. The condition in a bisexual flower in which both the reproductive whorls i.e.and roecium and gynoecium mature at different times is called dichogamy.
2. It prevents self-pollination and promotes cross pollination.

3. It is of following types:-

a) Protandry :- Androecium matures earlier than gynoecium.e.g. disc florets of sunflower.

b) Protogyny:- Gynoecium matures earlier than androecium. e.g. Gloriosa.

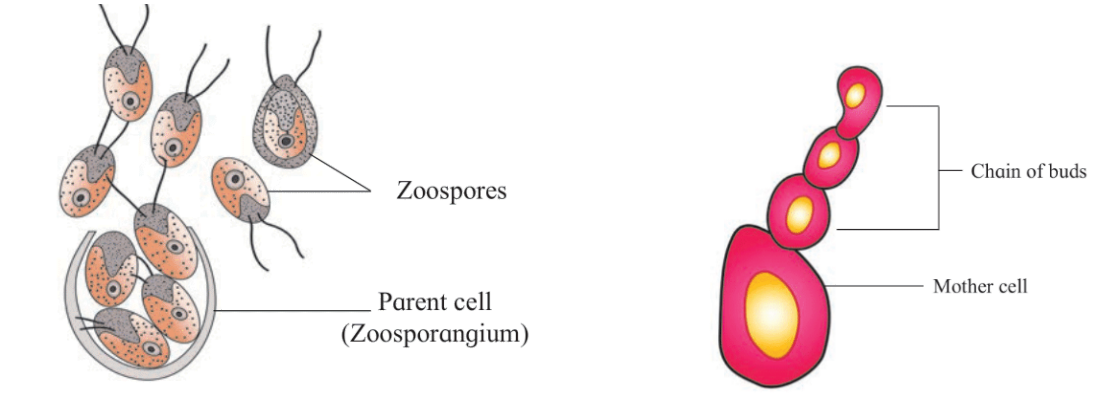
QN.7) A Tetrasporangiate anther was examined in a laboratory. Each lobe showed 15 PMC. Calculate the number of pollen grains and male gametes produced inside the anther.

Ans :

1. Each lobe has 15 PMC and each PMC will produce 4 pollen grains. Thus, 60 pollen grains will be produced per sporangium.
2. It means the anther will produce 240 pollen grains.
3. Each pollen grain produces 2 male gametes. Thus, 240 pollen grains will produce 480 male gametes.

QN.8) Draw a well labelled diagram of zoospore formation and budding.

Ans:-



SECTION-C

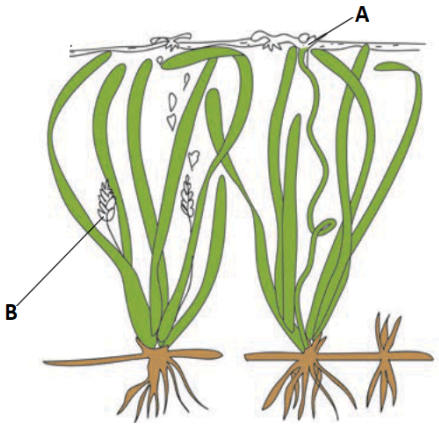
ATTEMPT ANY TWO: - (06)

QN.9) Name the hormone used to induce parthenocarpy. State two examples of natural parthenocarpy.

Ans : 1. The hormone used to induce parthenocarpy is indole-3 acetic acid.

2. The natural parthenocarps are pineapple, banana, papaya, etc.

QN.10)Identify A and B in the given diagram. Mention the kind of hydrophily in the given diagram. What is the specific feature of pollen grain seen in this pollination that enables them to float on the water surface?



Ans : 1. In the given diagram A is a female flower and B is male flower.

2. The diagram shows epihydrophily.

3. Specific gravity of pollen grain is equal to that of water. That is why it can float on water.

QN.11)How callistemon carries out its pollination? Explain various characters developed by it.

Ans : 1.Callistemon shows ornithophily.

2.The different adaptations shown for this pollination are as follows:-

a. Usually brightly coloured flowers which are large and showy.

b. Secret profuse, dilute nectar.

c. Sticky and spiny pollen grains.

d. Flowers are generally without fragrance as birds have a poor sense of smell.

SECTION-D

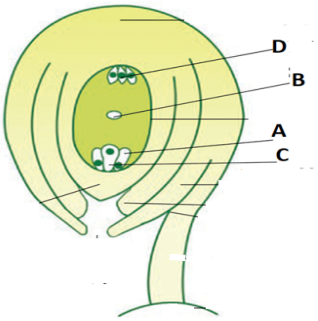
ATTEMPT ANY ONE :- **(04)**

QN.12)What is triple fusion? What is the product of triple fusion and what is its fate ? Calculate the ploidy of endosperm obtained from a cross between diploid male plant and tetraploid female plant.

Ans :

1. The fusion between one of the male gametes and the secondary nucleus is called triple fusion.
2. The product of triple fusion is the triploid primary endospermic nucleus.
3. It develops into a nutritive tissue endosperm.
4. Ploidy of endosperm = ½ of the ploidy of male plant + ploidy of the female plant (possible for you to calculate, use the given formula)

QN.13)Identify the marked parts in the given diagram and also mention their fate after fertilization.



1. A is synergid. It degenerates after fertilization.
2. B is a secondary nucleus. After fertilization it develops into a primary endospermic nucleus, triploid in nature.
3. C is an egg cell. It develops into zygote after fertilization.
4. D is Antipodal cells. Degenerates after fertilization.

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CHAPTER – 2 : REPRODUCTION IN LOWER AND HIGHER ANIMALS

Marks :- 25 **Time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:-
(04)

1. In the human penis, urethra passes through .....
   (a) corpus cavernosum
   (b) corpus spongiosum
   (c) corpus luteum
   (d) corpus albicans

2. In human beings the type of cleavage is .....
   (a) *holoblastic and equal*
   (b) meroblastic and equal
   (c) holoblastic and unequal
   (d) meroblastic and complete

3. Onset of the menstrual cycle at the time of puberty is called .....
   (a) menopause **(b) menarche** (c) menstruation (d) metamerism

4. Which one of the following is not formed from mesoderm?
   (a) blood (b) bones & cartilage (c) kidneys **(d) nervous system**

QN.2)ANSWER THE FOLLOWING: - **(03)**

1) Name the embryonic layer from which enamel of teeth develops.
Ans:- It develops from ectoderm.
2) Which antibiotic is used in treatment of Syphilis?
Ans:- Penicillin is used.
3) Name the structure produced by corpus luteum in the absence of fertilization.
Ans:- Corpus albicans

SECTION-B

ATTEMPT ANY FOUR: - **(08)**

QN.3) Define labour pains and after birth.
Ans:- 1. Labour pains :- Localized sensation of discomfort accompanied by labour is called labour pain.
2. After birth :- The separated placenta from the uterus expelled after delivery of the baby is called after birth.

QN.4) Explain the method of contraception shown in the diagram.

Ans:

1. The method given in the photo is an implant.
2. It is a contraceptive used by females.
3. It is a tiny thin rod about the size of a matchstick which is implanted under the skin of the upper arm.
4. They contain progesterone and estrogen which inhibit ovulation.
5. They prevent pregnancy for 3-4 years.

QN.5) Enlist various sequential stages of sexual reproduction in humans.

Ans : Stages in sexual reproduction are as follows:-

1. movement of sperm towards the egg
2. Entry of sperm into the egg
3. Acrosome reaction
4. Activation of ovum
5. Fusion of egg and sperm.

QN.6)Give the composition of prostatic fluid. How does it protects sperms?

Ans : Composition of prostatic fluid:

1. Prostatic fluid is milky white and slightly acidic.
2. It contains citric acid, acid phosphatase and other enzymes.

Role : The acid phosphatase enzyme protects the sperms from the acidic environment of vagina.

QN.7) Explain budding as a method of reproduction in hydra.

Ans : Budding in Hydra:

1. It is a simple method of asexual reproduction occurring in favourable conditions.
2. Various coelenterates show this method of reproduction e.g. hydra.
3. In Hydra, a small outgrowth is produced towards the basal end of the body.
4. It develops as a bud which grows and forms tentacles and develops into new individuals. This is called budding.
5. The young Hydra after detachment develops into a new individual.

QN.8) Name the different layers that are found associated with graafian follicles (outside to inside).

Ans : The different layers are as follows:-

1. Theca externa
2. Theca interna
3. membrana granulosa
4. Discus proligerous and corona radiata
5. zona pellucida

SECTION-C

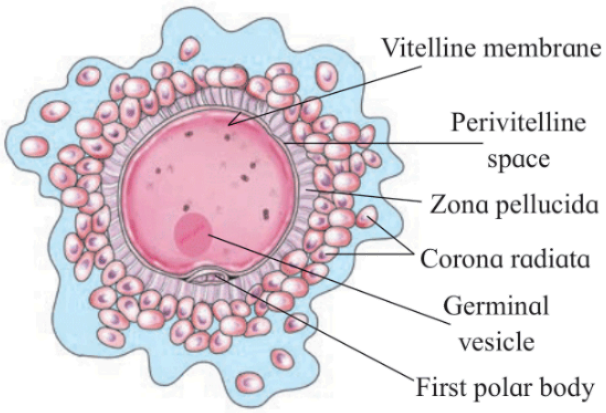
ATTEMPT ANY TWO: - **(06)**

QN.9) Name the structure that produces the acrosome of sperm. Which types of enzymes are present in acrosome of sperm?

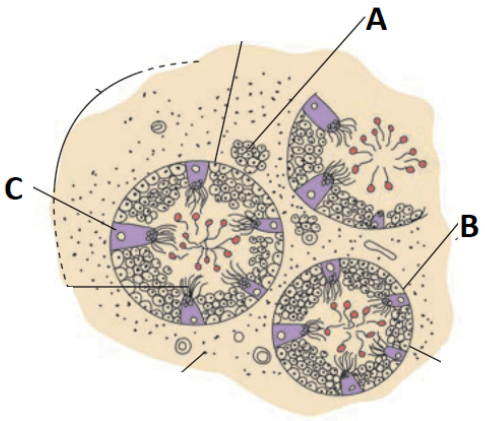
Ans :
1. Acrosomes develop from the Golgi body.
2. It contains hydrolytic enzyme hyaluronidase.
3. The proteolytic enzymes present are zona lysin and corona penetrating enzymes.

QN.10)Draw a well labelled diagram of an unfertilized egg.

Ans :



QN.11)Observe the following diagram and answer the following questions:-



(a) Name the hormone secreted by 'A'.

(b) What is the chromosomal status of 'B' ?

(c) Give the function of 'C'.

Ans : a. It secrets testosterone.

b. The cells are diploid in nature.

c. The Sertoli cells provide nourishment to developing sperms.

SECTION-D

ATTEMPT ANY ONE : **(04)**

QN.12) Give causative agent, incubation period, symptoms and preventive measure for Gonorrhoea.

Ans :

Name of Disease	Syphilis
Causative agent	*Treponema pallidum* (Bacteria)
Incubation period	3-4 weeks
Infection site	Mucous membrane in genital, rectal and oral region.
Symptoms	Primary lesion called **chancre** at the site of infection. Chancre is formed on external genitalia, skin rashes and mild fever, inflamed joints, loss of hair. Paralysis, Degenerative changes occur in the heart and brain.
Preventive measures	Education about sex practices, sex hygiene, avoiding sex with unknown partner or multipartners, using condom during coitus.
Treatment	Antibiotic-Penicillin

QN.13)Give an account of uterus and vagina as a part of duct system in human female reproductive system.

Ans :

- Uterus or Womb :

1) It is large bag-like structure present in pelvic cavity
2) It is muscular, glandular, and highly vascularized in nature.
3) Consists of anterior dome shaped fundus middle glandular body and posterior narrower cervix.

4) Two important wall layers of the uterus are myometrium and endometrium.
5) Cervix opens into vagina through internal orifice.

- Function :

1) It provides a site for the development of foetus.
2) It shows considerable enlargement to accommodate foetal growth.
3) Endometrium provides nourishment to developing foetus through placenta
4) Myometrium shows contraction to bring about easy parturition.

- Vagina :

1) It is present below cervix
2) It is fibromuscular tube which measures nearly 23 cm in length
3) Internally it shows transverse skin folds.
4) It opens into external Genitalia through vaginal orifice.

- Function :

1) Serves as passage for copulation.
2) Provides passage for entry of sperms.
3) It serves as passage for menstrual discharge.
4) It serves as birth canal.

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CHAPTER – 3 : INHERITANCE AND VARIATION

Marks :- 25 **Time :- 1.30 Hrs**

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SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- (04)

1) The number of autosomes in human sex cell is------

a) 22 b) 12 c) 44 d) 23

2) In sickle cell anaemia ,F2 generation shows the ratio of carrier to normal is ----

a) 2:1 b) 1:2 c) 3:1 d) 1:3

3) Nullisomy is rightly explained by the condition -------

a) 2n+2 b) 2n+1 **c) 2n-2** d) 2n-1

4) The number of linkage groups for a bacterial cell will be-----

a) 7 b) 2 c) 4 **d) 1**

QN.2) ANSWER THE FOLLOWING: - (03)

1) Define crossing over.

Ans : Crossing over is the process of exchange of genetic material or segments between non-sister chromatids of two homologous chromosomes.

2) What are X-linked genes?

Ans : Genes located on the non-homologous part of X - chromosome only are called as X - linked genes.

3) How many different types of genotypes will be produced by *Drosophila melanogaster* showing five different alleles for wing structure.

Ans : It will produce 15 genotypes. (formula is no. of genotypes= n/2 (n+1)

SECTION-B

ATTEMPT ANY FOUR : - (08)

QN.3) Which law of Mendel is universally applicable and acceptable? State the law.

Ans : Law of segregation or Law of purity of gametes is universally acceptable and applicable. The law can be stated as,

The law states that "When hybrid (F1) forms gametes, the alleles segregate from each other and enter in different gametes". The gametes formed are pure in that they carry only

one allele each (either dominant allele or recessive allele). Hence, this law is also described as "Law of purity of gametes".

QN.4) Give reasons: Sex linked characters appear more frequently in men than in women.

Ans :

1) Human male shows a pair of heteromorphic sex chromosome i.e. XY while a female shows a homomorphic pair as XX.
2) Since, Y - chromosome is present in males only and not in females Y-linked genes will be expressed only in males.
3) The sex-linked dominant genes present on X-chromosome are expressed equally in both males and females. But sex-linked recessive genes are expressed only when both chromosomes show recessive genes.
4) Since male contain only one X- chromosome he requires only a single recessive gene for expression of sex-linked genes.

Due to all above reasons, sex linked characters appear more frequently in men than in women.

QN.5) Give an account of Thalassemia in Humans.

Ans :

1) It is characterised by reduced synthesis of or chains of haemoglobin.
2) Hence, it shows two types as thalassemia or B- thalassemia.
3) It was discovered by Coley (1925) hence it is also known as Cooley's anaemia or thalassemia Major.
4) Haemoglobin is a conjugated protein consisting of A and B chains, each chain with a and b subunits.
5) The decreased synthesis is of Hb A chain.
6) The a-globin chain is coded by a gene on chromosome 16 and the gene for b-globin chain is located on chromosome 11.
7) It results in deficiency of one chain and the relative excess of other chains.
8) Clinical symptoms are the occurrence of anemia, inability to synthesize Hb, Jaundice, variation in size and shape of RBC'.
9) Massive blood transfusion is needed i.e. transfusion one or two times the patients normal blood volume.
10) Thalassemia is a quantitative abnormality of polypeptide globin chain synthesis.

11) In a normal adult, this is equivalent to 10-20 units.

QN.6) Explain different types of chromosomes in detail.

Ans : On the basis of position of centromere the different types of chromosomes are as follows -

a) Metacentric: In this case the centromere occupies exactly the middle position. Due to which the two halves become equal and the chromosome appears V - shaped.

b) Sub Metacentric: In such chromosomes, the centromere occupies position slightly away from the mid-point and due to this the chromosomes appear 'L' or 'J' shaped.

c) Acrocentric: These are rod shaped chromosomes where the centromere is very near the proximal end and thus has a small arm on this end.

d) Telocentric: Centromere occupies position at the proximal end on a rod like chromosomes.

QN.7) Explain mechanism sex determination in honey bees.

Ans :1) The mechanism of sex determination in honey bees is Haplo - Diploid sex determination.

2) In honey bees, sex is determined by the number of sets of chromosomes received by an individual.

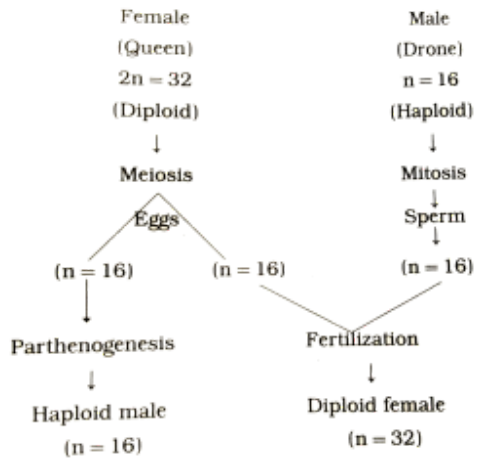
3) The fertilized egg develops as the female offspring may be a worker of the queen. It is diploid (2n = 32).

4) An unfertilized egg develops as a male / drone by parthenogenesis. The drones have haploid i.e. n = 16 number of chromosomes.

5) The sperms are produced by drones through mitosis.

6) It can be represented as follows -

Parents: -	Female	X	Male	
	(2n = 32)			(n = 16)
	Diploid			Haploid



QN.8) Give the significance of the test cross.

Ans : Significance of test cross :-

1) Pure line varieties:-It helps in development of homozygous true breeding variety.
2) It explains the law of dominance and the law of segregation.
3) It explains homozygous and heterozygous conditions of the individuals i.e. determine the genotypes of the unknown plants.
4) It is an easy and quick method of obtaining exotic varieties.
5) Back cross is usually used in hybridization programmes due to its simple ratios.

SECTION - C

ATTEMPT ANY TWO: - (06)

QN.9) Differentiate between chromosomal disorders and Mendelian disorders**.**

Chromosomal disorders	Mendelian disorders
1) Caused by chromosomal abnormalities.	1) Caused by allelic abnormalities.
2) Develop due to defective synapsis and disjunction.	2) Develop due to mutation.
3) Defects can be known through amniocentesis.	3) Defects can be predicted through pedigree analysis.
4) Rarely transmitted.	4) Transmitted into the progeny.

QN.10) State various reasons for Mendel's success.

Ans :

1) Selection of pea plants was an important reason.
2) Mendel selected and studied a single character at a time.
3) Mendel used principles of mathematics and statistics for interpretation of results.
4) Mendel kept his records in a definite pattern which helped to trace the characters in several generations.

5) Mendel's luck played a major role in his success.

6) Luckily, there was no linkage or incomplete dominance in characters selected by Mendel.

QN.11)A woman with blood group 'O' marries a man with AB blood group.

i) Work out all the possible phenotypes and genotypes of the progeny.

ii) Discuss the kind of dominance in the parents and the progeny in this case.

Ans :

A. The possible blood groups in offspring are A and B.

B. In codominance, both alleles of a pair express themselves fully in F1 hybrid. It is contrary to the situation seen in incomplete dominance, where traits express themselves only partially. This is the example of partial dominance or complete dominance.

		Father's genes	
		A	B
Mother's genes	O	*O/A* Blood type A	*O/B* Blood type B
	O	*O/A* Blood type A	*O/B* Blood type B

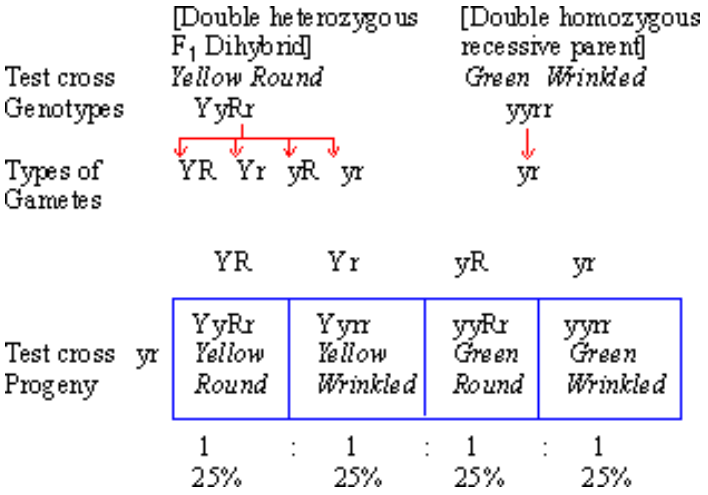
SECTION - D

ATTEMPT ANY ONE :- **(04)**

QN.12)A cross is made between a yellow plant having round seeds (YyRr) with one having green and wrinkled seeds (yyrr).What would be the genotypes and phenotypes of plants in the resultant generation? What kind of cross is this?

Ans:-

1. The given cross is a dihybrid test cross where an F1 individual is crossed with its recessive parent.
2. The phenotypes and genotypes can be represented by following checker board,



QN.13)Describe the structure of sex chromosomes with the help of labelled diagrams.

Ans.: The two sex chromosomes are X-chromosome and Y- chromosome. The structure can be explained as follows:

A) X - Chromosome:-

1) The X–chromosomes are sub metacentric with the centromere located slightly away from the middle.
2) It shows two types of segments namely, homologous and non-homologous chromosomes.
3) The homologous part shows identical gene loci and cross over during meiosis.
4) The non- homologous region carries X - linked genes which show X - linked inheritance.
5) The X - chromosomes show large amounts of Euchromatin and small amounts of heterochromatin.
6) X - chromosome is present in both males and females.
7) It decides the female sex of zygote.
8) The linkage shown by X - chromosome is known as X - linkage.
9) X - chromosomes show criss cross inheritance.

B) Y - Chromosome:

1) Y - chromosomes are present in males and absent in females.
2) It is shorter than X - chromosomes and curved at the end except for humans.
3) It shows centromere at one end hence it is acrocentric in nature.
4) It shows a homologous segment which shows crossing over during meiosis.
5) The non-homologous part does not carry the same gene loci and does not show crossing over.

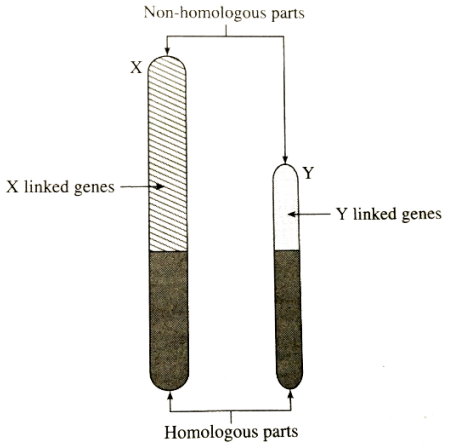
6) The genes present on non-homologous part are called as Y - linked gene and show Y - linked inheritance

7) Y-Chromosomes contain small amounts of Euchromatin and large amounts of heterochromatin.

8) The linkage shown by Y - Chromosomes is known as Y - linkage.

9) Y - Chromosomes show straight inheritance.

10) It determines male sex.



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CHAPTER – 4 : MOLECULAR BASIS OF INHERITANCE

Marks :- 25 **Time :- 1.30 Hrs**

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QN.1) SELECT AND WRITE THE CORRECT ANSWER: - **(04)**

1) Histone proteins are rich in ------

a) Arginine and Leucine b) Lysine and valine

c) Methionine and Arginine **d) Arginine and Lysine**

2) The main step involved in the process of translation is

a) Activation of amino acid

b) Initiation of polypeptide chain synthesis

c) Termination of polypeptide chain formation

d) Transfer of polypeptide chain to tRNA

3) The enzyme required for transcription is -----

a) RNA polymerase **b) DNA dependent RNA polymerase**

c) DNA polymerase d) DNA dependent DNA polymerase

4) Extranuclear DNA is present in ------

a) mitochondrion b) Golgi bodies

c) rough ER d) ribosome

QN.2) ANSWER THE FOLLOWING: - (03)

i) Mention the function of non-histone proteins.

Ans:- Non histone proteins contribute to the packaging of chromatin at higher levels.

ii) What is point mutation?

Ans:- Mutation that occurs in a single base pair of DNA is called point mutation.

iii) Which amino acid is coded by initiation codon?

Ans:- Methionine is the amino acid coded by initiation codon.

SECTION-B

ATTEMPT ANY FOUR: - (08)

QN.3) Enlist different levels of regulation of gene expression in eukaryotes.

Ans : The different levels of regulation at different levels are as follows:-

1) transcriptional level (formation of primary transcript)
2) processing level (regulation of splicing)
3) transport of mRNA from nucleus to cytoplasm
4) translational level

QN.4) Mention any two applications of genomics.

Ans :

1) Used in agriculture to develop transgenic crops having more desirable characters.
2) Genetic markers developed in genomics have applications in forensic analysis.
3) Genomics can lead to introducing new genes in microbes to produce enzymes, therapeutic proteins and even biofuels.
4) Helps on treatment of genetic disorders through gene therapy.
5) Improvement of livestock is also possible.

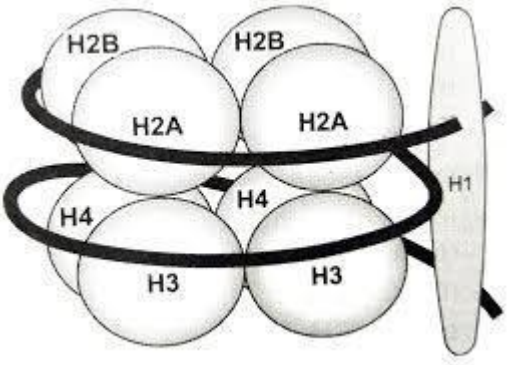
QN.5) Define the terms monocistronic and polycistronic.

Ans :

A. monocistronic:- A single structural gene in a transcription unit is said to be monocistronic.
B. polycistronic:- A long segment of DNA having a set of various structural genes in one transcription unit is referred to as polycistronic.

QN.6) Draw a well labelled diagram of the nucleosome.

Ans :



QN.7) Mention any two applications of DNA fingerprinting.

Ans : **1)** used to solve rape cases and complicated murder cases.

2) to find out the biological mother or father or both in case of disputed parentage.

3) used in pedigree analysis of various animals and humans.

QN.8) Complete the blanks a,b,c and d on the basis of Griffith's experiment.

S-strain---- injected into mice-----(--a---)

R-strain---- injected into mice-----(-b---)

S-strain(heat killed)---- injected into mice-----(--c---)

S-strain(heat killed) + live R-strain---- injected into mice-----(--d---)

Ans : a) mice alive b) mice dead c) mice alive d) mice dead

SECTION-C

ATTEMPT ANY TWO: - (06)

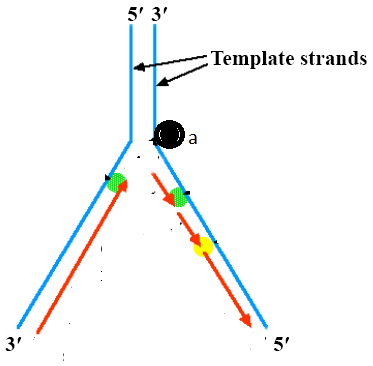
QN.9) Three codons on mRNA are not recognised by tRNA.Which are these codons? What is the general term used for them? What is their role in protein synthesis?

Ans : 1) The codons on mRNA that are not recognised by tRNA are UAA,UAG and UGA.

2) These are commonly called non-sense codons.

3) Their role in protein synthesis is to terminate the synthesis of the polypeptide chain at right stage.

QN.10) Observe the given figure and answer the following questions:-



(i) In which direction the new strands will be synthesized?

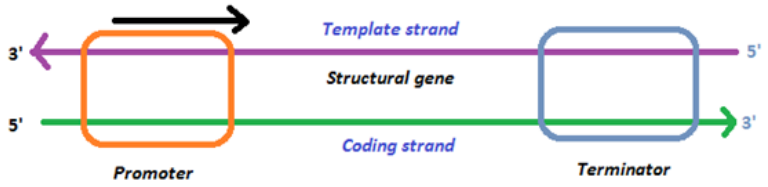
(ii)Which enzyme used to join the fragments of DNA produced in synthesis of lagging strand?

(iii) Identify 'a' in the given figure.

Ans : i) The new strands will be synthesised in the direction 5' to 3'.
ii) DNA ligase enzyme is used to join the fragments produced.
iii) The structure 'a' in the given diagram is SSBP i.e. single stranded binding protein.

QN.11) Draw a well labelled diagram of the transcription unit.

Ans :



Transcription unit

SECTION-D

ATTEMPT ANY ONE **(04)**

QN.12)Write a note on processing of hnRNA.

Ans :

1) In eukaryotes, the RNA obtained through transcription is called the primary transcript.
2) Primary transcript is non-functional and contains both exons and introns. It is to be processed before becoming functional.
3) Exons are the coding sequences and introns are noncoding sequences.
4) Splicing is the process through which introns are removed.
5) All exons are joined in a definite sequence with the help of enzyme DNA ligase.
6) This further undergoes capping and tailing.
7) In capping, methylated guanosine triphosphate is added at 5' end of this RNA.

8) In tailing, polyadenylation is carried out at 3' end. Adenylic acid residues are added.
9) This fully processed RNA is now called mRNA and is transported to cytoplasm for its use.

QN.13) Give an account of Hershey-Chase experiment that proved, 'DNA is the genetic material'.

Ans :

1) worked with bacteriophages that were composed of DNA and proteins.
2) Used radioactive phosphorus ^{32}P in the medium for some viruses and radioactive sulphur ^{35}S for some others.
3) Viruses cultured on medium with radioactive phosphorus contained radioactive DNA but not radioactive protein because DNA contains phosphorus but proteins do not.
4) Similarly, viruses grown on radioactive sulphur contained radioactive protein but not radioactive DNA because DNA does not contain sulphur.
5) These phages were allowed to infect E.coli bacteria containing normal 'P' and 'S'. After infection viral coats were removed by centrifugation.
6) Bacteria infected with viruses containing radioactive DNA were radioactive and those infected with containing radioactive sulphur were not radioactive.
7) This indicates that protein did not enter the bacteria. Hence, DNA is the genetic material.

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CHAPTER – 5 : ORIGIN AND EVOLUTION OF LIFE

Marks :- 25 **Time :- 1.30 Hrs**

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SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- (04)

1) Transfer of part of chromosome or set of genes to a non-homologous chromosome is called as -------

a) Deletion b) duplication c) Inversion **d) translocation**

2) Industrial mechanism is an example of

a) Neo-Darwinism **b) natural selection** c) mutation d) Neo-Lamarckism

3) Which of the following characters is not shown by apes?

a) Prognathous face **b) presence of tail**

c) chin absent d) forelimbs longer than hindlimbs

4) Any random fluctuation in allele frequency, occurring in the natural population by pure chance is called as------

a) Gene pool b) gene mutation c) Genetic recombination **d) genetic drift**

QN.2) ANSWER THE FOLLOWING: - (03)

1) What was the cranial capacity of *Homo habilis*?

Ans : The cranial capacity of *Homo habilis* was 650 to 800 cc.

2) What is chromosomal aberration?

Ans : The structural, morphological change in chromosome due to rearrangement is called chromosomal aberration.

3) Whose fossils were discovered at the site of Shivalik hills, India?

Ans : Fossils of *Ramapithecus* were discovered at the site of Shivalik hills, India.

SECTION-B

ATTEMPT ANY FOUR: - (08)

QN.3)Explain how complex organic molecules were formed from the primitive broth in context of chemical evolution.

Ans :

1. Primitive broth was neutral and free from oxygen.
2. Complex organic molecules were formed by polymerization.
3. Simple organic molecules aggregated to produce new complex organic molecules like polysaccharides, fats, proteins, nucleosides and nucleotides.
4. Protoproteins were formed due to polymerization of amino acids which were converted into proteins later on.
5. Formation of proteins was the landmark in origin of life as they accelerated the rate of different chemical reactions.

QN.4) State any two objections against Darwinism.

Ans :

1. Minute fluctuating variations were considered as main factors which are not inheritable and not part of evolution.
2. Unable to distinguish between somatic and germinal variations and considered all variations are inheritable.
3. Unable to explain 'arrival of fittest' and cause, origin and inheritance of variation and vestigial organs as well as extinction of species.
4. Natural selection suggests gradual accumulation of useful variations. This suggests the existence of intermediate forms, but no such forms are recognized.
5. Unable to explain the existence of neutral flowers and sterility of hybrids.

QN.5) Name any two types of premating isolating mechanisms.

Ans :

1) Habitat isolation or ecological isolation
2) Seasonal or temporal isolation
3) Ethological isolation
4) Mechanical isolation.
   These are the different types of pre-mating or prezygotic isolation.

QN.6) What is gene flow? What is its role?

Ans :

a) Gene flow:- the transfer of genes during interbreeding of populations that are genetically different is called gene flow.
b) Role:- It brings about change in the gene frequency.

QN.7) Explain directional selection.

Ans :

1. More individual acquired value other than the mean character value.
2. Natural selection acts to eliminate one of the extremes of the phenotypic range and favour the other. systematic elimination of homozygous recessive.
3. Operates for many generations leading to an evolutionary trend within the population and shifting peak in one direction.
4. examples are industrial melanism, DDT resistant mosquitoes etc.

QN.8) Give significance to palaeontology.

Ans :

1) useful in reconstruction of phylogeny.
2) helps in studying various structures and forms of extinct animals.
3) provides a record of missing links between two groups of organisms.

4) helps in the study of habits of extinct animals.
5) provides different types of evidence in support of evolution.

SECTION-C

ATTEMPT ANY TWO: - **(06)**

QN.9) Neanderthal man is the most advanced prehistoric man. Answer the following questions related to Neanderthal man.

a. In which epoch he lived?

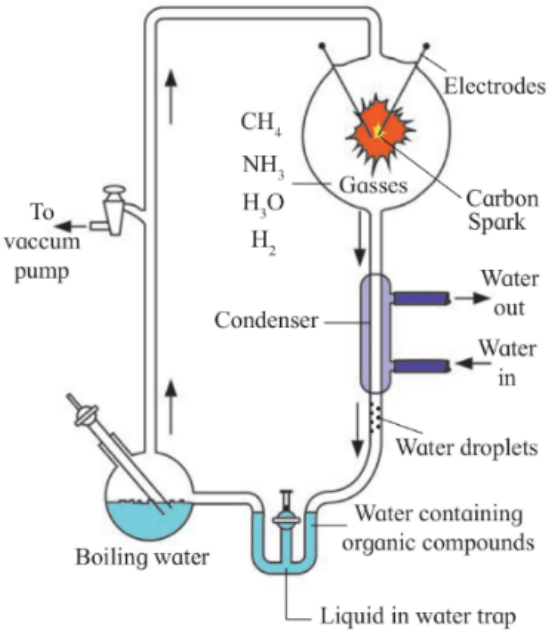
b. What was his cranial capacity?

c. What was the nature of his thigh bones?

Ans : a. Lived in the late Pleistocene epoch.
b. Cranial capacity was 1400 cc.
c. Thigh bones were outwardly curved.

QN.10) Draw a well labelled diagram showing the Urey-Miller experiment.

Ans :



QN.11)'Molecular evidence supports the common origin of life, justify.

Ans :

1. Cells form the structural and functional unit in all living organisms.
2. Cytoplasmic organelles like Golgi apparatus, endoplasmic reticulum, mitochondria are found in all cells.
3. Proteins and genes perform the same type of functions in all living organisms.
4. DNA forms the common ubiquitous genetic material.
5. DNA replication, protein synthesis, respiration follow the same mechanisms in all

living organisms.

6. All organisms use ATP as a source of any for different physiological activities.

Thus, all these facts indicate the common origin of life.

SECTION-D

ATTEMPT ANY ONE: - **(04)**

QN.12)Give the various important features of mutation theory.

Ans : 1) Mutations are large, sudden and discontinuous variations in a population.
2) Mutations are inheritable.
3) Mutations provide the raw material for evolution.
4) Mutations may be useful or harmful. Nature selects only useful mutations.
5) Accumulation of mutations over a long period of time leads to origin and establishment of new species.
6) Harmful mutations may persist or get eliminated by nature.

QN 13. Explain any three types of pre-mating isolating mechanisms.

Ans : Pre mating isolating mechanism:-

a) Habitat isolation:-Members of the population living in the same geographic region but occupy separate habitats so that potential mates do not meet.

b) Seasonal or temporal isolation:-Members of a population living the same geographic region but sexually mature at different times of the year or different years.

c) Ethological isolation:- Due to specific mating behavior the members of the population do not mate.

d) Mechanical isolation:- Members of two populations have differences in the structure of reproductive organs.

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CHAPTER – 6 : PLANT WATER RELATION

Marks :- 25 **Time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:-

(04)

1) Process of water oozing out from specific pore along leaf margins, is called as ……

a) photosynthesis **b) guttation** c) transpiration d) bleedin

2) Water available for absorption to the terrestrial plants is…..

a) capillary water b) hygroscopic water

c) gravitational water d) chemically bound water

3) The osmotic potential and water potential of pure water are respectively…..

a) 100 and zero **b) zero and zero**

c) 100 and 100 d) zero and 100

4) The space between the plasma membrane and the cell wall of a plasmolysed cell is occupied by ……

a) isotonic solution **b) hypertonic solution**

c) hypotonic solution d) water

QN.2) ANSWER THE FOLLOWING: - **(03)**

1) Which type of solution will bring out deplasmolysis?

Ans : Hypotonic solution will bring about deplasmolysis

2) What is the function of velamen tissue?

Ans : Absorption of water vapours from air is the function of velamen tissue

3) What is root pressure?

Ans : The hydrostatic pressure which is developed due to accumulation of water absorbed by roots is called as root pressure

SECTION-B

ATTEMPT ANY FOUR: - **(08)**

QN.3) Enlist various objections to root pressure theory.

Ans :

1. It is not applicable to plants taller than 20 meters.
2. Ascent of sap can also occur even in the absence of root pressure.
3. Root pressure value or magnitude is almost zero in taller Gymnosperms.
4. In actively transpiring plants, no root pressure is seen.

5. Xylem sap under normal conditions is under tension i.e. it shows negative hydrostatic pressure or high osmotic pressure.

QN.4) Mention any two/four points of advantages of transpiration.

Ans :

1) It removes excess water.
2) helps in the passive absorption of water and minerals from the soil.
3) helps in the ascent of sap.
4) Due to open stomata, it helps in gaseous exchange during photosynthesis and respiration.
5) It maintains the turgor of the cell.
6) Reduces temperature of the leaf and gives a cooling effect.

QN.5) Draw a well labelled diagram of the structure of stomata.

Ans :

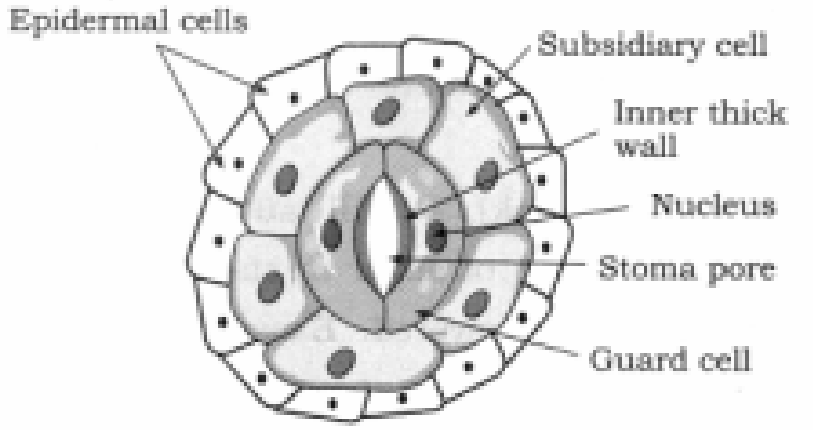


Fig. Structure of guard cell

QN.6) What are the various factors affecting water absorption?

Ans : 1.Presence of capillary water is essential.

2. Rate of water absorption is maximum at soil temperature between 20^0C to 30^0C.

3. High concentration of solutes in soil water reduces the rate of absorption of water.

4. Poorly aerated soil shows poor rate of absorption.

5. Increased transpiration accelerates the rate of absorption of water in the irrigated water.

QN.7) Explain the terms imbibant and imbibate.

Ans : 1) Imbibant :- Substance that absorbs water or liquid is called imbibant.

2) Imbibate :- The water or the liquid which gets imbibed is called an imbibate.

QN.8) Match the columns:-

Ans :

Column 'A'	Column 'B'
1.epistomatic	**a.nerium**
2.hypostomatic	**b.grass**
3.amphistomatic	**c.potamogeton**
4.astomatic	**d.lotus**

Ans :

Column 'A'	Column 'B'
1.epistomatic	**d.lotus**
2.hypostomatic	**a.nerium**
3.amphistomatic	**b.grass**
4.astomatic	**c.potamogeton.**

SECTION-C

ATTEMPT ANY TWO: - **(06)**

QN.9) Explain mechanism of sugar transport through phloem.

Ans : The Munch hypothesis is a widely accepted theory to explain the mechanism of sugar transport through phloem. It can be explained as follows: -

a) photosynthetic cells synthesize sugars due to which osmotic concentration of the cell increases.

b) It results in entry of water from the surrounding cells and xylem due to endo-osmosis.

c) Due to this turgor pressure of the cell increases and, sugar from the cell is forced ultimately into the sieve tube of the vein which is called as loading of vein.

d) At the sink end, root cell uses sugar and also synthesizes starch from excess sugar. This results in lowering of osmotic concentration.

e) Exo-osmosis occurs, water from the root cell is lost and turgidity decreases.

f) Due to lowering of turgor pressure, a turgor pressure gradient develops from the sieve tube in the leaf to root cell.

g) As a result, food is translocated along the concentration gradient, passively. This is called vein unloading.

QN.10) Write an account of diffusion in detail.

Ans :

1) Diffusion can be defined as the movement of ions/atoms/molecules/ of a substance from the region of their higher concentration to the region of their lower concentration.

2) The movement is due to the kinetic energy of the molecules.
3) The diffusion occurs only when the concentration of diffusing substance is not uniform and is continued till the equilibrium is achieved.
4) Diffusion pressure of pure solvent(pure water) is always greater than that of its solvent in a solution.
5) The difference in the diffusion pressure of pure solvent and the solvent in the solution is called diffusion pressure deficit or suction pressure. It is now called water potential.
6) Diffusion plays a significant role in plants in absorption of water, minerals, conduction of water against gravity, exchange of gases and transport and distribution of food.
7) Diffusion results in diffusion pressure which is directly proportional to the number of diffusing particles.

QN.11)Explain various types of transpiration.

Ans : The different types of transpiration can be explained as follows:-

a) Cuticular transpiration:

1. Cuticle is a layer of waxy substance present on the outer wall of epidermal cells of leaf and stem.
2. Simple diffusion is the main cause of cuticular transpiration and it accounts for 8-10% of total transpiration.
3. The process is continued throughout the day and its rate is inversely proportional to the thickness of the cuticle.

b) Lenticular transpiration:-

1. Lenticels are small raised structures composed of loosely arranged complementary cells.
2. Lenticels is a porous tissue present in the bark of old stem and pericarp of woody fruits.
3. It contributes about 0.1 to 1.0 % of total transpiration.

c) Stomatal transpiration:-

1. Stomata are major transpiring organs of the leaf and are present over the leaf epidermis.
2. Stomatal transpiration occurs only during daytime and accounts 90 to 93 % of total transpiration.

SECTION-D

ATTEMPT ANY ONE **(04)**

QN.12)Give an account of transpiration in pull theory.

Ans:- It is a widely accepted theory proposed by Dixon and Joly. The theory is based on following principles:-

A) Cohesive and adhesive forces of water :

1. The water molecules have a strong mutual force of attraction due to which they cannot be easily separated.
2. The magnitude of this cohesive force is about 350 atm.
3. There is attraction between water molecules and walls of tracheid and vessels of xylem. This is called adhesion.
4. The walls are made up of lignin and cellulose which show strong affinity for water.

B) Continuity of water column:

1. Strong cohesive and adhesive forces are responsible for development of continuous water columns in xylem.
2. The water column starts from root hair cells, cortical cells, xylem to mesophyll cells of the leaf around stoma.
3. The xylem vessels form a continuous column as their end walls are perforated and are placed on above the other.
4. The force of attraction is strong in such a way that the water column cannot be easily broken or pulled away.

C) Transpiration pull:-

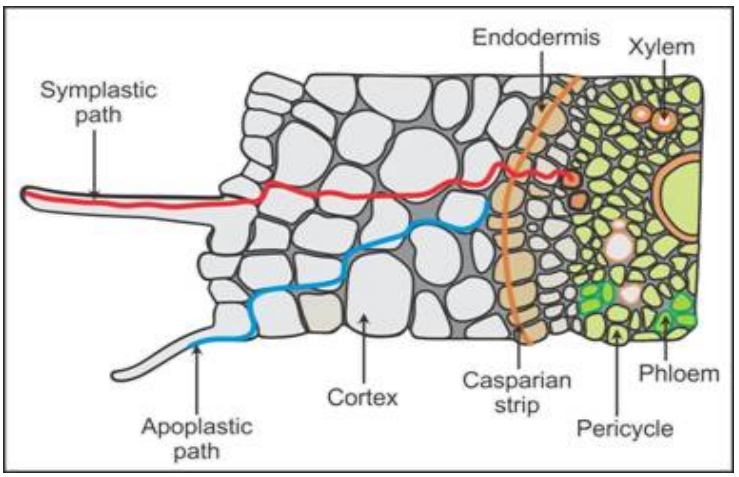
1. Transpiration results in loss of water from the mesophyll cells which results in development of D.P.D.
2. The negative hydrostatic pressure developed due to this is transmitted to the root cells.
3. Due to this water is pulled inside continuously from adjacent cells and carried upto leaf cells.
4. Due to transpiration pull, the water column moves upward by mass flow and the ascent of sap is completed.

QN.13) Discuss the path of water across the root with the help of a suitable diagram.

Ans : Path of water across the root :-

1. Water is absorbed by the root if there is an increasing gradient of diffusion pressure deficit.
2. The absorbed water in the root hair then moves to cortical cells and finally to the xylem.
3. The root cells after absorption of water become fully turgid. Due to this the suction pressure of the root cells decreases but it increases for the adjoining cells of cortex.

4. Water moves into the cortical cells and finally reaches the endodermis of the root.
5. Due to deposition of suberin endodermal cells do not allow movement of water. This deposition is called casparian strips.
6. However, in the endodermis opposite to protoxylem groups specialized thin walled passage cells are present that allow movement of water into the cells of the pericycle. Pericycle cells become turgid.
7. In xylem there is no turgor pressure. Their DPD is higher than that of surrounding cells. Hence , water moves upward easily.



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CHAPTER – 7 : PLANT GROWTH AND MINERAL NUTRITION

Marks :- 25 **Time :- 1.30 Hrs**

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SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- **(04)**

1) The Pfr form of phytochrome

a) retards flowering in LDP b) promotes flowering in LDP

c) promotes flowering in SDP d) promotes flowering in DNP

2) NPK denotes

a) Nitrogen, protein and kinetin

b) nitrogen, protein and potassium

c) nitrogen, potassium and kinetin

d) nitrogen, phosphorus and potassium

3) Which naturally occurring plant growth regulator was initially named as dormin?

a) IAA b) GA c) Kinetin **d) ABA**

4) Nitrogen fixing enzyme found in root nodules is ……..

a) nitrogen esterase **b) nitrogenase** c) nitrase d) *Nitrosomonas*

QN.2) ANSWER THE FOLLOWING: - **(03)**

i) Define absolute growth rate.

Ans : The ratio of change in the cell number(dn) over the time interval (dt) is called the absolute growth rate(AGR).

ii) Give the mathematical equation for arithmetic growth.

Ans : The mathematical equation for arithmetic growth is,

$Lt = L_0 + rt$

iii) What is bolting?

Ans : Elongation of internodes causing increase in the length of the stem is called bolting.

SECTION-B

ATTEMPT ANY FOUR: - **(08)**

QN.3) Explain the role of water and nutrients in growth.

Ans : A) Water:-

1. Essential component of protoplasm and maintains turgidity of the cell.
2. It acts as aqueous medium for biochemical reactions.

B) Nutrients:-

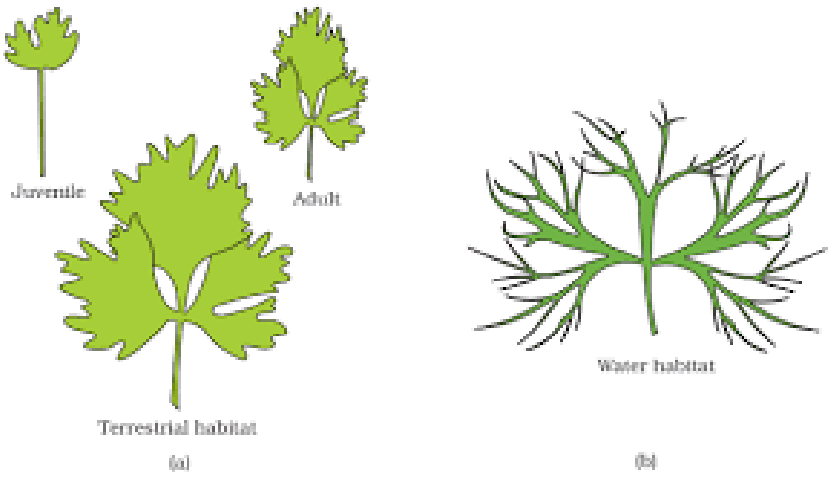
1. Various microelements and macroelements are required for proper growth of the plant body.

QN.4) Define the terms dedifferentiation and redifferentiation.

Ans : 1. Dedifferentiation: The living differentiated cell which has lost the capacity of division when it regains the ability to divide, it is called dedifferentiation.
2. Redifferentiation:- The cells produced by dedifferentiation once again lose the property of division and mature to perform the specific function. This is called redifferentiation.

QN.5) Write a note on plasticity. Draw suitable diagrams for the same.
Ans :

1. The ability of plants to produce different kinds of structures in response to different environmental conditions i.e. either external or internal stimuli in various phases of life.
2. In many plants the juvenile stage and mature stage show different forms of leaves in the same plant. E.g. heterophylly in cotton, coriander and larkspur.
3. The environmental heterophylly is exhibited by *Ranunculus* or butter cup.
4. The intrinsic plasticity is found in coriander and cotton.



QN.6) Differentiate between LDP and SDP.
Ans :

LDP (LONG DAY PLANTS)	**SDP(SHORT DAY PLANTS)**
1. Flowers under photoperiod more than critical day length.	1. Flowers under photoperiod less than critical day length.
2. Flowering occurs even if the dark period is interrupted by light.	2. Flowering is inhibited if a long dark period is interrupted midway by the flash of light.
3. Interruption during the light period inhibits flowering.	3. Interruption during the light period does not inhibit flowering.
4. Dark periods are not critical for flowering.	4.Long continuous and uninterrupted dark period is critical for flowering.

QN.7) Give an account of amino acid synthesis in plants.
Ans : The synthesis of amino acids in plants is carried out by following methods:-

a) Reductive deamination:- Ammonia reacts with alpha ketoglutaric acid to form glutamic acid or the glutamate.

$\alpha -$ ketoglutaric acid $+NH_4+NADPH_2 \rightarrow$ glutamate$+H_2O+$NADP

Glutamate dehydrogenase

b) Transamination:- The Amino group of one amino acid ($-CHNH_2$) is transferred to the keto position (-CO) of other carboxylic acid.

Glutamic acid + oxaloacetic acid $\rightarrow$ $\alpha -$ ketoglutaric acid + aspartic acid

Glutamate aspartate aminotransferase

QN.8) Define devernalization and give two points of significance of vernalization.

Ans : A) Devernalization:- The reversion of vernalization by high temperature treatment is called devernalization.

B) Significance of vernalization:-

1. Crops can be produced earlier.
2. Crops can be cultivated in a region where they do not usually grow.

SECTION-C

ATTEMPT ANY TWO: - (06)

QN.9) Explain stunting, chlorosis and necrosis as deficiency symptoms for mineral elements in plants.

Ans :

a) Stunting:- The growth is retarded. The stem appears condensed and short.
b) Chlorosis:- It is the loss or non-development of chlorophyll resulting in the yellowing of leaves.
c) Necrosis:- It is the localized death of tissue in leaves.

QN.10) 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. Dieback of shoots
5. Chlorine	e. Poor growth of plant
6. Manganese	f. malformed leaves.

Ans :

1.- c, 2.-f, 3.- d, 4.-b, 5.-e, 6.-a

QN.11)Write an account of nitrification.

Ans :1.Many soil bacteria participate in converting ammonia into nitrate, the form of nitrogen which can be used by plants and animals.

2. It is carried out by different bacteria as follows:-

Soil bacteria convert ammonia to nitrite. E.g. *Nitrosomonas, Nitrosococcus,* etc.

$2NH_3 + 3O_2 \rightarrow 2HNO_2 + 2H_2O$

Soil bacterium Nitrobacter adds a third oxygen atom to produce nitrate.

$2HNO_2 + O_2 \rightarrow 2HNO_3$

These bacteria are chemoautotrophs. By metabolizing nitrogen along with oxygen, they obtain energy for metabolism. (page no. 149)

SECTION-D

ATTEMPT ANY ONE **(04)**

QN.12)Explain various phases of growth. Draw sigmoid growth curves corresponding to phases of growth.

Ans:- The different phases of growth are as follows:-

A) Phase of cell division/ formation:-

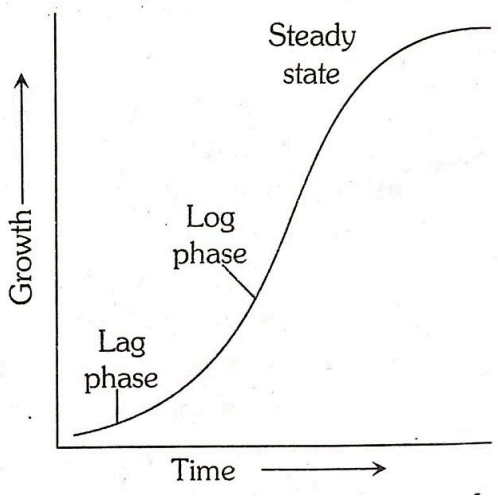
1. Meristematic cells undergo mitotic division to form new cells.
2. Out of two daughter cells formed , one undergoes enlargement and differentiation whereas the other remains meristematic.
3. In this phase, growth rate is very slow. (lag phase)

B) Phase of cell enlargement/elongation:-

1. The newly formed cell becomes vacuolated, osmotically active and turgid due to absorption of water.
2. The cell shows enlargement both in length and breadth.
3. Synthesis of new cell wall material is seen in this phase.
4. The growth rate is highest in this phase and accelerated. (log phase)

C) Phase of cell maturation/differentiation:-

1. The elongated cell now becomes specialised to perform specific function and attains maturity.
2. The growth rate slows down and comes to a steady state. (stationary phase)



QN.13) Explain role of cytokinin with respect to:-

a) apical dominance b) Richmond-Lang effect

c) secondary growth d) seed germination

Ans:-

a) apical dominance:- Cytokinin promotes the growth of lateral buds and reverses the effect of apical dominance.

b) Richmond-Lang effect:- It delays the senescence or ageing and abscission process in plant organs.

c) Secondary growth:- It promotes formation of interfascicular cambium and cell expansion

d) Seed germination:- It breaks dormancy and promotes seed germination at faster rate.

****

CHAPTER – 8 : RESPIRATION AND CIRCULATION

Marks :- 25 **Time :- 1.30 Hrs**

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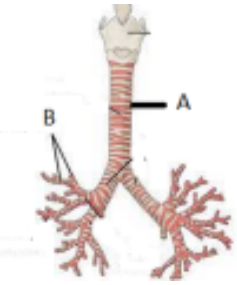
SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- **(04)**

1) In the given figure, label A and B represent



a) A- trachea, B- Bronchus b) A- Alveolus, B- Bronchiole

c) A- Bronchiole, B- Trachea **d) A- trachea, B- Bronchiole**

2) Which of the following cation is required for the conversion of prothrombin into active thrombin by thromboplastin?

a) Cu^{++} b) Fe^{++} c) Fe^{+++} **d) Ca^{2+}**

3) The heart sound murmur is heard during -----

a) closing of bicuspid and tricuspid valves

b) closing of aortic semilunar valves

c) leaking of blood through valves

d) closing of pulmonary semilunar valves

4) Switch off centre is for breathing lies in -------

a) medulla oblongata b) hypothalamus **c) pons varoli** d) carotid bodies

QN.2) ANSWER THE FOLLOWING: - **(03)**

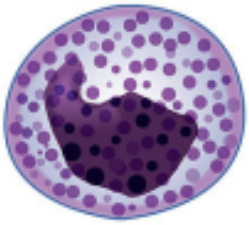
1) Why is 'fish heart' called venous heart?

Ans : As the heart of fish carries only deoxygenated blood it is called a venous heart.

2) Define oxygen dissociation curve.

Ans : The relationship between HbO_2 saturation and oxygen tension (ppO_2) is called the oxygen dissociation curve.

3) Identify the cell in the given diagram.



Ans : The given cell is a basophil.

SECTION-B

ATTEMPT ANY FOUR: **(08)**

QN.3) Match the columns showing organism and its respiratory organ :-

Column a	**Column b**
1.Sponges	A) Book gills
2.Insects	B) Plasma membrane
3.Spider	C) Spiracles
4.Limulus	D) Book lungs

Ans :

Column a	**Column b**
1.Sponges	B) plasma membrane
2.Insects	C) spiracles
3.Spider	D) book lungs
4.Limulus	A) book gills

QN.4) Write a short note on the ventilator.

Ans :

1. A ventilator is a machine that supports breathing during surgery, treatment for serious lung diseases or other conditions when normal breathing fails.
2. It is mainly used as a part of life support system.
3. It serves the following functions:-
   a. get oxygen into the lungs.
   b. removes carbon dioxide from the lungs.
   c. helps the patient breathe.

QN.5) Define the terms total lung capacity and vital capacity.

Ans:

1) Total lung capacity:- The maximum amount of air that the lungs can hold after a maximum forceful inspiration is called total lung capacity.
2) Vital capacity:- The maximum amount of air that can be breathed out after maximum inspiration is called as vital capacity.

QN.6) Give an account of agranulocytes.

Ans : B) Agranulocycles :

1) These do not contain granular cytoplasm and their nuclei are simple i.e. without lobes.

They are classified as follows :

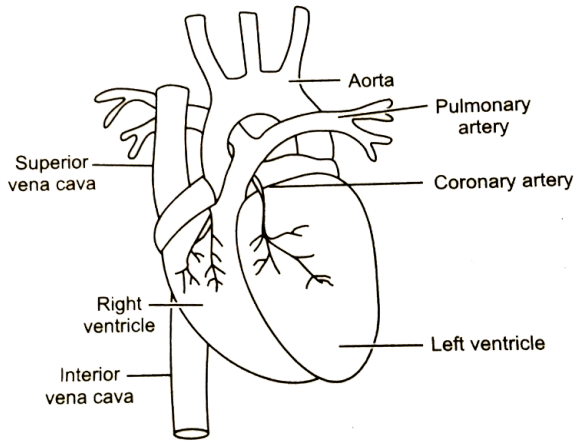
I) Lymphocytes :

1) These are the smallest cells with a thin layer of cytoplasm and large rounded nucleus.

2) These are 5% of total WBC content.

3) The important function is to produce antibodies and antitoxins against infection and give an immune response.
4) These can undergo mitosis producing B-lymphocytes and T-lymphocytes.
II) Monocytes :
1) These are large cells with kidney shaped nuclei and abundant cytoplasm.
2) These are 5%of total WBC^{S} contain.
3) Cells are phagocytic in nature.
4) Cells can undergo mitosis and produce B-lymphocytes and T-lymphocytes.
5) At the site of infection, the cells enlarge and differentiate into macrophages.

QN.7) Draw a well labelled diagram of ventral view of the human heart.
Ans :



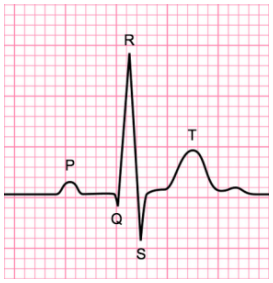
QN.8) Describe the structure of the heart wall.
Ans :

1) The heart is mesodermal in origin and its wall is composed of three layers.
2) Epicardium is the outer wall. It is thin and formed of single layer flat squamous epithelium resting on the basement membrane.
3) Myocardium is the middle thick layer formed of cardiac muscles.
4) Endocardium is a single thin layer formed of squamous epithelium.
5) Epicardium and endocardium are protective in function and myocardium brings outcontraction and relaxation of heart.

SECTION-C

ATTEMPT ANY TWO: - (06)

QN.9) Observe the following diagram and answer the given questions,



i) Which wave represents the atrial depolarisation?

ii) Name the wave that represents the ventricular repolarization.

iii) What does the QRS complex indicate?

Ans : i) P-wave represents the atrial depolarization.

ii) T-wave represents the ventricular repolarization.

iii) It represents the ventricular depolarization.

QN.10) Give an account of Internal structure or Histology of blood vessels.

Ans.: The blood vessel has three layer which are as follows:

(a) Tunica externa or Tunica Adventitia:

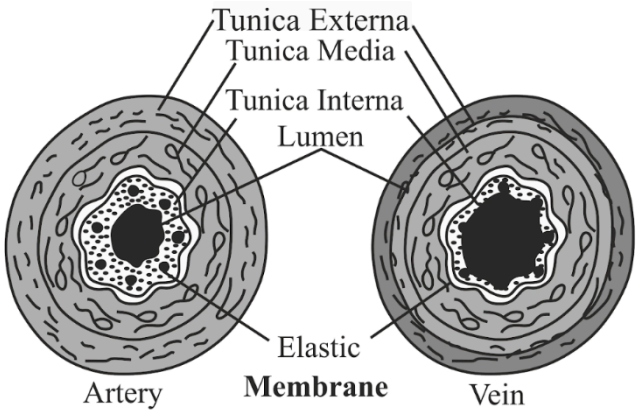
1. It is the outermost layer.
2. It is made up of connective tissue and collagen fibre.
3. In large arteries the tunica externa shows a distinct small blood vessel called vasavasorum which supplies blood to the arterial wall.

(b) Tunica Media:

1. It is the middle layer.
2. It is thick with helically arranged smooth muscles.
3. The layer gives elasticity and helps in regulation of blood pressure.

(c) Tunica Interna:

1. It is the innermost layer.
2. It is composed of a single layer of endothelial cells and some elastic fibre.
3. It minimises resistance against flow.



T.S of Artery and Vein

QN.11)Write symptoms, cause and treatment for chronic bronchitis and acute bronchitis.

Ans : A) Chronic bronchitis:-

a. Symptoms :-i) Coughing and shortness of breath
b. Cause:- Smoking and air pollution.
c. Treatment:- Quit smoking, avoid polluted air, if possible, move to a warmer and drier climate.

B) Acute bronchitis:-

a. Symptoms :- i) inflammation of bronchi, shortness of breath, yellow mucus coughed up.
b. Cause:- Viruses and bacteria are the main causes.
c. Treatment:- If bacterial antibiotics can be used, cough medicines and use vaporiser.

SECTION-D

ATTEMPT ANY ONE **(04)**

QN.12) Give the composition of blood plasma.

Ans:-

I. Plasma is a pale straw coloured slightly alkaline liquid part of the blood.
II. It is the matrix of blood and constitutes about 55% of total volume of blood.
III. It consists of 90% water and 10% different substances.
IV. The chemical composition of plasma is very complex.
V. Plasma shows two main types of components.

a) Organic Components:

I. Proteins: Plasma contains a number of proteins such as serum, albumin, globulin, fibrinogen, heparin and prothrombin.
II. Digested food: The different compounds such as glucose, glycerol, fats, amino acids, minerals vitamins etc. are present.
III. Excretory waste materials: These are generally in the form of urea, ammonia, uric acid, bilirubin, creatinine. etc.
IV. Regulative Substances: These are in the form of different enzymes and hormones.
V. Protective compounds: These are in the form of antibodies, antitoxins etc.
VI. Other Components: These are substances like cholesterol.

b) Inorganic Compounds:

I. Inorganic Salts: Plasma contains different cations and anions.Ex. Na^{+}, K^{+}, Ca^{++}, Carbonate, bicarbonate, etc.
II. Dissolved gases: These are oxygen and carbon di-oxide.

QN.13)Write a note on neural regulation of breathing.

Ans : Breathing regulation involves two main controls as neural control and chemical or hormonal control.

- Neural regulation:-

1. Normal breathing is quite an involuntary process.

2. The respiratory CENTRE is composed of groups of neurons located in medulla oblongata and pons varoli. Respiratory CENTRE is divided into two parts:-

a) Medullary respiratory CENTRE:-

i) Dorsal respiratory group:-

1. located in the dorsal portion of medulla oblongata.

2. It is mainly responsible for the inspiration process.

ii) Ventral respiratory group:-

1. It is located in the ventrolateral part of medulla oblongata.

2. It can cause inspiration or expiration depending upon which neuron group is stimulated.

b) Pons respiratory CENTRE:-

i) Pneumotaxic CENTRE:-

1. It is located in the dorsal part of pons varoli.

2. It primarily limits respiration.

ii) Apneustic centre:-

1. It is considered as a hypothetical Centre located in the lower part of pons varoli.

2. Proper function is not well understood.

3. It operates in association with the Pneumotaxic Centre to control depth of respiration.

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CHAPTER – 9 : CONTROL AND COORDINATION

Marks :- 25 **time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:-
(04)

1) The mandibular nerve is a branch of which cranial nerve?
a) II b) III **c) V** d) VI

2) Depolarisation of nerve impulse involves ---
a) entry of Na^+ only b) entry of K^+ only
c) entry of Na^+ and exit of K^+ d) entry of K^+ and exit of Na^+

3) Which gland atrophies after puberty ?
a) thymus b) thyroid c) parathyroid d) adrenal

4) Receptors for protein hormones are located -----
a) in cytoplasm **b) on cell surface** c) in nucleus d) on Golgi complex

QN.2) ANSWER THE FOLLOWING: - **(03)**

1) Name the hormone that helps in cell mediated immunity.
Ans : Thymosin hormone plays an important role in cell mediated immunity.

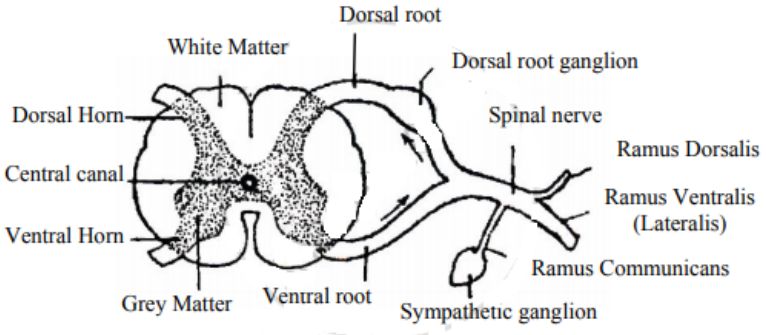
2) Name the area present on the frontal lobe of the brain that translates thoughts into speech.
Ans : Broca's area translates thoughts into speech.

3) Correct the following statement by replacing the word underlined. Insulin is a <u>steroid</u> hormone.
Ans : Insulin is a peptide hormone.

SECTION-B

ATTEMPT ANY FOUR: - **(08)**

QN.3) Draw a well labelled diagram of spinal nerve.
Ans :



Formation of Typical Spinal Nerve

QN.4) Write a note on the ventricles of the brain.

Ans :

1) Nature of CNS is hollow and filled with CSF.
2) The cavities of brain are called as ventricles and that of spinal cord is called as neurocoel or central canal.
3) The ventricles of the brain and neurocoel are internally lined by epithelial cells called ependymal cells.
4) These cells secrete CSF.
5) All the ventricles remain interconnected.
6) The different ventricles of brain are as follows :
   a. Paracoel : It is also called the lateral ventricle. These are two in number one in each cerebral hemisphere. These remain interconnected with a third ventricle through foramen of Monroe.
   b. Diocoel : It is also called the third ventricle. It is present in the diencephalon region. It remains connected with IVth ventricle through iter or aqueduct of Sylvius.
   c. Metacoel : It is also called the IV ventricle. It is present in hindbrain region. It further runs through the spinal cord.
   d. Neurocoel: It is the cavity of the spinal cord and also called the central canal.

QN.5) Explain conductivity and summation effect as properties of nerve fibre.

Ans : 1) Conductivity:It is the ability to transmit the excitation.

2) Summation effect:- A single subliminal stimulus will have no effect but if many such weak stimuli are given in quick succession, they may produce an impulse due to addition or summation effect.

QN.6) Explain role of placenta as a diffused endocrine gland.

Ans : 1. Placenta is a temporary endocrine gland.

2. During pregnancy, placenta secretes hormones such as estrogen, progesterone hCG i.e. human chorionic gonadotropin and human placental progesterone.

3. These hormones check the contraction of uterine muscles and also maintain the thickness of uterine endometrium thus they help to maintain pregnancy.

QN.7) Write an account of disorders related to adrenal cortex.

Ans : A) Addison's disease:-

1. It is due to hyposecretion of mineralocorticoids and glucocorticoids.
2. Characteristics of the disease:-
   a) low blood sugar
   b) low Na^+ and high K^+ concentration in plasma and water in urine
   c) Leads to weight loss, weakness, nausea, vomiting and diarrhoea.

B) Cushing's disease:-

1. It is caused due to hypersecretion of glucocorticoids.
2. Characteristics of the disease:-
   a) High blood sugar level
   b) excretion of glucose in urine
   c) rise in Na^+ in blood volume
   d) high blood pressure
   e) obesity and wasting of limb muscles.

QN.8) Which hormone is secreted by the pineal gland? What are its functions?

Ans : 1. Pineal gland secretes a hormone called melatonin or sleep hormone.
2. The different role are as follows:-
   a. Plays important role in the regulation of biological clock
   b. It helps in maintaining the normal rhythm of the sleep-wake cycle and also influences the body temperature.
   c. It influences metabolism.
   d. Influences reproductive cycle.

SECTION-C

ATTEMPT ANY TWO: - (06)

QN.9) Write an account of mid brain.

Ans:- MidBrain or mesencephalon:

1) It is present above pons varoli and is completely covered by cerebrum.
2) It mostly consists of white mater and also shows grey mater in the form of basal Nuclei.
3) It shows two parts:
   (a) Corpora Quadrigemina :
      i. The dorsal thick surface of mid brain is known as Tectum which produces two pairs of rounded structures. Hence the name quadrigemina.
      ii. The anterior lobes are called superior colliculi and posterior lobes are called inferior colliculi.
      iii. The anterior colliculi regulate visual reflexes (Specially over moving objects.)
      iv. Inferior colliculi control auditory reflexes (Ex. Sounds like the barking of a dog).
   (b) Crura cerebri or cerebral peduncle:
      i. The large vertical bundles of nerve fibre present on the ventral surface of mid brainis called as cerebral peduncles.
      ii. It connects the cerebral cortex with other brain parts along with spinal cords.
      iii. Functions:
         1) Controls vision, coordination of eye movement, auditory reflexes, etc.
         2) Cerebral Peduncle serves as gatekeeper for sorting of stimuli.
         3) Regulates muscle tone through RAS.

QN.10) Complete the following table based on types of exteroreceptors:

Sr.no.	Type of receptor	Location	function
1	Phonoreceptor	----	----
2	Statoreceptor	----	----
3	Photoreceptor	----	----

Ans :

Sr.no.	Type of receptor	Location	function
1	Phonoreceptor	Internal ear-organ of Corti	Sound reception
2	Statoreceptor	Internal ear-semi-circular canal	Receptors for maintaining balance and equilibrium
3	Photoreceptor	Retina of eye	Receives sensory stimuli for vision

QN.11) Explain role of various hormones secreted by gastrointestinal tract.

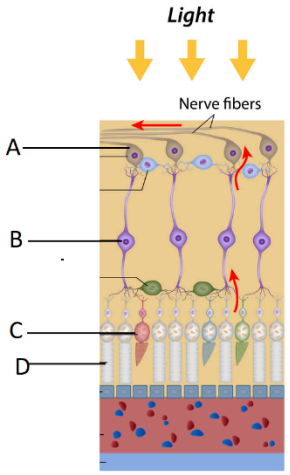
Ans : The different hormones are as follows:-

1. Gastrin:- It stimulates gastric glands to produce gastric juice.
2. Secretin:- It is responsible for secretion of pancreatic juice and bile from presence and
3. Cholecystokinin CCK/ pancreozymin PZ:- This hormone stimulates the pancreas to release its enzymes and also stimulates gallbladder to release bile.
4. Enterogastrone/ gastric inhibitory peptide(GIP):- It slows gastric contractions and inhibits secretion of gastric juice.

SECTION-D

ATTEMPT ANY ONE (04)

QN.12) The given diagram shows the structure of the retina. Some cells are marked in the
diagram. Identify these cells and write their functions.



Ans : 1) A is a Ganglion cell. The nerve fibres from the basal end of these cells collectively form the optic nerve.
2) 'B' is a bipolar cell. These cells provide the main pathway from photoreceptor to ganglion cells.
3) 'C' is a Cone cell. It is responsible for day vision i.e. photopic vision and colour vision.
4) 'D' is rod cell. It is responsible for vision in dim light i.e. scotopic vision.

QN.13) Observe the figure carefully and answer the following questions

i. The person in the photograph is suffering from -----
ii. The main cause of disorder is
iii. Mention its effect on BMR.
iv. How can it be controlled?

Ans :

i. The person in the photograph is suffering from exophthalmic goitre or Grave's disease.
ii. The main cause of disorder is an increase in the levels of thyroid hormone.
iii. BMR increases in this disease and causes effects on entire physiology.
iv. It can be treated by surgical removal of a portion of the gland.

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CHAPTER – 10 : HUMAN HEALTH AND DISEASES

Marks :- 25 **Time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- (04)

1) Typhoid is an acute infection of

a) liver **b) intestine** c) lungs d) blood

2) Drugs that have been used to treat typhoid fever include

a) Chloramphenicol b) Amoxicillin **c) Ciprofloxacin** d) All of these

3) AZT is used in the treatment of

a) Typhoid b) Malaria c) Cancer **d) AIDS**

4) Opium derivative is

a) codeine b) caffeine **c) heroin** d) psilocybin

QN.2) ANSWER THE FOLLOWING: - (03)

1) What is the source of cocaine ? (*Erythroxylum coca)*
2) Name the confirmatory test for AIDS. (ELISA)
3) Name the vector for filariasis. (Culex mosquito)

SECTION-B

ATTEMPT ANY FOUR: - (08)

QN.3) Write a note on clinical manifestation of AIDS.[238]

Ans : Clinical manifestation - the clinical manifestations of(symptoms) AIDS have been classified into four broad categories.

A. Stage I (Initial Infection by the Virus) : It is characterized by fatigue, fever, weakness, rash over face. Formation of antibodies , usually 2-8 weeks after initial infection.
B. Stage II (Asymptomatic or Carrier Stage): No symptoms are observed. Person becomes a carrier and spreads infection. Incubation period ranges from 6 months to 10 years.
C. Stage III (Development of AIDS related complex) ARC: It is characterized by lymph node enlargement (lymphadenopathy). It shows recurrent fever for longer than one month, fatigue, unexplained diarrhea, night sweats, shortness of breath, loss of more than 10 percent of weight, etc.
D. Stage IV : Characterized by persistent cough, sweating, loss of weight, fever, etc May develop headache, mental confusion etc. It may develop kaposi sarcoma, TB, Pneumonia etc.

QN.4) Explain surgery and immunotherapy as methods for treatment of cancer.

Ans : Surgery- In surgery the entire cancerous tissue or cells are removed surgically. It has limited utility.In certain cases such as breast tumor or uterine tumor,the surgery is most

effective, but other treatments are also given to kill any cancerous cell that may have been escaped in surgery.
Immunotherapy- Tumor cells have been shown to avoid detection and destruction by the immune system. Therefore, the patients are given substances called biological response modifiers such as a-interferon which activates their immune system and helps in destroying the tumor.

QN.5) Give any two symptoms of nasopharyngitis and also mention any two methods of prevention and control.

Ans : Symptoms of nasopharyngitis are Cough, sore throat, running nose and fever. Nasal congestion ,sneezing. Conjunctivitis [red eyes] Muscle rashes, fatigue, headache, shivering and loss of appetite.
Prevention and control : -
1] Staying away from people suffering from the common cold.
2] Use of a handkerchief to cover the nose and mouth during coughing and sneezing.
3] Washing hands with soap and water.

QN.6) Give an account of mode of transmission and diagnosis and treatment of pneumonia.

Ans:- Mode of transmission – Pneumonia mostly spreads by direct person to person contact.it can also spread via droplets released by using shared clothes and utensils.
Diagnosis and treatment – course of treatment depends upon pathogen lending to the disease. for bacterial pneumonia, antibiotics like Benzyl penicillium, Ampicillin and Chloramphenicol are effective.

QN.7)Explain mechanism of response of t-lymphocytes to antigen.

Ans : On coming in contact with antigen, T-lymphocytes form clones T-cells which are similar but they have different functions.
The clone has four types of T-lymphocytes.

1) Helper T cells - sensitized helper T cells produce lymphokines for performing several types of functions like proliferation of other T-cells,stimulization of B-lymphocytes, macrophages etc.
2) Killer T cells or Cytotoxic :-T-cells-they directly attack and destroy invading macrobes,infected body cells and cancer cells. Killer T-cells bind to infected cells and secrete perforins. The perforins form a hole in infected cell.it also releases substances that kill the cell, hence the name cytotoxic T -cells.
3) Suppressor T-cells:- These cells suppress the entire immune system against the attack on the own body cells.
4) Memory T-cells – these are the previously sanitized cells which retain the sensitization memory for long time in the future.

QN.8) Explain any two features of acquired immunity.

Ans : 1. Specificity: It is the ability to differentiate various foreign molecules. It is specific for each type of pathogen.
2. Diversity : It can recognize a vast variety of diverse pathogens or foreign molecules.
3. Discrimination between self and non-self : It is able to differentiate between its own body cells (self) and foreign cells or molecules (non-self).
4.Memory : When the immune system encounters a specific pathogen for the first time, it generates an immune response and eliminates the invader. The immune system retains the memory of this encounter. As a result, a second encounter with the same pathogen brings about a quicker and stronger immune response.

SECTION-C

ATTEMPT ANY TWO: - **(06)**

QN.9) Describe the structure of antibodies with the help of labelled diagrams.

Ans : Antibodies or immunoglobulins are highly specific to specific antigen. Structure – antibody is a "Y" shaped molecule.

Each immunoglobulin molecule is made up of four polypeptide chains. There are two heavy H-chains and two light or L-chains.

The four polypeptide chains are held together by disulphide bonds.(-s-s) to form a Y shaped structure.

The region holding together arms and stem of antibody ,is termed as hinge. Each chain of the antibody includes two distinct regions, the variable region and the constant region.

Variable region constitutes the antigen binding site(paratope). This part of antigen recognizes and binds to the specific antigen to form an antigen -antibody complex. Since most antibodies carry two antigen binding sites, they are called bivalent.

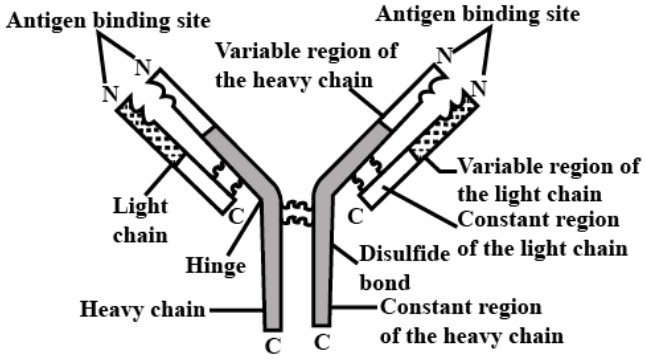


Fig. Structure of antibody

QN.10) Write a note on amoebiasis.

Ans : Amoebiasis is also known as amoebic dysentery. It is a common infection of the human gastro -intestinal tract. Amoebiasis is caused by the protist parasite entamoeba histolytica.

- Signs and symptoms : – Diarrhoea, flatulence, stool with mucous and abdominal pain

[cramp] is common. Passing of blood with stool is common in severe cases. Hepatomegaly occurs if a parasite enters the liver, the liver develops amoebic liver abscess accompanied with fever and pain in the right abdomen.

- Mode of transmission :- faeco-oral route.eating with dirty hands, contaminated food and water.
- Diagnosis and treatment : – Diagnosis of amoebiasis is made through microscopic examination of stool. Amoebiasis is treated by use of metronidazole and tinidazole which can destroy the e.histolytica in the digestive tract as well as other tissues.
- Prevention and control : – Wash hands with hot water and after using toilets. Drink boiled water or chlorinated or filtered water. Avoid eating unhygienic food. Vegetables must be properly washed and cooked. Proper sanitary facilities including sewage disposal help in prevention.

QN.11) Explain various stages of adolescence.

Ans : Adolescents are defined as individuals of the 10 to 19-year age group. adolescence is divided in three stages viz.early stage, middle stage, and late stage.

- **Early period [10 to 14 yrs.] :-**The changes include the beginning of the appearance of secondary sexual characters, growth reaching to its peak, rapid physical growth, concrete thinking, defining boundaries dependence /independence, self-exploration ,developing body image, development of intense friendship, seeking to counter instability and evaluation.
- **Middle period [15 to 17 yrs.] :-** It is characterized almost full development of secondary sexual characteristic,growth slows down,appx 90% of adult stature is attained, thinking is more abstract, concrete thinking under stressful conditions, reestablishment of body image capable of long range thinking, sense of leadership and all-powerfulness, preoccupied with romantic fantasy, ability testing to attract opposite sex,peer group help defining behavioral code etc.
- **Late period [18 to 19 yrs.] :-** It is characterized by establishment of total physical maturity, establishment abstract thinking, intellectual and functional identity, peer group recedes in favor of individual relationship, stable relationship and change from childhood to adulthood relationship.

SECTION-D (04)

QN.12)Observe the given figure and answer the following questions.

i. Which disease is caused by this organism ?

(ringworm or dermatophytosis)

ii. What is onychomycosis?

(infection of nails)

iii. What is the main mode of transmission of this disease ?

(sharing and close contact with infected person)

iv. Name any one drug used to cure this disease.

(nystatin, fluconazole, itraconazole)

QN.13)Mention any four symptoms of malaria .How it is diagnosed ? Explain the method of biocontrol?

Ans :

- Symptoms : -Symptoms of malaria begin to appear about 7 to 15 days after the bite of an infectious mosquito. Initial symptoms are fever ,headache, and chill, which may be difficult to recognize as malaria ,vomiting and convulsions, arthralgia [joint pain] anemia due to rupturing of RBCs retinal damage.
- Diagnosis : - Malaria can be diagnosed by microscopic study of blood smear. Besides, other rapid diagnostic tests based on nucleic acid amplification techniques are also used.
- Method of biocontrol :- Can be controlled by using *Gambusia* freshwater fish.

****

CHAPTER – 11 : ENHANCEMENT OF FOOD PRODUCTION

Marks :- 25 **Time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- **(04)**

1) The percentage of methane in biogas is about

a) 30-40% b) 0-3% **c) 50-60%** d) 60-70%

2) Mule is produced through-----

a) inbreeding b) artificial insemination

c)Interspecific hybridisation d) outbreeding

3) Microbial source of vitamin C is

a) *Aspergillus niger* b) *Pseudomonas denitrificans*

c) *Neurospora gossypi* d) Yeast

4) ……..is a variety of wheat developed against leaf and stripe rust.

a) Pusa Sadabahar b) Pusa Shubhra c) Pusa Swarnim **d) Himgiri**

QN.2) ANSWER THE FOLLOWING: - **(03)**

1) What is heterosis?

Ans : The superiority of hybrids in characters over its parents is called heterosis or hybrid vigour.

2) Name the technique used to increase the herd size.

Ans : MOET i.e. multiple ovulation embryo transfer technique is used to increase herd size.

3) Name the microbe used to produce cellulase enzymes.

Ans : *Trichoderma konigii* is used to produce cellulase enzymes.

SECTION-B

ATTEMPT ANY FOUR: - **(08)**

QN.3) Physiological, biochemical and morphological characters of crop plants provide resistance. Explain this with suitable examples.

Ans : The different examples can be given as follows:-

1. Development of morphological characters like hairy leaves in cotton and wheat develop vector resistance from jassids and cereal leaf beetle respectively.
2. solid stem in wheat leads to resistance to stem borers.
3. Biochemical characters provide resistance to insects and pests. For example, the high aspartic acid, low nitrogen and sugar content in maize lead to resistance against stem borers.
4. The nectar less cotton having smooth leaves develop resistance against bollworms.

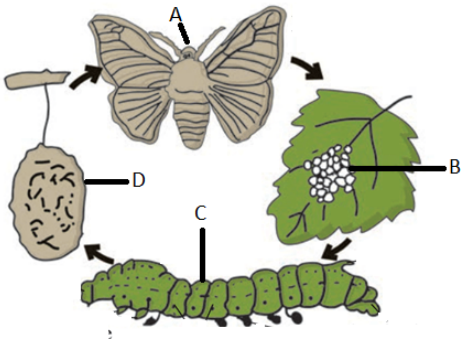
QN.4) Match the columns poultry disease and causative agent:-

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

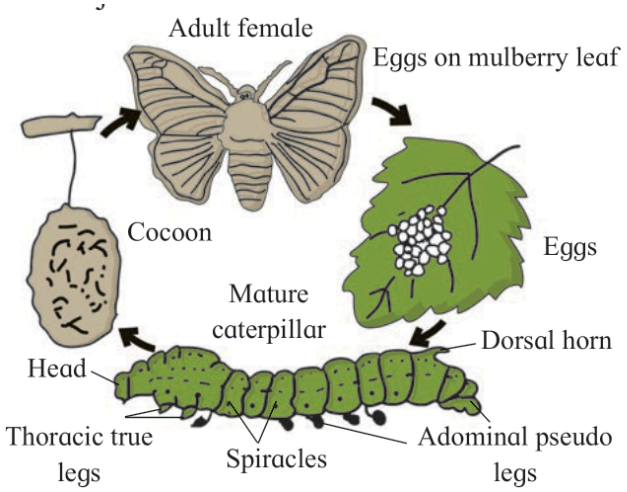
Ans :

Poultry disease	**Causative agent**
1) Chronic respiratory disease	D) bacterial disease
2) Favus and thrush	A) fungal disease
3) Caecal worm infection	B) parasitic disease
4) Coccidiosis	E) protozoan disease

QN.5)Identify the stages of life cycle of silkworm in the following diagram,



ANS:-



QN.6) Fruit orchards and flowering plants largely depend on gibberellins. Can you explain this?

Ans :

1. Gibberellins show various effects on flowering plants and fruit orchards.
2. They can be used to induce parthenocarpy in apple, pear, etc.
3. Used in breaking dormancy of seeds.
4. Induce flowering in long day plants under short day conditions.
5. Elongation of fruit in apple and increase in length of grape stalk is another application.

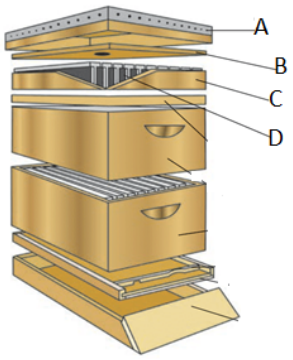
QN.7) Complete the following table with respect to microbes and any one of their hosts:-

Column-I	Column –II
1) *Bacillus thuringiensis*	a)
2) *Zoopthora radicans*	b)
3) *Nosema locustae*	c)
4) *Granulovirus*	d)

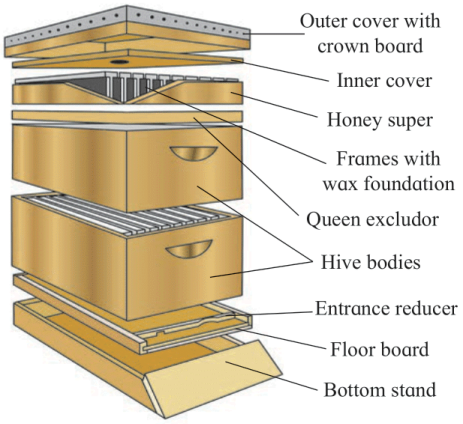
Ans :

Column-I	Column –II
1) *Bacillus thuringiensis*	a) Caterpillar, cabbage worm, adult beetle
2) *Zoopthora radicans*	b) aphids, mealy bugs, mites, white flies
3) *Nosema locustae*	c) grasshopper, caterpillars, crickets
4) *Granulovirus*	d) caterpillars, wasps, gypsy moths, ants, beetles

QN.8) Identify A, B, C, and D in the following:-



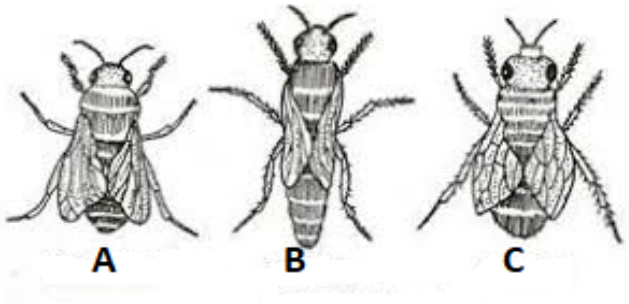
ANS:-


Outer cover with
crown board
Inner cover
Honey super
Frames with
wax foundation
Queen excludor
Hive bodies
Entrance reducer
Floor board
Bottom stand

SECTION-C

ATTEMPT ANY TWO: - (06)

QN.9)Identify A, B and C in the following diagram and answer the following questions:-



1) …… is responsible for maintenance of bee hives, collection of pollen and nectar.
2) The mother of the beehive is -----.
3) Which one of the above is less in number and develops parthenogenetically?

Ans : 1) Worker bee 2) Queen 3) Drone

QN.10) Differentiate between callus culture and suspension culture.

Ans :

	Callus Culture		**Suspension Culture**
1.	It consists of unorganized Mass of cells called Callus.	1.	It consists of single cell or small cell groups.
2.	Cells are cultured over solid nutrient medium with agar.	2.	Cells are cultured in liquid Medium which is without agar.
3.	May contain cytokinin and auxin.	3.	It contains mostly auxin specially 2-4 D.
4.	There is no need for agitation.	4.	It needs constant agitation at 100 to 250 rpm.
5.	Callus is produced in 3 weeks.	5.	It gives quick resultsgenerally, within 2 weeks.

QN.11) Complete the following table based on pest resistant varieties of plants,

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

Ans :

Crop	**Variety**	**Insect pest**
Brassica	Pusa Gaurav	Aphids
Flat bean	Pusa sem 2 Pusa sem 3	Jassids, aphids and fruit borer
Okra	Pusa Sawani, Pusa A-4	Shoot and fruit borer

SECTION-D

ATTEMPT ANY ONE **(04)**

QN.12)Mention different advantages of micropropagation.

Ans :

Advantages of microporpagation:

1. It helps in rapid multiplication of plants.
2. A large number of plantlets are obtained within a short period and from a small space.
3. Plants are obtained throughout the year under controlled conditions, independent of seasons.
4. Genetically similar plants (clones) are produced (formed) by this method. Therefore desirable characters (genotype) and desired sex of superior variety are kept constant for many generations.
5. The rare plant and endangered species are multiplied by this method and such plants are saved.

QN.13) Complete the following table based on antibiotic and its microbial source.

Antibiotic produced	Microbial source
1) Terramycin	*a)*
2) Griseofulvin	*b)*
3) Erythromycin	*c)*
4) Streptomycin	*d)*

Ans :

Antibiotic produced	Microbial source
1) Terramycin	*a) Streptomyces aurifaciens*
2) Griseofulvin	*b) penicillium griesofulvum*
3) Erythromycin	*c) streptomyces erythreus*
4) Streptomycin	*d) Streptomyces griseus*

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CHAPTER – 12 : BIOTECHNOLOGY

Marks :- 25 **Time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:-

(04)

1) The _____ are molecular scissors that are used to recognize and cut DNA at specific sequences.

a) plasmids b) cloning vectors

c) restriction enzymes d) lysozymes

2) In vitro amplification of DNA or RNA segment is known as _____

a) chromatography **b) polymerase chain reaction**

c) southern blotting d) gel electrophoresis

3) In Anemia the Recombinant protein _____ is produced by r- DNA technology.

a) Relaxin b) Insulin **c) erythropoietin** d) antitrypsin

(4) The Ti plasmid being used for introducing genes in plants obtained from _____

a) *Agrobacterium rhizogenus* b) *Agrobacterium T20*

c) ***Agrobacterium tumefaciens*** d) *E.coli*

QN.2) ANSWER THE FOLLOWING: - **(03)**

1) What is a Palindromic sequence?

Ans : Palindromes are groups of letters that form the same word when read in both directions i.e. forward and backward.

2) Give the role of Ca^{++} ions in the transfer of a recombinant vector into a bacterial host cell.

Ans : Calcium ions assist the transfer of recombinant vectors into the host cell Increasing the competency of the cell.

3) What does the abbreviation HGP stand for?

Ans : Human Genome Project.

SECTION-B

ATTEMPT ANY FOUR: - **(08)**

QN.3) Enlist the basic steps involved in r- DNA technology.

Ans : 1) Isolation of DNA (gene) from the donor organism.

2) Insertion of desired foreign gene into a cloning vector (vehicle DNA).

3) Transfer of rDNA into a suitable competent host or cloning organism.

4) Selection of the transformed host cells.

5) Multiplication of transformed host cells.

6) Expression of the gene to obtain the desired product.

QN.4) Give an account of oral vaccines.

Ans :

1) It is the latest development in the field of vaccines.
2) Immunogenic proteins of certain pathogens are found to be active if taken orally.
3) The gene that encodes such protein is isolated and constructed artificially.
4) It is then inserted into a plant genome for its expression. Immunogenic protein is expressed in plants.
5) If it is given to animals, especially humans, the person gets vaccinated against a specific pathogen. Such vaccines are known as edible vaccines.
6) The most important example is the flu vaccine by bacillus which melts in the mouth.
7) Comfort of use, low cost and easy storage are few more advantages.

QN.5) What is Biopiracy ? Mention any two examples.

Ans : Biopiracy:- It is defined as ‘ theft of various natural products and then selling them by getting patents without giving any benefits or compensation back to the host country.’

Examples:-

1. Patenting of neem
2. Patenting of Basmati rice

QN.6) Give the importance of transgenic animals in medical research and pharmaceuticals.

Ans :

a) Medical research :- Transgenic animals are used to identify the functions of specific factors in complex homeostatic systems through over or under- expression of a modified gene (the inserted transgene).
b) Pharmaceuticals :- In the pharma industry targeted production of pharmaceutical proteins, drug production and product efficacy testing.

QN.7) Give an account of any two proteins obtained through transgenic plants.

Ans :

a) Human growth hormone with the gene inserted into the chloroplast DNA of tobacco plants.
b) Humanized antibodies against such infectious agents as HIV, respiratory syncytial virus(RSV), Herpes simplex virus (HSV) , the cause of cold sores.
c) protein antigens to be used in vaccines .e.g. -patients specific antilymphoma vaccines.

QN.8) Give any two applications of gene therapy.

Ans :

1. Replace missing or defective genes
2. Deleiver genes that speed the destruction of cancer cells.
3. Supply genes that cause cancer cells to revert back to normal cells
4. Deliver bacterial or viral genes as a form of vaccination
5. Deliver DNA to antigen expression and generation of immune response.

6. Supply of gene for impairing viral replication
7. Provide genes that promote or impede the growth of new tissue.
8. Deliver genes that stimulate healing of damaged tissue.

SECTION-C

ATTEMPT ANY TWO: - **(06)**

QN.9) Give an account of somatic cell gene therapy.

Ans :

1. In this type the gene is introduced only in somatic cells like bone marrow cells, hepatic cells ,fibroblasts, endothelium and pulmonary epithelial cells, central nervous system, endocrine cells and smooth muscle cells of blood vessel walls.
2. Modification of somatic cells only affects the person being treated and the modified chromosomes cannot be passed on to future generations.
3. Somatic cell gene therapy is the only feasible option and the clinical trials have already employed for the treatment of acquired disorders such as cancer and rheumatoid arthritis and blood disorders including SCID, Gaucher's disease, familial hhypercholesteroemia, haemophilia, phenylketonuria, cystic,fibrosis,sickle cell anemia. Duchenne muscular dystrophy emphysema ,thalassemia etc.

QN.10)Write an account of main objectives of improved animal breeding programs coupled with gene transfer technique.

Ans :

1. Efficiency of meat production
2. Improved meat quality
3. Milk quality and quantity
4. Egg production
5. Wool quality and quantity
6. Disease resistance in animals
7. Production of low-cost pharmaceuticals and biologicals

QN.11)Explain effects of Biotechnology on Human health with respect to allergies, long term effect and new proteins .

Ans :

1) **Allergies**- GMO crops could potentially have negative effects on human health as well. Consumers have developed unexpected allergic reactions. e.g. researchers used a gene from the Brazil nut to increase the production of methionine in soybeans. The insertion of this gene inadvertently caused allergic reactions to the soya beans in those with known nut allergies. (biotech soybeans)
2) **Long term effect-** Because GMO technology has been available for such a short amount of time, there is relatively little research which has been conducted on the long-term effect of health which we can anticipate at this point.

3) **New proteins-** Proteins that have never been ingested before by humans are now part of the foods that people consume every day. Their potential effects on the human body are as yet unknown.

SECTION-D **(04)**

QN.12)Describe PCR technique with a labelled diagram.

Ans : Three basic steps involved are denaturation annealing polymerisation.

a) Denaturation (Melting of DNA):

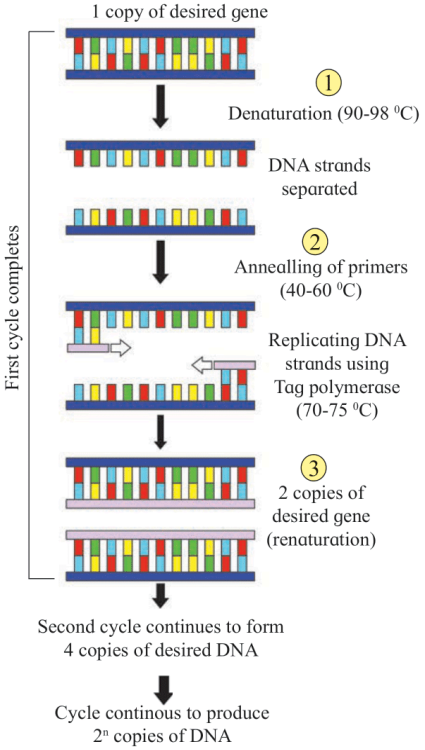
1) In these steps the desired DNA is heated up to 91^0C (mostly 94 to 96^0C).
2) These results in breaking of hydrogen bonds and separation of two DNA strands
3) These ssDNA obtained then act as a template. The process is called melting of DNA.

b) Annealing (Renaturation):

1) The process of pairing of two oligonucleotide primer with the single strandedDNA template is annealing.
2) The primers are added, temp. is maintained at 55^0c which further helps in formation of hydrogen bonds.

c) Polymerisation or Extension:

1) The different dNTPs and taq polymerase are added to the reaction mixture.
2) Taq DNA polymerase helps to add new nucleotides in the presence of Mg.
3) The process is initiated at 3' end of each primer and primers extend by joining the bases complementary to the template.
4) The two primers extend towards each other .
5) The optimum temp. polymerisation is 72^0C which can be maintained by using different methods. In PCR, these three steps are repeated several times to obtain large no. of copies. A single cycle takes 3 to 5 min.



QN.13) Explain the following terms with respect to recombinant DNA technology.

a) passenger DNA

b) chimeric DNA

c) transformed cells

d) restriction site

Ans :

a) Passenger DNA :- A fragment containing a desired gene which is isolated and selected for cloning is called passenger DNA or foreign DNA.

b) Chimeric DNA:- The combination of vector DNA and foreign DNA or passenger DNA is called chimeric DNA or recombinant DNA.

c) Transformed cells:- The host competent cell which has taken up rDNA is called a transformed cell.

d) Restriction Site:- The site at which DNA is cut by the restriction enzymes is called a restriction site.

****

CHAPTER – 13 : ORGANISMS AND POPULATIONS

Marks :- 25 **Time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- **(04)**

1) Community is defined as….

a) Group of similar Angiosperms. **b) interacting population**

c) Interacting ecosystem d) group of mangroves

2) Regional and local variations within each biome lead to the formation of variety of

a)habitats b) niches c) species d) genus

3) Maximum absorption of rainfall water is done by

a) tropical evergreen forest b) tropical deciduous forest

c) coniferous forest d) deserts

4) Polar bears show hibernation during

a) winter b) summer

c) rainy season d) favourable conditions

QN.2) ANSWER THE FOLLOWING: - **(03)**

1) Define the term absolute mortality.

Ans : The number of deaths under ideal conditions (with no competition, abundance of resources such as food and water, etc.) is called absolute mortality.

2) What does ESS stand for?

Ans : ESS stands for evolutionary stable strategy.

3) Define the term habitat.

Ans : Habitat is a place or the set of environmental conditions around the organisms to which it must adapt to survive and prosper.

SECTION-B

ATTEMPT ANY SIX: - **(12)**

QN.3) Explain dormancy, hibernation and aestivation as an adaptation.

Ans :

1. All the three terms are included under ‘suspend’ which is an adaptation against adversity of the environment.
2. Dormancy is shown by seeds to tide over the period of stress i.e. they temporarily suspend germination and growth.
3. Hibernation is seen in animals like polar bear during winter as they are unable to migrate.
4. Aestivation is shown by some snails and fish to avoid summer heat.

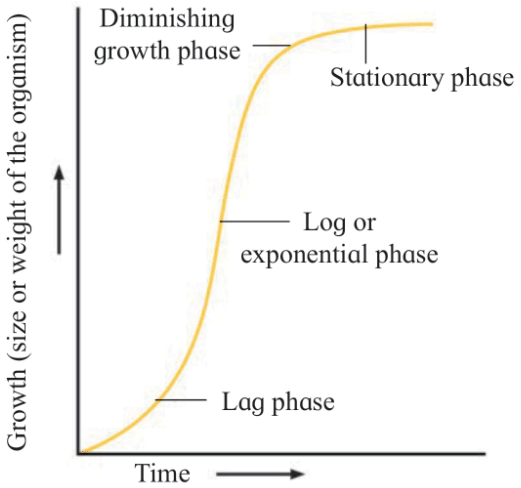
QN.4) Define the terms immigration and emigration.

Ans :

1. Immigration:- Immigration is the number of individuals of the same species that have come into the habitat from elsewhere during the time period under consideration.
2. Emigration:- Emigration is the number of individuals of the population who left the habitat during the time period under consideration.

QN.5) Draw a well labelled diagram of the logistic growth curve.

Ans :



QN.6) Write a note on natality.

Ans :

1. Natality is the birth rate of a population.
2. It has the greatest influence on a population's growth.
3. Natality is a crude birth rate or specific birth rate.
4. Crude birth rate is used when calculating the population size whereas specific birth rate is used relative to a specific criterion.
5. Natality is of two types, absolute natality and realised natality.

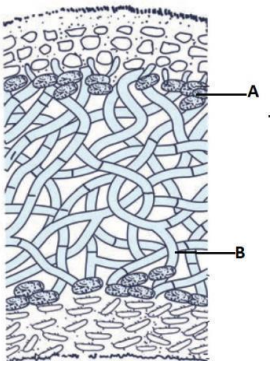
QN.7) Define the term biome and population.

Ans:-

i. Biome:- The distinctly large area seen on the earth identified by the climatic zone having specific flora and the associated fauna.

ii. Population:- The group of organisms of the same kind inhabiting a geographical area is called a population.

QN.8) Identify A and B in the following diagram and mention their role in association.



Ans:

1. 'A' is alga in this association and it carries out photosynthesis and provides food to partners.
2. 'B' is a fungus that lives in association with alga and provides water to alga for photosynthesis.

QN.9) Xerophytes can survive in the regions with scarcity of water. Why?

Ans :

1. Xerophytes are the plants which develop different adaptations to survive in regions with less availability of water and reduce water loss also.
2. The different adaptations are as follows:-
   a. presence of thick cuticle on their leaf surfaces
   b. deep sunken stomata mostly on lower epidermis
   c. Special photosynthetic pathway -CAM pathway that enables stoma to remain closed during daytime.
   d. d. In plants like opuntia, leaves are reduced to spine and flattened stem carries out photosynthesis.

QN.10)Explain light as an abiotic factor that influences the habitat of an organism.

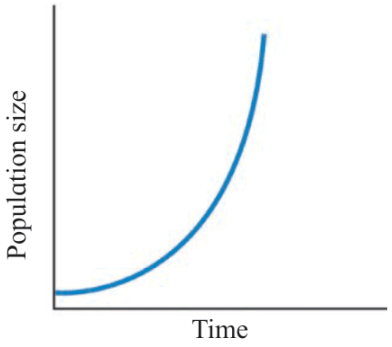
Ans :

1. Plants use light for photosynthesis which is the only source of energy for the entire ecosystem.
2. Many species of small plants are well adapted to low light conditions as they are constantly overshadowed by the tall trees.
3. Animals also respond to diurnal and seasonal variations in light intensity and duration.
4. These are the clues for timing their foraging, reproductive and migratory activities.
5. The availability of light is closely linked to the temperature conditions on land.

SECTION-C

ATTEMPT ANY TWO: - (06)

QN.11) Observe the following graph and answer the questions given below



i. Which type of growth model is shown in the graph?

Ans : The growth model shown in the graph is an exponential type of growth.

ii. Under which conditions such a curve is produced?

Ans : It is produced if the resources in the habitat are unlimited.

iii. What if the resources in nature become limited?

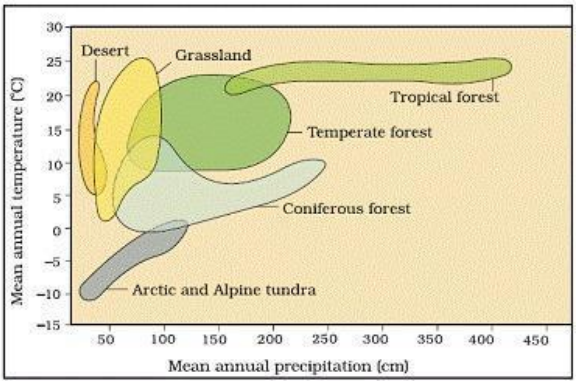
Ans : If resources in nature become limited the growth curve will be of sigmoid or logistic type.

QN.12) State Gause's competitive exclusion principle. Under which conditions it may stand true ? What is resource partitioning ?

Ans :

1. Gause's exclusion principle states that two closely related species competing for the same resources cannot coexist indefinitely and the competitively inferior species will be eliminated eventually.
2. The principle stands true if the resources in the habitat are limited.
3. Resource partitioning is to avoid competition by choosing different times for feeding if the two species compete for the same resource.

QN.13) Observe the following graph and answer the following questions: -



a) Which region shows lowest mean annual temperature?

b) Name the region which has the highest mean annual precipitation.

c) Name the region which shows lowest mean annual precipitation.

Ans : a) Arctic or alpine tundra

b) Tropical forest

c) Desert region

CHAPTER – 14 : ECOSYSTEM AND ENERGY FLOW

Marks :- 25 **Time :- 1.30 Hrs**

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SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:- (04)

1) After a landslide, which of the following types of succession occurs?

a) primary succession **b) secondary succession**

c) climax community develops d) tertiary succession.

2) Which of the following has the largest population in the food chain?

a) Producers b) Primary consumers

c) Secondary consumers d) Decomposers

3) What is the source of energy that flows through the living world?

a) photosynthate produced b) energy stored in chemical bonds

c) green plants **d) the sun**

4) In which ecosystem an inverted pyramid of biomass is found?

a) forest b) marine c) grassland d) tundra

QN.2) ANSWER THE FOLLOWING: - (03)

1) What is PAR?

Ans : PAR is photosynthetically active radiation.

2) Define ecological succession.

Ans : The gradual and predictable change in the species composition of the given area is called ecological succession.

3) Define nutrient cycling.

Ans : The movement of nutrient elements through the various components of the ecosystem is called nutrient cycling.

SECTION-B

ATTEMPT ANY SIX: - (12)

QN.3) What is gross primary productivity? Mention any two factors which decides primary productivity?

Ans : 1. The rate of production of organic matter during photosynthesis is called gross primary productivity.

2. The different factors that decide the rate are as follows:-

A. Environmental factors : Light intensity quality and durational, temperature range, wind, humidity, availability of usable water soil structure, etc.

B. Nutrients : Availability of nutrients like water, CO_2 minerals, oxygen, etc.

C. Photosynthetic capacity of the producers

D. Altitude, latitude direction, etc. of land i.e. topographic factors.

QN.4) Write a note on the pyramid of energy.

Ans.

1)) It is a graphic representation of the amount of energy trapped per unit time and area in different trophic levels in the food chain.
2) The unit of measurement of energy is kcal/m2/year.
3) According to the second law of thermodynamics there is a gradual decrease in the energy successive trophic levels as during energy transfer energy is lost.
4) Hence, the pyramid of energy will always be straight or upright.

QN.5) Explain supporting services and cultural services in ecosystem services.

Ans :

A. supporting services :- It includes services such as nutrient cycling, primary production, soil formation, habitat provision and pollination maintaining balance of the ecosystem.
B. Cultural Services:- It includes cultural, spiritual and historical, recreational experiences, science and education and therapeutics (including animal assisted therapy).

QN.6)Write a note on detritus food chain.

Ans :

1. The detritus food chain begins with dead organic matter.
2. It is composed of decomposers which are heterotrophic organisms and mainly include fungi and bacteria.
3. They meet their energy and nutrient requirement by degrading the detritus. These are known as saprotrophs.
4. Decomposers secrete enzymes that break down the dead organic matter into simple inorganic materials which are absorbed by them.
5. Detritus food chain may be connected with grazing food chain at some level.

QN.7) Explain various types of ecological services.

Ans : The services provided by the surrounding environment for the betterment of mankind are called ecological services.

The important ecological services are as follows:

A) Fixation of carbon dioxide.

1) Assimilation of carbon is the main service provided by the environment.
2) It supports the life of all organisms.
3) The different abiotic components like sunlight water, CO_2, etc. are used by green plants.
4) All these factors can act as limiting factors in fixation of CO_2.
5) It also determines the rate of CO_2 fixation in the ecosystem.

B) Release of oxygen :

1) It is released as a by-product of photosynthesis.
2) It helps in purification of air.
3) It takes part in ozone formation also and protects from radiation.

C) Pollination :

1) Wind and water, abiotic components of the ecosystem serve as agencies for pollination.
2) Different monocot crop plants are pollinated by wind.
3) Different insects, birds, ants, Snails etc. also bring about pollination.
4) Without pollination, fertilization, formation of fruits and seeds is not possible.

QN.8) Complete the following table based on trophic levels,

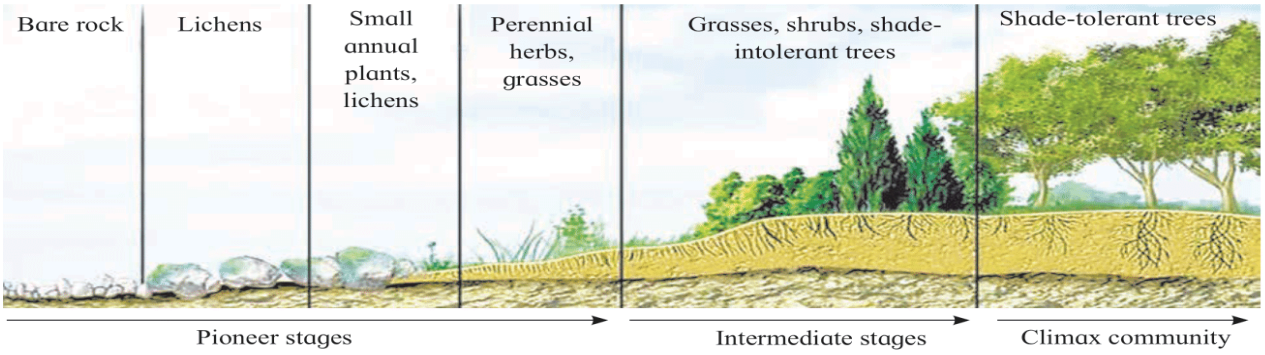
Tertiary consumer	Top carnivore	A
Secondary consumer	B	Fish
Primary consumer	C	zooplankton
Primary producer	Photoautotrophs	D

Ans :

Tertiary consumer	Top carnivore	**Man**
Secondary consumer	**Carnivores**	Fish
Primary consumer	**Herbivores**	zooplankton
Primary producer	Photoautotrophs	**phytoplankton**

QN.9) Complete the following sequence of stages in xerarch succession.

Ans:-



QN.10)Define the terms stratification and zonation.

Ans :

a. Stratification: - The arrangement of different animals and plants in different layers of the substratum, is known as stratification.

b. Zonation: The distribution of organisms in the horizontal space i.e. across the canopy or on the ground is zonation.

SECTION-C

ATTEMPT ANY TWO: - **(06)**

QN.11)Explain the process of decomposition in detail.

Ans :

A) Definition : The process in which complex organic compounds are broken into simpler and inorganic substances that can be utilized by the plants and animals for their growth is known as decomposition.

B) Decomposition provides energy and nutrients to the decomposers like fungi and bacteria.

C) Mechanism of decomposition:

The process is complex enzymatic in nature and involves stepwise degradation of detritus.
The different steps involved are as follows:

I) Fragmentation: Detrivore like termites, earthworms etc. feed on larger pieces. The smaller fragments are left. Pulverization occurs in the; digestive tract of derivatives as a part of detritus comes out undigested. The digested part is immobilized . The left-over detritus formed due to fragmentation comes to have large surface area. Earthworms carry out this process.

II) Leaching :

1) The process by which simple and water-soluble compounds like sugars and inorganic nutrients move downward along with gravitational water is known as leaching.

2) These inorganic nutrients are precipitated to form non-available salts.

III) Catabolism :

1) The extracellular enzymes released by decomposers in the surroundings bring about degradation of the detritus into various simple organic and inorganic compounds.

2) Microbes due to specific enzymes show the highest degree of specificity in degradation.

IV) Humification :

1) The simplified detritus is changed into a dark coloured amorphous substance called humus. This is known as humification.

2) Humus act as a reservoir of nutrients.

V) Mineralisation : It involves release of inorganic substances like water. CO_2, etc. and other nutrients like NH_4^+, Ca^{++}, Mg^{++}, K^+ etc. in the soil.

QN.12)Give an account of the gaseous cycle you have studied.

Ans : A) Importance of Carbon.

Carbon is important for all living organisms. It is a component of all the organic compounds of protoplasm. It constitutes 49% of dry weight and hence next to water in abundance.

B) Sources of carbon:-

These are four different forms in which carbon becomes the part of the abiotic environment.

1) Carbon dioxide in the air or atmosphere.

2) Dissolved carbon dioxide or carbonic acid and bicarbonates in water or hydrosphere.

3) Fossil fuels like coal, petroleum and natural gas.

4) Carbonates and graphite in the rocks.
C) Carbon recycling in nature:
It involves two different processes in nature which can be discussed as follows:
I) CO_2 utilization:-
1) Green plants fix the atmospheric CO_2 through the process of photosynthesis.
2) Carbon present in the lithosphere is made available to organisms through combustion or chemical reaction.
3) Glucose which is a product of photosynthesis is used to synthesize other organic compounds in plant body.
4) Carbon fixed by producers enters the food chain and is transferred to different trophic levels.
5) Due to these activities the amount of CO2 decreases.
II) CO_2 production:
a) CO_2 is released by producers and consumers through respiratory activities.
b) Decomposition of organic wastes and dead bodies by decomposers releases CO_2 into the atmosphere.
c) Combustion of wood and fossil fuel releases CO_2 in the atmosphere.
d) Volcanic eruptions and hot springs release CO_2.
e) Withering of carbonate containing rocks by acids also releases CO_2.
Thus, recycling of carbon occurs through the atmosphere, ocean, living and dead organisms.
f) Human impact: Humans may upset carbon cycling by excess use of fossil fuel, deforestation, massive burning etc.

QN.13)Give an account of the phosphorus cycle.
Ans : A) Importance of phosphorus.
1) Phosphorus is a component of nucleic acids. Bio membranes as Phospholipids, cellular transfer system as ATP, body structure as bones, shells and teeth.
2) It takes part in metabolic reactions involved in release of energy from food and utilization of this energy in various functions of the body.
B) Sources of phosphorus:
1) Sedimentary rock is the chief source of phosphorus
2) It is also available as phosphate e.g. PO_4, HPO_4 or H_2PO_4.
3) Rock phosphates are present in soil, in combination with calcium iron and aluminium. But they are not available to plants.
4) Aquatic habitats often show excess phosphate concentration obtained from soil wash, industrial wash, detergents etc.
5) Weathering of rocks adds phosphorus to cycling pools in small amounts.
C) Use and release / phosphorus cycling.
1) The insoluble phosphate in the soil is dissolved by chemicals secreted by microorganisms and plant roots. These are absorbed by plants and changed into organic form.
2) Addition of phosphates as fertilizer increases its availability.
3) Soil obtained from lakes, ocean beds and guano are also rich sources of phosphorus.
4) From plants, animals receive phosphorus through the food chain.

5) Excreta of animals and dead bodies are acted upon by decomposers releasing phosphorus which is made available to plants.
6) Amount of phosphorus lost through leaching. In the form of salts and unchanged teeth and bones settle at the bottom and become part of the lithosphere.
7) It is made available after a long interval due to weathering of rocks.

CHAPTER – 15 : BIODIVERSITY, CONSERVATION AND ENVIRONMENTAL ISSUES

Marks :- 25 **Time :- 1.30 Hrs**

……

SECTION - A

QN.1) SELECT AND WRITE THE CORRECT ANSWER:-
(04)

1)Community is defined as….
a) Group of similar Angiosperms. **b) interacting population**
c) interacting ecosystem d) group of mangroves

2) Regional and local variations within each biome lead to the formation of variety of
a) habitats b) niches c) species d) genus

3) Maximum absorption of rainfall water is done by
a) tropical evergreen forest b) tropical deciduous forest
c) coniferous forest d) deserts

4) Polar bears show hibernation during
a) winter b) summer
c) rainy season d) favourable conditions

QN.2) ANSWER THE FOLLOWING: - (03)

1) In IUCN Red List 2004, what does 'Red' represent?
Ans : The Red indicates 'The species that are at highest risk of extinction'

2) What is a sacred groove?
Ans : Stretches of forest that are set aside and protected in the name of almighty are called sacred grooves.

3) 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?
Ans : High BOD value indicates intense level of microbial pollution in the lake.

SECTION-B

ATTEMPT ANY SIX: - (12)

QN.3) Give full form of – i) IUCN ii) NBA
Ans:- 1) IUCN :- International Union for Conservation of Nature and natural resources
2) NBA :- National Biodiversity Authority

QN.4) State various ill effects of ozone depletion.

Ans : 1) Thinning of the ozone layer increases the amount of live radiation reaching the earth.

2) Cornea will show inflammation and develop blindness cataract.

3) Damage the skin cells, causes ageing of skin cells, and skin cancer.

4) Higher mortality among young animals.

5) Damage to nucleic acids causing mutations.

6) Inhibition of photosynthesis.

7) Disturbed marine and terrestrial food chain.

QN.5) Explain Alien species in invasion with examples of Nile Perch and Cichlid fish.

Ans:-

1) It is one of the major causes of biodiversity loss.
2) When a new species is introduced into any ecosystem accidentally or intentionally there are the chances that it proves harmful to the existing population or species.
3) It may lead to extinction of local species.
4) Such species are called invasive species.
5) Introduction of predator fish Nile Perch in Lake Victoria proved deleterious for 200 local species of Cichlid fish.

QN.6) What are the four factors that form 'Evil quartet'?

Ans:- The different factors that form the evil quartet are as follows:-

1. Habitat loss and fragmentation
2. Over-exploitation
3. Alien species invasion
4. Co-extinction

QN.7)Write a note on Ex-situ conservation with its limitations.

Ans : The different methods of ex-situ conservation are as follows:

A) Seed gene bank or germplasm bank : It is the easiest way to preserve germplasm at low temperature in vitro culturing, cutting etc. methods can also be employed.

B) Field gene bank :Genetic variability is preserved through storing sperms, egg and embryos. Through normal growing flora and fauna can be preserved.

C) Cryopreservation : It is the type of in vitro preservation of the material at -196°C (Useful in potatoes).

D) Botanical gardens : Arboreta and botanical gardens help to conserve plant species of commercial importance.

E) Zoos : Caged animals are protected, serve as a place of recreation, and also used for captive breeding.

Limitations :

1. It stops the natural evolution and adaptation process.
2. Strategies are highly expensive.

3. Fails to recreate the habitat as a whole.
4. Viability cannot be maintained for a long period.

QN.8)Explain various types of extinction?

Ans.: The different types of extinction are as follows:

(A) Natural extinction:

1. It is also called background extinction.
2. Due to changing environmental conditions, some species are lost and new species appear adapted to the changed environment.
3. It is a gradual continuous process and has occurred in the geological past.

(B) Mass extinction:

1. 1.Catastrophes i.e. sudden changes like earthquakes, volcanoes etc. are responsible for extinction of large numbers of animals and plants.
2. The most important example of dinosaurs was the extinction of 5% of species at the end of the Cretaceous period.
3. Global warming may cause mass extinction in the future is a matter of fear.

(C) Anthoropogenic extinction:

Due to human activities, loss of biodiversity is taking place. This leads to the disappearance of a number of specters and it takes place in a short time period.

Q.9.

Match the following pairs of carcinogens with the organs they affect.

Carcinogen	**Organ affected in cancer**
1 Cadmium oxide	**a. Urinary bladder**
2. Mustard Gas	**b. Prostate gland**
3. Vinyl chloride (V(c)	**c. Skin**
4. 2- Naphthylamine	**d. Lungs**
	e. Liver

Ans:-

Carcinogen	**Answers**
1. Cadmium oxide	**b. Prostate gland**
2. Mustard Gas	**d. Lungs**
3. Vinyl chloride (V(c)	**e. Liver**
4. 2- Naphthylamine	**b. Urinary bladder**

QUESTION BANK FOR PRACTICE
CONTENT

SR. NO.	NAME OF CHAPTER
1	Reproduction in Lower and Higher Plants
2	Reproduction in Lower and Higher Animals
3	Inheritance and Variation
4	Molecular Basis of Inheritance
5	Origin and Evolution of Life
6	Plant Water Relation
7	Plant Growth and Mineral Nutrition
8	Respiration and Circulation
9	Control and Coordination
10	Human Health and Diseases
11	Enhancement of Food Production
12	Biotechnology
13	Organisms and Population
14	Ecosystem and Energy Flow

15	BIODIVERSITY, CONSERVATION AND ENVIRONMENTAL ISSUES

CHAPTER – 1 : REPRODUCTION IN LOWER AND HIGHER PLANTS

.....

MULTIPLE CHOICE QUESTIONS : -

1) The non-motile asexual spores produced by fungi are _____
(a) Conidia (b) Zoospores (c) Homospores (d) Heterocyst

2) Which one of the following shows more than one ovule ? _____
(a) Mango (b) Coconut (c) Rice (d) Tomato

3) Male flowers float on the surface of water in _____ plant.
(a)*Vallisneria* (b) *Eichornia* (c) *Pistia* (d) Lotus

4) When pollen tube enters ovule through integuments it is termed as_____
(a) Porogamy (b) misogamy (c) homogamy (d) chalazogamy

5) Part of the plant the pollen recognition takes place on _____
(a) Stigma of pistil (b) Stigma of Another (c) style (d) ovary

6) Tip of pollen tube enter in embryo sac through _____
(a) egg cell (b) central cell (c) antipodal (d) synergid

7) Filiform apparatus is characteristic of _____
(a)antipodal cells (b) egg (c) secondary nucleus (d) synergids

8) In the ovule the opening of integument is called as _____
(a) micropyle (b) chalaza (c) Embryo sac (d) secondary nucleus

9) Funicle is attached to body of the ovule at the _____
(a) nucellus (b) chalaza (c) hilum (d) placenta

10) The mature embryo sac of angiosperms is _____nucleated.
(a) 4 (b) 6 (c) 8 (d) 10

11) Ovule represents _____.
(a) megasporangium (b) microsporangium (c) microsporophyll (d) anther

12)In angiosperms functional megaspore develops into _____
(a)embryo sac (b) endosperm (c) ovule (d) male gamete

13) The bisexual flowers of pea exhibit _____
(a) geitonogamy (b) allogamy (c) xenogamy (d) autogamy

14) Versatile & exposed anthers producing large numbers of pollen are characteristic features of _____plants.
(a) entomophilous (b) anemophilous (c) hydrophilous (d) hypohydrophilous

15) The special type Lever mechanism type of pollination in observed in____
(a) China Rose (b) *Salvia* flower (c) Pea Plant (d)*Vincarosea*

16) Aquatic plants like Lotus are pollinated by _____
(a) insects (b) water (c) wind (d) bats

17) The pollination of two flowers are different plants belonging to same species is known as_____
(a) dichogamy (b) geitonogamy (c) xenogamy (d) Cleistogamy

18) When pollination occurs on the surface of water it is termed as __
(a) hypohydrophily (b) anemophily (c) epihydrophily (d) homophily

19) In bisexual flower when pistil becomes receptive before anther the condition is termed as _____
(a) protandrous (b) homogynous (c) heterogynous (d) protogynous

20) Total number of nuclei involved in double fertilization is _____
(a) two (b) four (c) five (d) six

VERY SHORT ANSWER QUESTIONS :-

1) What is anemophily?
2) In angiospermic ovule how many cells embryo sacs are present ?
3) At the time of development of embryo sac how many times meiosis occurs ?
4) What is asexual reproduction ?
5) Define reproduction?
6) What is needed for reproduction ?
7) Define micropropagation.
8) Which cell produces male gametes in angiosperms ?
9) Secondary cell fuses to which cell to produce endosperm.
10) How many mitotic divisions are required to form an embryo sac?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) Write a note on the structure of microspore.
2) Define megasporogenesis & which type of embryo development in angiosperms?
3) What is Geitonogamy?
4) Which are the adaptations in anemophilous flowers.
5) Which are the adaptations for entomophilous pollination.
6) Write a note on the Lever mechanism in *Salvia.*
7) Write a note of Dichogamy.

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) What is double fertilization?
2) What is the meaning of porogamy, mesogamy & chalazogamy?
3) Which are different types of Endosperm development in angiosperms.
4) What is the significance of double fertilization?
5) Describe development of male gametophyte in angiosperms.
6) Differentiate Anemophilous Entomophilous pollination?
7) Which are the outbreeding devices for cross pollination?

8) LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) What is double fertilization? Add a note on its significance.
2) With the help of suitable diagrams explain different types of Endosperm development in angiosperms .
3) With the help of a suitable diagram describing the development of the dicot embryo.
4) What is apomixis? Which are the main categories of apomixis?
5) What is polyembryony? Explain with different examples.

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CHAPTER – 2 : REPRODUCTION IN LOWER AND HIGHER ANIMALS

……

MULTIPLE CHOICE QUESTIONS :-

1) Test tube baby technique is called ……

(a) in vivo fertilization (b) in situ fertilization

(c) in vitro fertilization (d) artificial insemination

2) The number of nuclei present in the zygote is……..

(a) one (b) two (c) three (d) four

3) Rupturing of follicles and discharge of ovum is called as……

(a) ovulation (b) capacitation (c) copulation (d) gestation

4) Attachment of the embryo to the wall of the uterus is known as……

(a) fertilization (b) cleavage (c) implantation (d) gastrulation

5)In the human penis, urethra passes through .....

(a) corpus cavernosum (b) corpus spongiosum

(c) corpus luteum (d) corpus albicans

6) In human beings the type of cleavage is .....

(a) *holoblastic and equal* (b) meroblastic and equal

(c) holoblastic and unequal (d) meroblastic and complete

7) Onset of the menstrual cycle at the time of puberty is called .....

(a) menopause (b) menarche (c) menstruation (d) metamerism

8) Which one of the following is not formed from mesoderm?

(a) blood (b) bones & cartilage (c) kidneys (d)nervous system

9) Vaginal orifice, urethral orifice and clitoris are protected by

(a) Labia majora (b) Labia minora (c) Vulva (d) Anus

10)The endodermal derivatives include

(a) Thyroid (b) Pineal gland (c) Spleen (d) Pituitary

11) Foetal ejection reflex in human female is induced by

(a) Release of oxytocin from pituitary (b) Fully developed foetus and placenta

(c) Differentiation of mammary glands (d) Pressure exerted by amniotic fluid

12) Medical Termination of Pregnancy (MTP) is considered safe up to how many weeks of pregnancy?

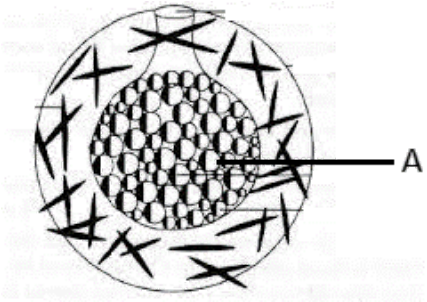
(a) Eight weeks (b) Twelve weeks (c) Eighteen weeks (d) Six weeks

VERY SHORT ANSWER QUESTIONS :-

1) How many sperms will be produced from 10 primary spermatocytes?

2) Define oogenesis.

3) Identify the labelled part in the given diagram.



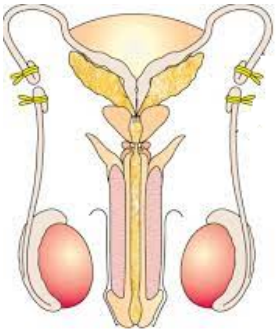
4) Name the embryonic layer from which enamel of teeth develops.

5) Which antibiotic is used in treatment of Syphilis ?

7) Name the structure produced by corpus luteum in the absence of fertilization.

8) Name the embryonic layer from which heart, blood and blood vessels develop.

9) Identify the permanent birth control method in the given diagram.



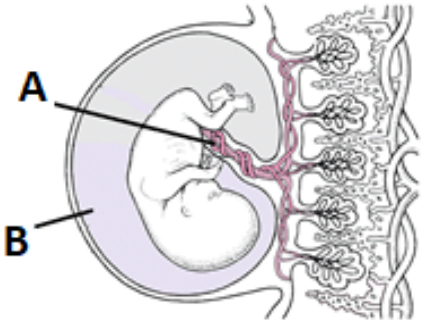
10)Name the enzyme secreted by the prostate gland.

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) Mention any two goals of the RCH programme ?

2) Name the causal organism of syphilis and mention any two symptoms.

3) Identify the labelled parts in the given diagram.



4) Write a note on the functions of the uterus in the human female reproductive system .

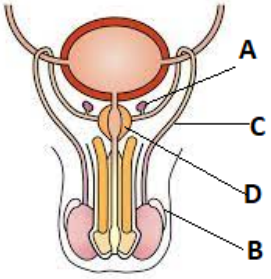
5) Draw a well labelled diagram of the Graafian follicle.

6) Give an account of the proliferative phase of the menstrual cycle.

7) Define labour pains and after birth.

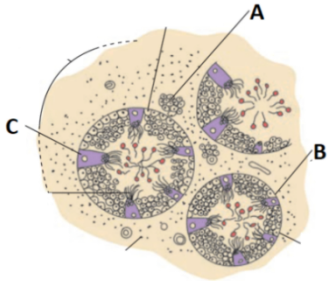
8) Explain the method of contraception shown in the diagram.

9) Enlist various sequential stages of sexual reproduction in humans.
10) Give the composition of prostatic fluid. How does it protect sperms?
11)Explain budding as a method of reproduction in hydra.
12) Name the different layers that are found associated with the graafian follicle (outside to inside).
13) Describe the structure of the Graafian follicle.
14) Mention any two different goals of the RCH programme.
15) Write a short note on the fallopian tube.
16) Draw a well labelled diagram of human sperm showing: acrosome, mitochondrion, axoneme and nucleus.
17) Explain any two methods that can be used to overcome infertility.
18) Identify the labels: A, B, C and D in the given figure.



SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Write a note on external genitalia in the human female reproductive system.
2) Name the structure that produces the acrosome of sperm. Which types of enzymes are present in acrosomes of sperm?
3) Draw a well labelled diagram of an unfertilized egg.
4) Observe the following diagram and answer the following questions:-

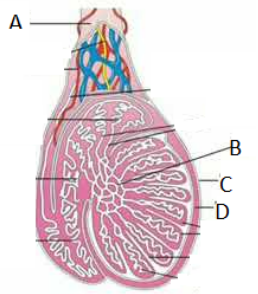


a.Name the hormone secreted by ‘A’.
b.What is the chromosomal status of ‘B’ ?
c. Give the function of ‘C’.

5) Explain the structure of human sperm.
6) Draw a well labelled diagram of V.S. of late gastrula.
7) Write a note on implantation.
8) Describe the histological structure of human testis with the help of a labelled diagram.
9) Explain the process of oogenesis in human females.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Describe the process of cleavage in embryo development.
2)Identify the labelled parts in the following diagram.



3) Give causative agent, incubation period, symptoms and preventive measure for Gonorrhoea.
4) Give an account of the uterus and vagina as a part of the duct system in the human female reproductive system.
5) Explain the ovarian cycle with its different phases.
6) Explain the mechanism of fertilization in humans.

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CHAPTER – 3 : INHERITANCE AND VARIATION

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MULTIPLE CHOICE QUESTIONS :-

1) The genotypic and phenotypic ratio are not identical in case of:

(a) Incomplete dominance. (b) Monohybrid test cross

(c) Dihybrid test cross. (d) Complete dominance

2) In humans, the sex chromosome complement is

(a) XX–XY (b) XX–XO (c) ZO–ZZ (d) ZW–ZZ

3) Daughter of a colour-blind father and normal mother marries a colour-blind person. Colour blindness in the family shall be

(a) 50% sons and 50% daughter (b) All sons and daughters

(c) All daazughters (d) All sons

4) The number of autosomes in human sex cell is------

(a) 22 (b) 12 (c) 44 (d) 23

5) In sickle cell anaemia, F2 generation shows the ratio of carrier to normal is ----

(a) 2:1 (b) 1:2 (c) 3:1 (d) 1:3

6) Nullisomy is rightly explained by the condition -------

(a) 2n-1 (b) 2n+1 (c) 2n+2 (d) 2n-1

7) What will be the ratio of different types of gametes formed by a pea plant with Yy genotype?

(a) 9:3:3:1. (b) 1:1:1:1. (c) 3:1 (d) 1:1

8) Heredity is

(a) Transmission of characters (b) Mixing of characters

(c) Blending of inheritance (d) Deleting of characters

9) In sickle cell anaemia ,F_2 generation shows the ratio of normal to carrier is ----

(a) 2:1 (b) 1:2 (c) 3:1 (d) 1:3

10) Monosomy is rightly explained by the condition.....

(a) 2n-1 (b) 2n+1 (c) 2n+2 (d) 2n-2

11) The chromosomes in which centromere is situated close to one end are

(a) Metacritic (b) Acrocentric (c) Telocentric (d) Sub Metacentric

12) The chromosomal denotation for heterogametic female and homogametic males is

(a) ZW and ZZ (b) ZO-ZZ (c) XX-XO .(d) Both (a) and (b)

13) Haploid-diploid mechanism of sex determination (haplodiploidy) takes place in

(a) Bees (b) Wasps (c) Ants (d) All of these

VERY SHORT ANSWER QUESTIONS:-

1) Define euploidy.
2) Give one example of complete linkage
3) Define crossing over.
4) What are X-linked genes?
5) How many linkage groups are present in *Drosophila melanogaster* ?
6) What is the chromosomal makeup of Turner's syndrome ?
7) What is centromere?
8) What are X-linked genes?
9) What are Y-linked genes?
10) What is sex linked gene?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) State any four reasons for Mendel's success.
2) Give an account of pleiotropy with suitable examples.
3) Write a note on the mechanism of sex determination in birds.
4) Give reasons: Sex linked characters appear more frequently in men than in women.
5) Explain different types of chromosomes in detail.
6) Give the significance of the test cross.
7) Define the term character with suitable examples.
8) Draw a well labelled diagram of chromosome showing satellite, primary constriction, telomere and chromomeres.
9) Differentiate between chromosomal disorders and Mendelian disorders.
10) Differentiate between homozygous and heterozygous.

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Describe the structure of sex chromosomes with the help of labelled diagram.
2) Write a note on Down's syndrome.
3) Define sex linked inheritance. Explain complete sex linkage with examples.
4) Mendel selected a pea plant for his experiment. Several contrasting characters are present in pea plants. Prepare a table showing characters selected by Mendel with respect to height of plant, position of flower, shape of pod and colour of cotyledon. State dominant and recessive forms in each character given.
5) Explain incomplete dominance with suitable examples.
6) Write a note on complete linkage.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Define inheritance. Give statements for various laws of inheritance.
2) Explain the inheritance pattern of colour blindness.
3) A woman with blood group 'O' marries a man with AB blood group.
4) A cross is made between a tall plant having red flowers (TtRr) with one having flowers (ttrr).What would be the genotypes and phenotypes of plants in the resultant generation? What kind of cross is this ?
5) Give various characters selected by Mendel for his experiments on pea plants.

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CHAPTER – 4 : MOLECULAR BASIS OF INHERITANCE

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MULTIPLE CHOICE QUESTIONS :-

1) Histone proteins are rich in ------

(a) Arginine and Leucine (b) Lysine and valine

(c) Methionine and Arginine (d) Arginine and Lysine

2) The main step involved in the process of translation is

(a) Activation of amino acid

(b) Initiation of polypeptide chain synthesis

(c) Termination of polypeptide chain formation

(d) Transfer of polypeptide chain to tRNA

3) The enzyme required for transcription is -----

(a) RNA polymerase (b) DNA dependent RNA polymerase

(c) DNA polymerase (d) DNA dependent DNA polymerase

4) Extranuclear DNA is present in ------

(a) mitochondrion (b) Golgi bodies (c) rough ER (d) ribosome

5) The terminator codons are

(a) UAA, UAG, UGA (b) AUG, UAG, UGA

(c) UAC, AUG, UAG (d) DCC, UAA, CAC

6) The octamer core of nucleosome contains two molecules each of the following histones

(a) H_2A, H_2B, H_3 and H_4 (b) H_1, H_2A, H_2B, H_3

(c) H_1, H_2A, H_2B, H_4 (d) H_1, H_2B, H_3, H_4

VERY SHORT ANSWER QUESTIONS :-

1) Mention the function of non-histone proteins.
2) What is point mutation?
3) Which amino acid is coded by initiation codon?
4) How many base pairs of DNA helix are wound over on a nucleosome approximately?

5) Name the enzyme which nicks DNA strands temporarily at point ‘O’.

6) What is the number of estimated base pairs in the bacterium *E.coli* ?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) Enlist different levels of regulation of gene expression in eukaryotes.

2) Mention any two applications of genomics.

3) Define the terms monocistronic and polycistronic.

4) Draw a well labelled diagram of the nucleosome.

5) Mention any two applications of DNA fingerprinting.

6) Complete the blanks a,b,c and d on the basis of Griffith’s experiment.

S-strain---- injected into mice-----(--a---)

R-strain---- injected into mice-----(-b---)

S-strain(heat kille(d)---- injected into mice-----(--c---)

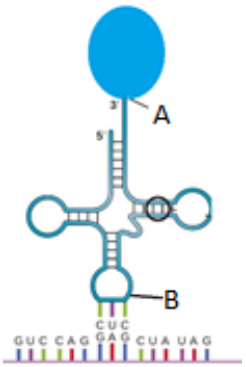
S-strain(heat kille(d) + live R-strain---- injected into mice-----(--d---)

7) Give any two applications of genomics.

8) Give the role of -galactoside permease and galactoside acetyltransferase.

9) Draw a well labelled diagram of the transcription unit.

10) Identify ‘A’ and ‘B’ in the following figure,



11) Differentiate between leading strand and lagging strand (any two points).

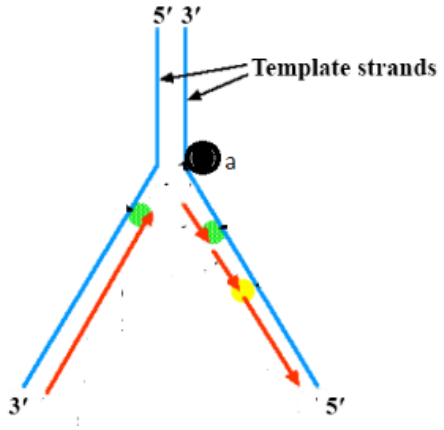
12) Match the following columns and write the correct answer,

Column(I)	Column(II)
(a) UUU	i) Leu
(b) AUG	ii) Isoleu
(c) AUU	iii) Phe
(d) UUA	iv) Met

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Three codons on mRNA are not recognised by tRNA.Which are these codons? What is the general term used for them? What is their role in protein synthesis?

2) Observe the given figure and answer the following questions:-



i) In which direction the new strands will be synthesized?

ii) Which enzyme used to join the fragments of DNA produced in synthesis of lagging strand ?

iii) Identify 'a' in the given figure.

3) Draw a well labelled diagram of the transcription unit.

4) Explain any three properties of the genetic code.

5) Give an account of the Hershey-Chase experiment that proved, 'DNA is the genetic material'.

6) State any three aims of the human genome project.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Write a note on processing of hnRNA.

2) Give an account of Hershey-Chase experiment that proved, 'DNA is the genetic

3) Explain various steps of DNA fingerprinting in sequence. Draw a flow sheet diagram for the same.

4) Describe the experiment that proves, 'DNA replication is semiconservative'.

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CHAPTER – 5 : ORIGIN AND EVOLUTION

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MULTIPLE CHOICE QUESTIONS :-

1) Hot dilute soup or primitive broth didn't contain _____.

(a) RNA (b) monosaccharides (c) fatty acids (d) purines

2) Which mixture was exposed to electric discharge in Urey – Miller's apparatus ?

(a) CO_2 , NH_3 , H_2 (b) H_2 , CO, NH_2 (c) CH_4, NH_3,H_2 (d) NH_3 ,H_2O, CH_4

3) The origin of life on earth is known as _____.

(a) auto biogenesis (b) abiogenesis (c) protobiogenesis (d) organogenesis

4) Overproduction is the principle of _____.

(a) Lamarckism (b) panspermia theory

(c) modern theory of evolution (d) theory of organic evolution

5) The most common types of fossils are _____.

(a) actual remains (b) casts (c) moulds (d) models

6) Gene frequency in a population remains constant due to _____.

(a) migration (b) mutation (c) random mating (d) non-random mating

7) Archaeopteryx is a missing link between _____.

(a) fishes & amphibians (b) Annelida&Arthropoda

(c) birds & reptiles (d) Aschelminthes & platyhelminthic

8) _____ is the connecting link between Ape & Man.

(a) Australopithecus (b) Dryopithecus

(c) Homo erectus (d) Homo neanderthalensis

9) Vermiform appendix is an example of _____.

(a) vestigial (b) sense

(c) homologous (d) analogous

10) _____ was called the Handy man.

(a) Australopithecus (b) Homo erectus

(c) Homo habilis (d) Neanderthal man

VERY SHORT ANSWER QUESTIONS :-

1) What is the Theory of Abiogenesis ?
2) What are Protobionts ?
3) Define Organic Evolution.
4) Who proposed the Mutation Theory ?
5) What are Chromosomal Aberrations ?
6) Give an example of Hybrid Sterility.
7) Define Bottleneck Effect.
8) Give an example of Adaptive Radiation.
9) What are Monotremes ?
10) Define Sympatric speciation.

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) Differentiate between Darwinism and Mutation Theory.

2) Match the columns :

PROSIMI	PLACENTAL MAMMALS
HYALOBATIDAE	BABOONS
EUTHERIANS	LEMURS
OLD WORLD MONKEYS	GIBBONS

3) What are connecting links ? Give one example.

4) What are Vestigial Organs ? Give 2 examples of each.

5) Why is Archaeopteryx a connecting link between reptiles and birds ?

6) What is Genetic Drift ? What is it also called ?

7) Describe the characteristics of a Homo erectus man.

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Describe the evidence of Darwinism.
2) Write the objections to Mutation Theory.
3) Explain Post – zygotic Barriers.
4) Enlist the factors responsible for changing gene frequency.? Give one example.
5) What are Analogous organs? Give one example.
6) What are Homologous organs ? Give one example.
7) Explain Adaptive Radiation with examples.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Describe Miller-Urey's Experiment in support of Chemical Evolution.
2) Give any five main postulates of Darwinism.
3) Which are the different types of Isolating Mechanisms ? Elaborate.
4) Prove that Industrial Melanism is one of the best examples of natural selection.
5) What is the significance of Planetology ?

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CHAPTER – 6 : PLANT WATER RELATIONS

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MULTIPLE CHOICE QUESTIONS :-

1)Cell wall is --------

(a) Selectively permeable (b) freely permeable (c) Impermeable (d)non permeable

2) Most plant cells and tissues constitute ----- water.

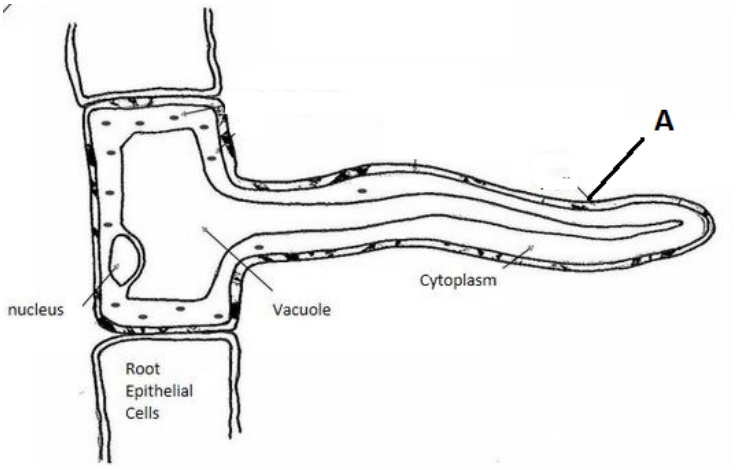
(a) 0-20% (b) 10-25% (c) 75-90% (d) 90-95%

3) Plasma membrane and tonoplast are------

(a) Selectively permeable (b) freely permeable

(c) Impermeable (d) non permeable

4) The labelled marked in diagram is made up of-----



(a) Cellulose (b) lignin (c) Starch (d) pectin

5) Process of water oozing out from specific pore along leaf margins, is called as ……

(a) photosynthesis (b) guttation (c) transpiration (d) bleeding

6) Water available for absorption to the terrestrial plants is….

(a) capillary water (b) hygroscopic water

(c) gravitational water (d) chemically bound water

7) The osmotic potential and water potential of pure water are respectively….

(a) 100 and zero (b) zero and zero (c) 100 and 100 (d) zero and 100

8) The space between the plasma membrane and cell wall of a plasmolysed cell is occupied by ……

(a) isotonic solution (b) hypertonic solution

(c) hypotonic solution (d) water

9) If the solution outside the cell has higher concentration than cytoplasm, then the solution is...

(a) isotonic (b) hypotonic (c) acidic (d) hypertonic

10)The osmotic potential and water potential of pure water are respectively .....

(a) 100 and zero (b) Zero and zero (c) 100 and 100 (d) Zero and 100

11)A plasmolysed cell can be deplasmolysed by placing it in .....

(a) concentrated solution (b) saturated solution

(c) hypertonic solution (d) Pure water or hypotonic solution

12)In woody plants or old trees, very little transpiration also occurs through .....

(a) Stomata (b) Lenticels (c) Bark (d) Roots

VERY SHORT ANSWER QUESTIONS :-

1) From which type of cell root hair originates ?
2) What is the composition of the inner wall layer of root hair ?
3) Name the compound which connects the physical world with biological processes.
4) Name the tissue present in epiphytic roots for absorption of water.
5) Which type of solution will bring out deplasmolysis?
6) What is the function of velamen tissue?
7) What is root pressure?

8) What is the function of velamen tissue?

9) Define wall pressure.

10) What is stoma?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

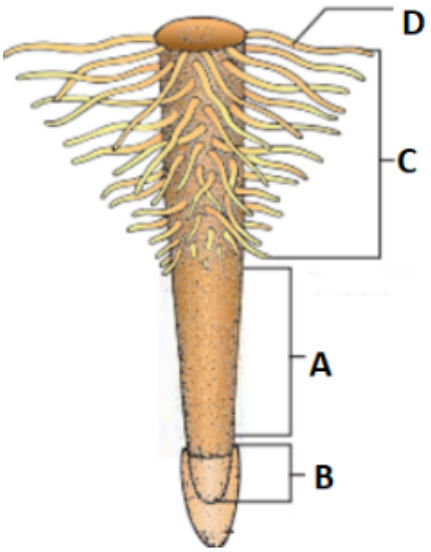
1) Why is water called the 'Elixir of Life'?

2) Explain the structure of root hair.

3) How the root can act as a water absorbing organ.

4) Mention any four properties of water.

5) Identify A, B, C and D in the following diagram.



6) What are the different types of water available to roots for absorption?

7) What are the properties of water which help in capillarity?

8) Enlist various objections to root pressure theory.

9) Mention any two/four points of advantages of transpiration.

10) Draw a well labelled diagram of the structure of the stomata.

11) What are the various factors affecting water absorption?

12) Explain the terms imbibant and imbibate.

13) Match the columns:-

Column ‘A’	Column ‘B’
1.epistomatic	a.nerium
2.hypostomatic	b.grass
3.amphistomatic	c.potamogeton
4.astomatic	d.lotus

14) Mention two disadvantages of transpiration.

15) Draw a well labelled diagram of root hair.

16) State any two factors affecting water absorption.

17) Write a note on the significance of plasmolysis.

18) Explain facilitated diffusion in detail.

19) Give an account of osmosis

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Explain the mechanism of sugar transport through phloem.

2) Write an account of diffusion in detail.

3) Explain various types of transpiration.

4) Differentiate between active and passive absorption.

5) Explain root pressure theory.

6) Draw a well labelled diagram of opened and closed stomata.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Give an account of transpiration in pull theory.

2) Discuss the path of water across the root with the help of a suitable diagram.

3) Give an account of transpiration in pull theory.

4) Explain the concept of permeability with its types.

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CHAPTER – 7 : PLANT GROWTH AND MINERAL NUTRITION

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MULTIPLE CHOICE QUESTIONS:-

1) The Pfr form of phytochrome

(a) retards flowering in LDP (b) promotes flowering in LDP

(c) promotes flowering in SDP (d)promotes flowering in DNP

2) NPK denotes

(a) Nitrogen, protein and kinetin (b) nitrogen, protein and potassium

(c) nitrogen, potassium and kinetin (d) nitrogen, phosphorus and potassium

3) Which naturally occurring plant growth regulator was initially named as dormin?

(a) IAA (b) GA (c) Kinetin (d) ABA

4) Nitrogen fixing enzymes found in root nodules are …….

(a) nitrogen esterase(b) nitrogenase (page no.149) (c) nitrase(d) *Nitrosomonas*

5) Which of the following is the effect of ethylene ?

(a) epinasty (b) Richmond-Lang effect

(c) antitranspirant (d) inhibits growth of apical bud

6) The hormone that induces flowering in Litchi is -----

(a) kinetin (b) dormin (c) IAA (d) NAA

7) Single maize root apical meristem cell can give rise to more than-

(a) 17500 new cells/min (b) 17500 new cells/day

(c) 17500 new cells/hour (d) 17500 new cells/year

8) Malformed leaves is the deficiency effect of -------

(a)Cl^- (b) Cu^{2+} (c) Zn^{2+} (d) Mg^{2+}

9) In lettuce and tobacco seeds ....acts like a substitute to red light for breaking seed dormancy.

(a) Auxins (b) ABA (c) Gibberellins (d) Cytokinin

10) The only gaseous hormone is……

(a) Auxins (b) CK (c) Gibberellins (d) Ethylene

11) Gibberellins promote synthesis of hydrolytic enzymes in

(a) dry seeds. (b) soaked, germination seeds.

(c) dormant buds and other organs (d) all of these.

12) Which of the following acts as a precursor for IAA synthesis in plants?

(a) Acetic acid (b) Methionine

(c) Tryptophan (d) Acetyl Co-A

VERY SHORT ANSWER QUESTIONS :-

1) Define absolute growth rate.

2) Give the mathematical equation for arithmetic growth.

3) What is bolting?

4) What is the effect of deficiency of boron in plants?

5) What is necrosis?

6) Write a mathematical equation for geometric growth.

7) What is the effect of agent orange on plants?

8) Define bolting.

9) What is apical dominance?

10) Which hormone plays an important role in callogenesis in tissue culture ?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) Explain the role of water and nutrients in growth.

2) Define the terms dedifferentiation and redifferentiation.

3) Write a note on plasticity. Draw suitable diagrams for the same.

4) Differentiate between LDP and SDP.

5) Give an account of amino acid synthesis in plants.

6) Define devernalization and give two points of significance of vernalization.

7) What is apical dominance? Which hormone controls apical dominance?

8) Explain any two physiological roles of gibberellins.

9) What is epinasty? Which hormone causes epinasty?

10) Explain the role of ABA in reducing water loss by plants.

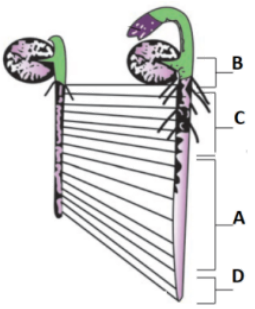
11) What is the Richmond Lang effect? Name the hormone that causes the Richmond Lang effect.

12) Give the role of auxin in relation to flowering and fruit.

13) Explain any two roles of cytokinin.

14) Differentiate between Auxin and Gibberellin with respect to movement, effect of light, root initiation and tissue culture.

15) Identify A,B,C and D in the given diagram,



16) Write a note on denitrification.

17) Mention advantages of vernalization.

18) Draw a well labelled diagram of S- shaped growth curve.

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Explain stunting, chlorosis and necrosis as deficiency symptoms for mineral elements in plants.

2) Match the columns based on the 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. Dieback of shoots
5. Chlorine	e. Poor growth of plant
6. Manganese	f. malformed leaves.

3) Write an account of nitrification.

4) 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

5) What is phytochrome? What is its role in flowering?

6) Nitrogen is one of the major elements required by the plants. Give its roles in plants and also mention its deficiency symptoms.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Explain various phases of growth. Draw sigmoid growth curves corresponding to phases of growth.
2) Explain role of cytokinin with respect to:-
   (a) apical dominance (b) Richmond-Lang effect
   (c)secondary growth (d) seed germination
3) Describe the process of amino acid synthesis.

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CHAPTER – 8 : RESPIRATION AND CIRCULATION

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MULTIPLE CHOICE QUESTIONS :-

1) Much developed larynx of the human male is called_____.

(a) Aristotle's lantern (b) Syrinx (c) Adam's apple (d) Muller's organ

2) Left lung of human has _____

(a) 2 lobes (b) 4 lobes (c) 3 lobes (d) 5 lobes

3) Partial pressure of oxygen in inspired and expired air is ..... and ..... mm of Hg.

(a) 100, 46 (b) 158, 40 (c) 158, 90 (d) 100, 95

4) Approximate amount of Oxygen in air expelled through nose is:

(a) 16% (b) 4.6% (c) 19% (d) <1%

5) Total lungs capacity is approximately:

(a) 1200 ml (b) 2400 ml (c) 4000 ml (d) 5800 ml

6) Although much CO_2 is carried in blood, yet blood does not become acidic, because:

(a) It is absorbed by the leukocytes.

(b) Blood buffers play an important role in CO_2 transport.

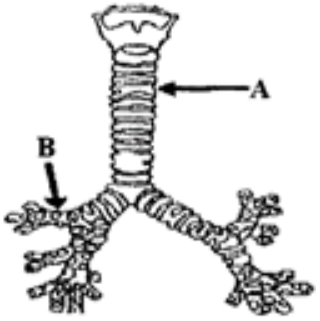
(c) It combines with water to form H_2CO_3 which is neutralised by $NaHCO_3$

(d) It is continuously diffused through tissues and is not allowed to accumulate.

7) The covering of lungs is called:

(a) Pleura (b) Pericardia (c) Peritoneum (d) Mediastinum

8) In the given figure, label A and B represent._



(a) A- Trachea, B- Bronchus (b) A- Alveolus, B- Bronchiole

(c) A- Bronchiole, B- Trachea (d) A- Trachea, B- Bronchiole

9) Match the respiratory disorders given in column-I with symptoms in column-II. Choose the answer which gives the correct combination of alphabets with numbers.

	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 strained sputum

(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 (d) A-II, B-IV; C-I, D-III

10) In expiration, diaphragm becomes_____.
(a) Flattened (b) Contract (c) Straightened (d) Arched

11) Asthma is caused due to:
(a) Infection of lungs (b) Spasm in bronchial muscles
(c) Bleeding into pleural cavity (d) Infection of trachea

12) Book lungs are respiratory organs of:
(a) Molluscs (b) Mammals (c) Arachnids (d) Earthworm

13) The disease that occurs when the haemoglobin content of the blood goes down is:
(a) Pleurisy (b) Emphysema (c) Anaemia (d) Pneumonia

14) Amount of air in the lungs that remains after deep breathing is called _____.
(a) Dead space (b) Residual volume (c) Vital capacity (d) Ventilation rate

15) The amount of air a person takes in during normal, restful breathing is called the ____.
(a) Dead space (b) Tidal volume (c) Vital capacity (d) Ventilation rate

16) Match the following and mark the correct options

Animal	Respiratory Organ
A) Earthworm	i. Moist cuticle
B) Aquatic Arthropods	ii. Gills
C) Fishes	iii. Lungs
D) Birds/Reptiles	iv. Trachea

(a) A-ii, B-i, C-iv, D-iii (b) A-i, B-iv, C-ii, D-iii
(c) A-i, B-iii, C-ii, D-iv (d) A-i, B-ii, C-i.v, D-iii

17) Which one of the following types of cells lack a nucleus?
(a) RBC (b) Neutrophils (c)Eosinophils (d) Monocytes

18) Which one of the following blood cells is involved in antibody production?
(a) B-Lymphocytes (b) T-Lymphocytes (c) RBC (d) Neutrophils

19) Calculate the cardiac output of a person having 72 heart beats per minute and a stroke volume of 50 ml.
(a) 360 mL (b) 3600 mL (c) 7200 mL (d) 5000 mL

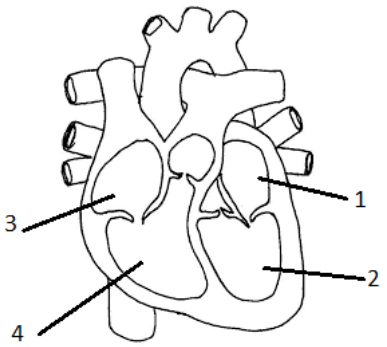
20) The normal pH of the arterial blood is:
(a) 6.8 (b) 7.8 (c) 7.4 (d) 8.8

21) Match the various Blood cells in column-I with their respective functions in column-II and choose the correct option. Choose the correct option showing the correct combination.

	Column-I		Column-II
A.	Basophils	I.	Phagocytes
B.	Neutrophils	II.	Secrete histamine, serotonin, heparin and involved in inflammatory response
C.	Monocytes	III.	Resist infections and are also involved in allergic reaction
D.	Eosinophils	IV.	Immunity
E.	Lymphocytes	V.	

(a) A- II; B and C- I; D- III; E- IV (b) A- II; B and C- III; D- I; E- IV
(c) A- III; B and C- I; D- II; E- IV (d) A-IV; B and C-III; D-I; E-II

22) The given diagram represents human heart with four chambers labelled as 1, 2, 3 & 4 ? Which chamber receives carbon dioxide rich blood from the body ?



(a) 1-Left atrium (b) 2-Left ventricle (c) 3- Right atrium (d) 4- Right ventricle

23) Which of the following structures of the lymphatic system acts primarily as a filter for detecting and destroying microorganisms in lymph traveling through major lymph vessels?
(a) Lymph nodes (b) Thymus (c) Lymph capillaries (d) Tonsil, but not the appendix

24) Haematocrit value is the expression of:
(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) None of the above.

25) Which one of the following blood vessels is without valves?
(a) Artery (b) Pulmonary aorta (c) Vein (d) Systemic aorta

26) A vein possesses a large lumen because:
(a) Tunica media and tunica externa form single layer.
(b) Tunica media and tunica interna form single layer.
(c) Tunica interna, tunica media and tunica externa are thin.
(d) Tunica media is a thin layer.

27) The pacemaker of the human heart is:
(a) SA node (b) Tricuspid valve (c) AV node (d) All of these

27) Papillary muscles are associated with:
(a) Ventricles (b) Auricles (c) Dorsal aorta (d) Sinus venosus

28) Which layer of the wall of blood vessels is made up of circular smooth muscles?
(a) Outer (b) Middle (c) Inner (d) Innermost

29) Tunica externa is the:
(a) Outermost fibrous layer of the artery.
(b) Middle vascular layer of the artery.
(c) Outermost covering of the stomach.
(d) Innermost layer of fine blood capillaries.

30) *Chordae tendinae* are found in:
(a) Joints of legs (b) Atria of heart (c) Ventricles of brain (d) Ventricles of heart

31) Mitral valve guards the opening between:
(a) Left auricle and left-ventricle (b) Pulmonary vein and left auricle
(c) Stomach and intestine (d) Liver and spleen

32) Cardiac cycle in man takes about:
(a) 0.5 seconds (b) 1.0 second (c) 1.2 seconds (d) 0.8 seconds

33) The left atrio-ventricular aperture in man is guarded by:
(a) Tricuspid valve (b) Semilunar valve (c) Bicuspid valve (d) Sphincter valve

34) 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.

	Column-I		Column-II
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

(a) A-V; B-I; C-III; D-II
(b) A-V; B-III; C-I; D-IV
(c) A-IV; B-V; C-III; D-I
(d) A-V; B-I; C-II; D-III

VERY SHORT ANSWER QUESTIONS:-

1. Define the following terms?

a. Tidal volume
b. Residual volume

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

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

4. Cigarette smoking causes emphysema. Give a reason.

5. What are Purkinje fibres?

6. What is serum?

7. Name any two types of granulocytes present in the blood

8. Complete the missing terms-

a. Inspiratory Capacity (I(c) = _____ +IRV
b. _____ = TV + ERV

c. Functional Residual Capacity (FR(c) = ERV + ____

9.Name the important parts involved in creating a pressure gradient between lungs and the atmosphere during normal respiration.

10.Name the blood component which is viscous and straw-coloured fluid.

11.Complete the missing word in the statement given below:

a. Plasma without _____ factors is called serum.

b. _____ and monocytes are phagocytic cells.

c. Eosinophils are associated with _____ reactions.

d. _____ ions play a significant role in clotting.

e. One can determine the heart beat rate by counting the number of _____ in an ECG.

12.Given below is the diagrammatic representation of a standard ECG. Label its different peaks.

13.Name the vascular connection that exists between the digestive tract and liver.
14. Given below are the abnormal conditions related to blood circulation.
15. Name the disorders.
a. Acute chest pain due to failure of O_2 supply to heart muscles
b. Increased systolic pressure
16.Which coronary artery diseases are caused due to narrowing of the lumen of arteries?
17.Define the following terms and give their location?
a. Pacemaker b. Bundle of His
18.State the function of the following in blood components:
a. Fibrinogen b. Globulin c. Neutrophils d. Lymphocytes
19. What is the significance of the time gap in the passage of action potential from SA node to the ventricle?
20. What physiological circumstances lead to *erythroblastosis fetalis*?
21. Explain the consequences of a situation in which blood does not coagulate.

SHORT ANSWER TYPE QUESTIONS (2/3 MARKS) :-
1.State the different modes of CO_2 transport in blood.
2. Compared to O_2, diffusion rate of CO_2 through the diffusion membrane per unit difference in partial pressure is much higher. Explain.
3. Differentiate between
a. Inspiratory and expiratory reserve volume
b. Vital capacity and total lung capacity
c. Emphysema and occupational respiratory disorder
4. The walls of ventricles are much thicker than atria. Explain.
5. Differentiate between
a. Blood and Lymph
b. Basophils and Eosinophils
c. Tricuspid and bicuspid valve
6.Arrange the following terms based on their volumes in an increasing or ascending order
a. Tidal Volume (TV)
b. Residual Volume (RV)
c. Inspiratory Reserve Volume (IRV)
7. Briefly describe the following:
a. Angina Pectoris b. Atherosclerosis c. Hypertension d. Erythroblastosis fetalis
8. Explain the advantage of the complete partition of ventricle among birds and mammals and hence leading to double circulation.
9. What is the significance of the hepatic portal system in the circulatory system?

10.Explain the functional significance of the lymphatic system?
11.Write the any two features that distinguish between the following
a. Open and Closed circulatory system
b. Sino-atrial node and Atrio-ventricular node
12.'Thrombocytes are essential for coagulation of blood.' Comment.
13. Answer the following
a. Name the major site where RBCs are formed.
b. Which part of the heart is responsible for initiating and maintaining its rhythmic activity?
c. What is specific in the heart of crocodiles among reptilians?

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Explain the exchange of O_2 and CO_2 at the alveoli and tissue with a diagram.
2) Explain the mechanism of breathing with neat labelled sketches.
3) Explain the role of the neural system in the regulation of respiration.
4) Explain Rh-incompatibility in humans.
5) Describe the events in the cardiac cycle. Explain "double circulation".
6) Explain different types of blood groups and donor compatibility by making a table.
7) Write notes on: a. Hypertension b. Coronary artery disease
8) Describe the main types of WBCs based upon the presence of granules in their cytoplasm.
9) describe the internal structure of the human heart.

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CHAPTER – 9 : CONTROL AND COORDINATION

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MULTIPLE CHOICE QUESTIONS :-

1)Plants are phototropic. Phototropism is the response to _____.

(a) Light (b) Chemical

(c) Sound (d) Touch

2) Sense organs are lacking in _____.

(a) Hydra (b) Planaria

(c) Crab (d) Snail

3) What is homeostasis?

(a) Maintaining constancy of the internal environment of the body.

(b) Keeping the body temperature constant in any situation.

(c) Continuous and constant secretion of essential hormones.

(d) Quick response of the body to escape from danger.

4) Identify the image.

(a) Microglia (b) Astrocyte

(c) Schwann cell (d) Satellite cell

5) Select the correct statement.

(a) Axon receives information.

(b) Dendron receives information.

(c) Axon carries information towards Cyton.

(d) Dendron carries information towards Cyton.

6) Select the correct sequence of meninges from outermost to innermost cover of the human brain.

(a) Dura mater Pia mater Arachnoid mater

(b) Arachnoid mater Pia mater Dura mater

(c) Pia mater Dura mater Arachnoid mater

(d) Dura mater Arachnoid mater Pia mater

7) What is the function of olfactory lobes?
(a) To detect the sense of smell.
(b) To transfer information to the midbrain.
(c) To detect the sense of touch.
(d) To transfer information to the hindbrain.

8) Visual area in the cerebrum is located in _____ lobe.
(a) Frontal (b) Parietal
(c) Temporal. (d) Occipital

9) Ventricle number _____ is present in the diencephalon.
(a) I (b) II (c) III (d) IV

10) Which of the following helps in controlling posture and muscle tone?
(a) Red nucleus (b) Corpus striatum.
(c) Corpus callosum (d) Basal nucleus.

11)Which of the following is called dentist's nerve.
(a) Glossopharyngeal. (b) Facial
(c) Occulomotor (d) Trigeminal

12) Adrenergic fibres are found in _____.
(a) Sympathetic nervous system
(b) Peripheral nervous system.
(c) Parasympathetic nervous system
(d) Central nervous system

13) Which part of the human eye determines its colour?
(a) Pupil (b) Iris (c) Lens (d) Cornea

14) Which of the following is not a protein hormone ?
(a) Insulin (b) Glucagon (c) Relaxin (d) Estrogen

15) Which of the following hormones is secreted by the hypothalamus and is released through the pituitary gland ?
(a) GnRH (b) GRP (c) GIP (d) ADH

16) Hyposecretion of growth hormone in childhood causes _____.
(a) Gigantism (b) Dwarfism (c) Cretinism (d) Goitre

17) Melatonin, the sleep hormone, is secreted by _____.
(a) Pituitary gland (b) Pineal gland
(c) Prostate gland (d) Parathyroid gland

18) What is parathyroid tetany ?
(a) Low blood calcium level
(b) High blood sodium level
(c) High blood calcium level
(d) Low blood sodium level

19) Which of the following hormones secreted by adrenal cortex helps in balancing sodium-potassium levels ?
(a) Aldosterone (b) Cortisol
(c) Estradiol. (d) Adrenaline

20) Which hormone secreted by the ovary is produced at the end of the gestation period?
(a) Estrogen (b) Progesterone
(c) Relaxin (d) Inhibin

21) Identify the active form of vitamin D3 secreted by kidneys.
(a) Renin (b) Calcitriol (c) Secretin (d) Cortisol

VERY SHORT ANSWER QUESTIONS :-

1) What is the cause of Alzheimer's disease?
2) Name the part of the brain that decodes the sound in the hearing process.
3) State the function of the conjunctiva of the human eye.
4) Which receptors sense the changes in B.P.?
5) State the function of mammillary bodies.
6) Which type of hormones need a membrane receptor to find entry into the cell?
7) What is the chemical nature of hormones secreted by hypothalamus?
8) Pars nervosa secretes ADH and oxytocin. State whether true or false.
9) Write the chemical name of thyroxine.
10) Which cells in pancreas produce somatostatin?

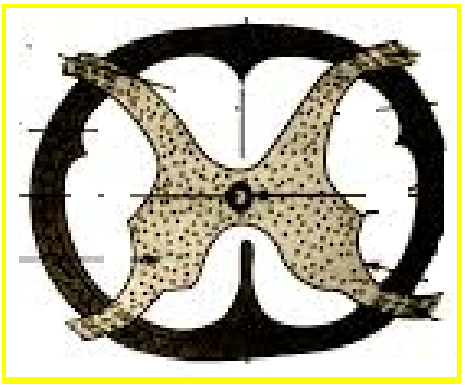
SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) What is the function of adrenal medulla?
2) Name the gonadotropins produced by adenohypophysis and state their function in human females.
3) Parafollicular cells are also called 'C' cells. What does 'C' stand for? What is the function of these cells?
4) Explain the role of placenta as a temporary endocrine organ.
5) Name any 4 applications of hormone therapy.
6) Write a note on blind spot
7) Complete the following table of cranial nerves

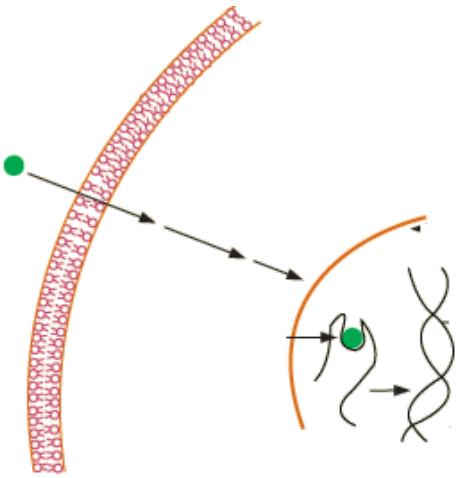
	NUMBER	NAME	TYPE
A	VI	---------	Motor
B	--------	Optic	Sensory
C	VIII	---------	Sensory
D	X	Vagus	---------

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Copy the following diagram and answer the questions.

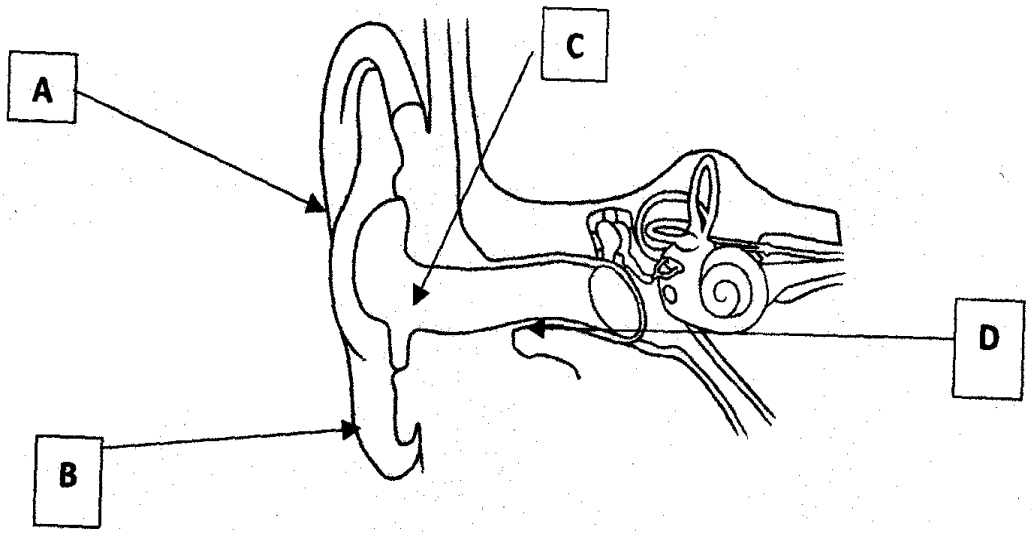


(a) Identify the diagram and state its functions.
(b) Label ependyma, anterior median fissure.
2) Write a note on functional areas of the cerebrum.
3) Name and explain any 3 properties of nerve fibres.
4) Explain the mode of hormone action shown in the figure with an example.



5) Explain the structure of gland lodged in Sella turcica
6) Write a note on diabetes and its types.
7) Enlist hormones secreted by the gastrointestinal tract and state their functions.
8) Make a flowchart explaining the process of image formation in human beings.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-



1) Label A, B, C and D in the above diagram.
2) Explain the structure of the human middle ear.
3) With the help of a suitable diagram, explain the formation of a typical spinal nerve.
4) Explain the histological structure of the largest endocrine gland with the help of a suitable diagram.
5) Rooma has developed a severe allergy.
(a) Which hormone can be administered to control it?
(b)Name the gland and the specific region of the gland that produces this hormone.
(c) State the position of the gland.

(d) What is the other function of this hormone?

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CHAPTER - 10 : HUMAN HEALTH & DISEASES

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MULTIPLE CHOICE QUESTIONS:-

1)……..is a branch of science which deals with the study of the immune system, immune responses to foreign substances & their role in resisting infection by pathogens.

(a) Histology (b) Immunology (c) Pathology (d) Physiology

2) ……..are a class of cytokines or soluble proteins released by cells infected with viruses & certain WBCs to stimulate other cells to protect themselves from viral infection.

(a) Plasma proteins (b) acute phase proteins

(c) Interferons (d) membrane proteins

3) Which one of the following is NOT an Acute Phase Protein ?

(a) C Reactive protein (b) Mannose Binding Proteins

(c) Alpha -I acid glycoproteins (d) cytokines proteins

4) Match the pair & choose the correct answer.

Type of immunity	source
1.natural acquired active immunity	(a)antibodies transferred from mother
2.artificial acquired active immunity	(b)infection
3.natural acquired passive immunity	(c)previously prepared antibodies
4.artificial acquired passive immunity	(d) vaccine induced antibody formation

(a) 1---b , 2--c , 3--a , 4—d (b) 1--d , 2--a , 3--b , 4-- c

(c) 1--b , 2--d , 3--a , 4---c (d) 1--d , 2---c , 3--b , 4---a

5) This type of T-cells produce lymphokines on coming in contact with an antigen…….

(a) suppressor T cells (b) memory T cells (c) killer T cells (d) Helper T cells

6) Which one of the following is not the function of free antibodies ?

(a) Neutralization (b) agglutination (c) sensitization (d) opsonization

7) Antibodies or Immunoglobulins are chemically……..molecules.

(a) Glycoproteins (b) lipoproteins (c) lipids (d) enzymes

8) Each immunoglobulin molecule is made up of ……. polypeptide chains.

(a) one (b) two (c) three (d) four

9) How many heavy & light chains are present in the antibody structure ?

(a) One H -chain & one L- chain (b) One H -chain & two L- chain

(c) Two H -chain & two L- chain (d) Two H -chain & one L- chain

10) Four polypeptide chains in an antibody are held together by ……bond /bonds.

(a) Disulfide bonds (b) Dipeptide bonds

(c) Single sulfide bond (d) Single peptide bond

11) Most antibodies are said to be……. according to antigen binding sites they carry.

(a) Monovalent (b) bivalent (c) trivalent (d) polyvalent

12) Blood group AB has ……. antigens.

(a) only antigen A (b) only antigen B (c) both antigen A &B (d) no antigen

13) Which of the following is NOT a synonym for common cold ?

(a) Nasopharyngitis (b) Acute viral rhinopharyngitis

(c) Acute coryza (d) Emphysema

14) Cancer of cartilage is also called ……

(a) Osteosarcoma (b)Myosarcoma (c) Chondrosarcoma (d) Liposarcoma

15) Epstein -barr virus or EBV is a virus causing ----disease.

(a) AIDS (b) Cancer (c) Dengue (d) Pneumonia

16) The HIV virus which is a retrovirus shows centrally located -----molecule/molecules.

(a) 1 single stranded DNA molecule (b) 1 single stranded RNA molecule

(c) 2 single stranded DNA molecules (d) 2 single stranded RNA molecules

17) ……is confirmatory test for AIDS.

(a) ELISA (b) Southern Blot (c) Western blot (d) Hemogram

18) Which type of drugs affect the cardiovascular system on their inhalation & ingestion ?

(a) Opioids (b) Cannabinoids (c) Cocaine (d) Alkaloids

19)…… is an addictive drug extracted from latex of poppy plant i.e. *Papaver somniferum.*

(a) Cocaine (b) Marijuana (c) Hashish (d) Heroin

20) Anorexia nervosa is a condition of mental illness which means

(a) Loss of memory (b) Emotional aversion to food

(c) Extreme overindulgence in food (d) hallucination

VERY SHORT ANSWER QUESTIONS:-

1) Define antigen.
2) What are Acute Phase Proteins(APP) ?
3) What is meant by Bursal or B – lymphocytes ?
4) Define Serology.
5) Which biocontrol method can be used to control Malaria ?
6) What is onychomycosis ?
7) Which is the causative organism of Amoebiasis ?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) What is the Rh-factor in human blood? Explain.
2) What is meant by congenital & acquired diseases ?
3) What is Pneumonia ? Does anyone state a causative pathogen?
4) What is the treatment for Filariasis ? How can it be prevented ?
5) Define the term : 1.neoplasm 2. Metastasis
6) What is Radiotherapy for the treatment of cancer ? Explain.
7) Match the pair

carcinogen	Organ affected in cancer
1.cadmium oxide	Urinary bladder
2.Mustard Gas	Prostate gland
3.Vinylchloride (V(c)	Skin
4. 2- naphthylamine	Lungs
	Liver

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) What are the three main functions of free antibodies ?
2) Explain any three unique features of Acquired immunity.
3) Describe the formation of the Antigen -Antibody complex.
4) What is erythroblastosis fetalis ?
5) Explain the terms .1.Pathogen 2.Vector 3.Parasite
6) State the signs & symptoms of Malaria .
7) Explain any three causes of cancer.
8) State & explain any three clinical manifestations of AIDS ?

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Describe the life cycle of *Plasmodium* in Malari
   (a) Draw a neat & labelled diagram of the life cycle of *Plasmodium.*

2) Explain the signs & symptoms of Typhoid disease. Describe the diagnosis & treatment of typhoid.

3) Describe the structure of antibodies.

4) Explain the structure of HIV.

5) State & explain any four types of cancer based on the type of tissue affected.

6) Describe the types of tumors.

7) Explain the types of Acquired immunity.

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CHAPTER – 11 : ENHANCEMENT OF FOOD PRODUCTION

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MULTIPLE CHOICE QUESTIONS:-

1) Emasculation is achieved by....

(a) removal of stamens (b) removal of stigma

(c) removal of entire gynoecium (d) removal of petals and sepals

2) Mule is the outcome of....

(a) inbreeding (b) outbreeding

(c) interspecific hybridization (d) intraspecific hybridization

3) Apis mellifera is ....

(a) little bee (b) rock bee (c) European bee (d) Indian bee

4) Aquaculture does not include .....

(a) prawns (b) fishes (c) oysters (d) silkworm

5) Propolis is.....

(a) beeglu (b) royal jelly (c) bee venom (d) bee wax

6) MOET technique is used for.....

(a) inbreeding (b) outbreeding (c) production of hybrids (d) outcrossing

7) Lac insect is a native of.....
(a) China (b) India (c) Africa (d) Europe

8) ..... variety of wheat is resistant to Hill bunt disease.
(a) Himgiri (b) PusaSwarnim (c) KalyanSona (d) Pusa A-4

9) Hisardale is a breed of sheep obtained by crossing.....
(a) bikaneri awes and merino rams
(b) merino awes and bikaneri rams
(c) deccani awes and bikaneri rams
(d) merino awes and apennine rams

10)In the dairy industry Surti and Mehsana are breeds of.....
(a) cow (b) buffalo (c) goat (d) sheep

11)The antibiotic Chloromycetin is prepared from....
(a) Penicilliumchrysogenum (b) Streptomyces erythreus
(c) Streptomyces griseus (d) Streptomyces venezuelae

12) In tissue culture differentiation of callous into different organs is called .....
(a) embryogenesis (b) micropropagation
(c) totipotency (d) morphogenesis

13) Ethanol is commercially produced through a particular space of …….
(a) Aspergillus(b) Saccharomyces (c) Clostridium (d) Trichoderma

14) Nif and Nod genes are present in .....
(a) Rhizobium (b) Penicillium (c) Aspergillus (d) Streptococcus

15) ……in biogas production hydrolysis is performed by
(a) Methanococcus (b) Clostridium (c) Methanobacillus (d) Azotobacter

16) Bombyx mori obtained.....
(a) Tassar silk (b) Mulberry silk (c)Eri silk (d) Muga silk

17) VAM is.....
(a) symbiotic bacteria (b) saprophytic bacteria
(c) saprophytic fungi (d) symbiotic fungi

18) The ectomycorrhizae form ……..... on the root surface.

(a) root tuber (b) mantle (c) root hair (d) arbuscles

19) The weed Senecio jacobeae is controlled by.....
(a) Cactoblastiscactarum (b) Bacillus thuringiensis
(c) Xanthomonas spp. (d) Tyrea moth

20) Nosema locustae is....pathogen
(a) bacteria (b) viral (c) protozoan (d) fungal

VERY SHORT ANSWER QUESTIONS:-

1) What is biofortification?
2) Name the microbe that is grown for use as protein rich food.
3) What is the meaning of totipotency ?
4) Gibberellin was first isolated from which plant ?
5) What is the microbial source of vitamin B12 ?
6) Name any one better yielding varieties of rice developed in India
7) Name any one freshwater fish.
8) Which part would be most suitable for raising plants for micro propagation ?
9) Write one quality of Saccharum officinarum (sugarcane) grown in south India
10) Define estuary.

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) Write a short note on biocontrol agents.
2) State any two advantages of SCP.
3) What is the heterocyst ?
4) What are the advantages of producing plants by micro propagations ?
5) What are the different requirements of dairy farm management ?
6) Explain the economic importance of fisheries.
7) What is artificial insemination ? What are the advantages of this technique ?

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Give any three types of poultry disease.
2) Which are the microbial sources of vitamin B2, vitamin B12 and vitamin C.
3) Write a note on lac culture.
4) Describe in brief the procedure involved in the sewage treatment .
5) Give the benefits of bio fertilizers.
6) Explain the role of microbes in energy generation.
7) Give an account of mutation breeding with examples.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) What is sericulture ?Explain the important aspects ?

2) Write the sequential steps of hybridization.
3) Explain the role of microbes in industrial productions.
4) Write the flowchart for tissue culture technique.
5) Write about any four biofertilizer microorganisms.

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CHAPTER – 12 : BIOTECHNOLOGY

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MULTIPLE CHOICE QUESTIONS:-

1) The _____ are molecular scissors that are used to recognize and cut DNA at specific sequences.

(a) plasmids (b) cloning vectors
(c) restriction enzymes (d) lysozymes

2) In vitro amplification of DNA or RNA segment is known as _____

(a) chromatography (b) polymerase chain reaction
(c) southern blotting (d) gel electrophoresis

3) In Anaemia the Recombinant protein _____ is produced by r- DNA technology.

(a) Relaxin (b) Insulin
(c) erythropoietin (d) antitrypsin

4) The Ti plasmid being used for introducing genes in plants obtained from _____

(a) *Agrobacterium rhizogenus* (b) *Agrobacterium T20*
(c) *Agrobacterium tumefaciens* (d) *E.coli*

5) Identify the plasmid from the following,
(a) Eco RI (b) Sal I (c) pACYC 121 (d) Sac I

6) Important objective of biotechnology in agriculture is ----
(a) produce pest resistant varieties of plants (b) increase nitrogen content
(c) decrease the seed number (d) increase plant weight

7) How many fragments will be generated on digestion of a closed circular DNA molecule with a specific restriction enzyme having six same types of recognition sites on the DNA ?
(a) 5 (b) 7 (c) 6 (d) 9

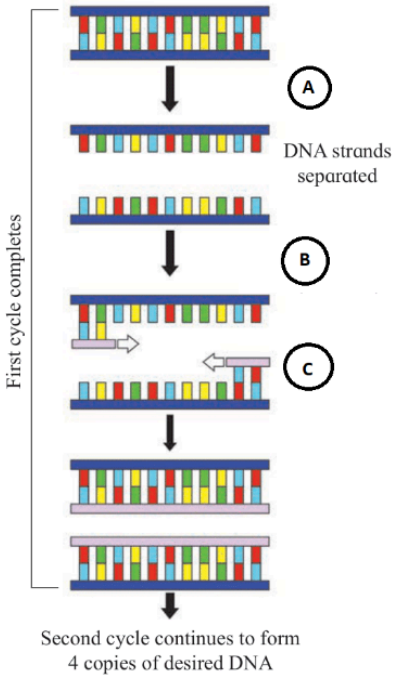
8) Recombinant protein …… is used to dissolve blood clots present in the body.
(a) insulin (b) tissue plasminogen activator (c) relaxin (d) erythropoietin

VERY SHORT ANSWER QUESTIONS :-
1) What is a Palindromic sequence?
2) Give the role of Ca^{++} ions in the transfer of a recombinant vector into a bacterial host cell.
3)What does the abbreviation HGP stand for?
4) Name the organism that shows tumour inducing plasmid?
5) What is the long form of GEAC?
6) What are nucleases?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-
1) Enlist the basic steps involved in r- DNA technology.
2) Give an account of oral vaccines.
3) What is Biopiracy ? Mention any two examples.
4) Give importance to transgenic animals in medical research and pharmaceuticals.
5) Give an account of any two proteins obtained through transgenic plants.
6) Give any two applications of gene therapy.
7) Name the organisms that produce Restriction enzymes Alu I and BamHI.
8) Name any two transgenes involved in iron fortification of rice.
9) Explain germ line therapy.
10) Give an account of transgenic plants producing edible vaccines.
11)Give the advantages of transgenic animals in molecular biology and animal husbandry programmes.
12) Give an account of the effect of biotechnology on human health with respect to allergies.

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-
1) Give an account of somatic cell gene therapy.

2) Write an account of the main objectives of improved animal breeding programs coupled with gene transfer techniques.
3) Explain the effects of Biotechnology on Human health with respect to allergies, long term effects and new proteins .
4) Identify A,B and C in the given diagram and also mention the temperature range suitable for them.



5) Explain the roles of enzymes like DNA ligase , reverse transcriptase and alkaline phosphatases in recombinant DNA technique.
6) Write an account of the main objectives of improved animal breeding programs coupled with gene transfer techniques.

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Describe PCR technique with a labelled diagram.
2) Explain the following terms with respect to recombinant DNA technology.
   (a) passenger DNA
   (b) chimeric DNA
   (c) transformed cells
   (d) restriction site
3) Describe common characteristics of Vectors.
4) Give an account of oral vaccine

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CHAPTER – 13 : ORGANISMS AND POPULATION

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MULTIPLE CHOICE QUESTIONS:-

1) _____ is the basic unit of ecological hierarchy.

(a) Organism (b) Populations (c) Communities (d) Biomes.

2) Organisms of the same kind inhabiting a geographical area constitute_____.

(a) Organism (b) Populations (c) Communities (d) Biomes.

3) Several populations of different species in a particular area form ____.

(a) Organism (b) Populations (c) Communities (d) Biomes.

4) In an interaction if both the species are benefited then it is called _____.

(a) Mutualism (b) Commensalism (c) Parasitism (d) Competition

5) Interactions are called _____ when they are existing between organisms of same population

(a) interspecific (b) intraspecific (c) competition (d) intergeneric

6) A population growing in a habitat with limited resources shows initially a _____phase.

(a) lag (b) log (c) Diminishing (d) Stationary

7) Lichen is an example of _____ .

(a) Mutualism (b) Commensalism (c) Parasitism (d) Competition

8) Insects visit flowers to collect nectar and unknowingly pollinate their flowers. This is an example of _____.

(a) Mutualism (b) Commensalism (c) Parasitism (d) Competition

9) Association between sea anemone and Hermit crab in gastropod shell is an example of .....

(a) Mutualism (b) Commensalism (c) Parasitism (d) Competition

10) The cattle egret and grazing cattle in close association, is a classic example of _____ .

(a) Mutualism (b) Commensalism (c) Parasitism (d) Competition

VERY SHORT ANSWER QUESTIONS:-

1) Define Habitat.

2) What is migration?

3) What is dormancy of seeds?

4) Name the special photosynthetic pathway shown by xerophytic plants.

5) How does the fat below the skin help seals to survive in a cold climate?

6) What is Natality?

7) What is Mortality?

8) Fig 13.4 Identify the type of growth curve

9) Fig 13.5 Identify the type of growth curve

10) What is commensalism?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) How will you differentiate between the terms Habitat and Niche?

2) Define Habitat. Give any two examples.

3) State any two characteristics of soil that decides the vegetation of an are(a)

4) What is migration? Why do some birds show migration?

5) State any two ways by which bad season can be avoided by animals which do not migrate?

6) How does the desert lizard manage to keep its body temperature constant?

7) State any two basic physical characteristics of a population.

8) What is commensalism? Give any one example.

9) What is Mutualism? Give any one example.

10) Fig 13.7 Identify A(alg(a) and B(Fungus)

11) What is Parasitism? Give any one example of an ectoparasite.

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) Enlist the three types of niches found in an environment.

2) State various methods by which plants and animals can overcome bad seasons.

3) Population is divided into three age groups. Name those groups.

4) Fig 13.5 labels A,B,C--- Identify the phase

5) What is commensalism? Explain with the help of any one example.

6) What is Mutualism? Explain with the help of any one example.

7) What is resource partitioning?

8) What is ectoparasite? Give one example of each plant and animal

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) State any four adaptations shown by plants growing in deserts.

2) 'Cuscuta is called an ectoparasite'. Justify the statement.

3) Explain how the human population in your locality is affected by Immigration and Emigration.

4) Explain an interaction between sea anemone and the clown fish. Name the type of an interaction.

5) Prey species have evolved various defenses to reduce the impact of predation. Give any four examples to support the above statement

****

CHAPTER – 14 : ECOSYSTEM AND ENERGY TRANSFER

……

MULTIPLE CHOICE QUESTIONS:-

1) Earthworms are …….

(a) decomposer (b) secondary consumer

(c) Detrivore (d) tertiary consumers

2) The letter 'R' given in the following equation represents-------

GPP – R = NPP

(a) respiration (b) regeneration

(c) respiratory losses (d) rate of reproduction

3) A constant input of ... .is the basic requirement for any ecosystem to function and sustain.

(a) soil (b) water

(c) nutrient (d) solar energy

4) Identify the type of food chain depicted below and choose the correct option.

Grass----------Deer----------Leopard

(Producer) (Primary consumer) (Secondary consumer)

(a) detritus food chain (b) parasitic food chain

(c) grazing food chain (d) predatory food chain

5) Which of the following represents Net Primary Productivity (NPP) of an ecosystem?

(a) GPP – R = NPP (b) GPP + R = NPP

(c) GPP – NPP = R (d) R -NPP = GPP

6) After a volcanic eruption has covered an area with lava, which of the following is the most likely order of succession in the repopulation of the area?

(a) Mosses—Herbs---Shrubs---Lichens---Trees

(b) Shrubs---Trees---Lichens---Moses---Herbs

(c) Lichens---Moses---Herbs---Shrubs----Trees

(d) Grasses---Shrubs---Trees---Lichens---Herbs

7) Identify the diagram given below

(a) Pyramid of number (b) Pyramid of biomass

(c) Inverted pyramid of biomass (d) Pyramid of energy

8) Which of the following would appear as the pioneer organisms on bare rocks?

(a) Mosses (b) Green algae

(c) Lichens (d) Liverworts

9) Which group of living organisms given below is a link in the food chain between green plants and hawks?

(a) grasshopper, frog and snake (b) grasshopper, fox and snake

(c) millipedes, centipedes and sparrow (d) earthworms, hen and rat

10) ---------have the greatest amount of energy

(a) insectivores (b) carnivores

(c) herbivores (d) autotrophs

VERY SHORT ANSWER QUESTIONS:-

1) What do you mean by pioneer species?

2) Name the nutrient cycles you studied.

3) Mention the different types of ecological pyramids you studied.

4) How many types of food chain are present in nature and which are they?

VERY SHORT ANSWER QUESTIONS:-

1) Give the important step in the process of decomposition.

2) Write a note on the spatial pattern.

3) Describe the function of the ecosystem.

4) What do you mean by ecological succession?

SHORT ANSWER TYPE QUESTIONS (2 / 3 MARKS) :-

1) Give the sequential steps in the process of succession.

2) Write a note of the pond ecosystem.

3) Explain the following terms with reference to ecological succession- Hydrosere, Xerosere, Pioneer and Serial stages

4) Draw a well labelled diagram of the energy pyramid.

5) Give provisioning services to the ecosystem.

6) Explain the carbon cycle.

7) Define PAR and state how much PAR is used by plants for photosynthesis?

****

CHAPTER – 15 : BIODIVERSITY, CONSERVATION AND ENVIRONMENTAL ISSUES

……

MULTIPLE CHOICE QUESTIONS:-

1) ---------- of the following is not included under in situ conservation??
(a) National Park (b) Sanctuary
(c) Botanical garden (d) Biosphere reserve

2) Announcing Kanha Forest as tiger reserve is an example of _____
(a) Ex situ conservation (b) in situ conservation
(c) Both (d) Tourism development

3) _____ is one of the most common sources of water pollution everywhere in India.
(a) Industrial Effluents (b) Domestic sewage
(c) Maritime traffic (d) Livestock farming

4) Thermal pollution of water is caused due to rise in temperature of water. The main source of thermal pollution is _____
(a) industrial effluents (b) Domestic sewage
(c) Deforestation (d) the thermal and nuclear power plants

5) What is the name of the species whose population has been reduced to a critical level?
(a) Endangered (b) Indeterminate (c) Rare (d) Vulnerable

6) The phenomenon through which certain pollutants get accumulated in tissues in increasing concentration along the food chains (successive trophic levels) is called _____
(a) Natural Eutrophication (b) Accelerated Eutrophication.
(c) Thermal pollution (d) Biomagnification

7) _____ are used to clean air for both dust and gases by passing it through dry or wet packing material.?
(a) Exhaust gas Scrubbers (b) Fabric Collectors.
(c) Mist collectors. (d) Dynamic precipitators

8) The sacred groves are found in Khasi and Jaintia hills from _____
(a) Meghalaya (b) Maharashtra (c) Gujrat (d) Kerala

9) Cryopreservation of gametes, cells, tissues, means preservation at low temperature _____ used to protect endangered species.
(a) - 10˚C (b) - 36˚C (c) - 78˚C (d) - 196˚C

10) Atlantic uses 35 tonnes of _____ and releases 70 tonnes of_____.
(a) Oxygen, Carbon dioxide (b) Carbon dioxide, Carbon monoxide.

(c) Carbon dioxide, Oxygen (d) Oxygen, Carbon monoxide.

11) India, at present has ____ biosphere reserves.

(a) 5 (b) 10 (c) 14 (d) 20

12) CO_2 and _____ are commonly called greenhouse gases.

(a) O_2 (b) CH_4 (c) SO_2 (d) NO_2

13) In the stratosphere _____ is generated by absorption of short wavelength UV radiations.

(a) Ozone (b) Oxygen (c) Methane (d) Nitrous oxide

14) Saalumara Thomeka is an Indian environmentalist from _____ noted for her work in planting and tending banyan trees.

(a) Orissa (b) Maharashtra (c) Kerala (d) Karnataka

15) The plantation drive is in line with National Forest Policy aims at maintaining _____ forest cover in the country.

(a) 5 % (b) 10 % (c) 33 % (d) 50 %

16) During the past century, the temperature of the Earth has increased by _____most of it during the last three decades.

(a) 0.1ºC (b) 0.2 ºC (c) 0.4 ºC (d) 0.6 ºC

17) Introduction of predator fish -Nile perch in Lake Victoria, proved deleterious for 200 local species of _____

(a) Elephant fish (b) Killifish (c) Marbled lungfish (d) Cichlid fish

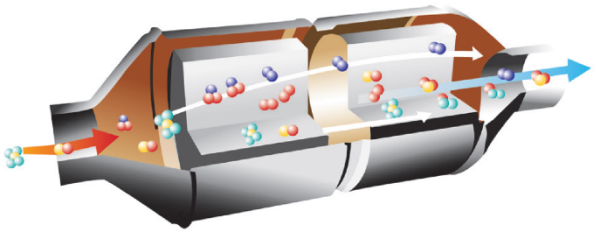
18) India boasts a handsome share of _____ of total biodiversity wealth of the earth.

(a) 5.4 % (b) 8.1% (c) 13.2 % (d) 15.0 %

VERY SHORT ANSWER QUESTIONS:-

1) Name the unit used to measure the thickness of the ozone in a column of air from the ground to the top of the atmosphere.
2) Explain the concept of Cultural or Accelerated Eutrophication.
3) Define Natural Eutrophication.
4) Name the predator fish from Lake Victoria which is proved deleterious for 200 local species of Cichlid fish.
5) Which fish species introduced for aquaculture purpose in Indian has proved harmful to endemic catfish varieties?
6) Define *In- situ* conservation?
7) Define *Ex -situ* conservation?
8) What is Bioprospecting?
9) Define a Pollutant?
10) What does the abbreviation NBA stand for in the field of Ecology?

11) What is the full form of IUCN?
12) What is the major Effect of Deforestation?
13) What is algal bloom?
14) Name the Hypothesis put forth by Paul Ehrlich to explain the significance of diversity.
15) How many national parks are there in Maharashtra?
16) Identify the device used in vehicles for Controlling Vehicular Air Pollution.



17) Name the plant which is commonly called 'Terror of Bengal'.
18) Which is the most common source of water pollution?

SHORT ANSWER TYPE QUESTIONS (2 MARKS) :-

1) Give the full form of BOD. What does high BOD indicate?
2) Enlist common sources of noise pollution.
3) Give any two advantages of CNG usage over other fuels.
4) Explain the algal bloom and its adverse effects.
5) How many world's biodiversity hotspots are there in India? Enlist the names of those.
6) Give one significance or importance of each of the following:
   (a) Seed banks. (b) tissue culture
7) What do you understand by Over exploitation of resources? Give any two examples of it.

SHORT ANSWER TYPE QUESTIONS (3 MARKS) :-

1) What do e-wastes mean by e-wastes and comment on its recycling.
2) Explain the following terms.
   a) Ecological sanitation
   b) Greenhouse effect
   c) Global warming
3) Distinguish between In- situ conservation and Ex -situ conservation.
4) Complete the given flow chart for the process of eutrophication.

Stinking eutrophic lake with coloured and turbid water

↓

Loss of species diversity

↓

_____

↓

_____

↓

Increase in organic loading of lake.

↓

Death of submerged plants due to reduced light

↓

Biological enrichment of water (algal bloom, planktonic algae and higher plants)

↓

_____

5) Write a note on Thermal pollution.

6) Discuss the adverse effects of various Gaseous pollutants.

7) Give an account of Habitat loss and fragmentation.

8) Match the following and rewrite the matched pairs.

A (ACT)	B (Year of Application)
i. Environment Protection Act	P) 1974
ii. Air (Prevention and control of pollution) Act	Q) 1987
iii. Montreal Protocol	R) 1986
iv. Water (prevention and control of pollution) Act	S) 1981

LONG ANSWER TYPE QUESTIONS (4 MARKS) :-

1) Distinguish between Mitosis and Meiosis.

2) Describe Noise pollution with respect to its causes and its effects on human health.

3) (a) Write a note on Ozone depletion.

(b) Discuss Major Effects of Deforestation in brief.

4) Explain the major causes Biodiversity loss.

5) Describe Global warming.

6) Give an account of Mission Harit Maharashtra

****

Model Question paper

Subject: Biology (56) **Duration: 3 Hrs.** **Total marks: 70**

Disclaimer:

Although every attempt has been made, in drafting this model question paper, to adhere to the blueprint on the various criteria like chapter wise weightage, learning objectives (K/ U/ A & S), it has been tweaked slightly (as per directives) to boost the confidence of academically underperforming students.

This is ONLY intended as a practice exercise and does not claim to be an exact question paper or question paper pattern for the upcoming HSC examinations.

INSTRUCTIONS:

1) *The question paper consists of a total* ***of 31 questions,*** *divided into* ***Four Sections namely A, B, C, D.***

Section A – Question 1 *consists of 10 MCQs, carrying* ***1 Mark each****.*

Question 2 *consists of 8 Very Short Answer questions, carrying* ***1 mark each****.*

Section B – *Questions* ***3 to 14*** *are 12 Short Answer questions, Carrying* ***2 marks each****.*

Attempt any eight questions.

Section C – *Questions* ***15 to 26****are 12 Short Answer questions, Carrying* ***3 marks each****.*

Attempt any eight questions.

Section D –*Questions* ***27 to 31*** *are Long answer questions, carrying* ***4 marks each****.*

Attempt any three questions.

2) *Figures to the right indicate full marks.*

3) *Start each new section on new page.*

4) *Evaluation of MCQs will be done for the first attempt only.*

SECTION A

Q.1 Select and write the most appropriate answer from the given options.

i) Extranuclear DNA is present in ------ **1**

(a) mitochondrion (b) golgi bodies (c) rough ER (d) ribosome

ii) Archaeopteryx is a missing link between _____. **1**

(a) fishes & amphibians (b) Annelida & Arthropoda

(c) birds & reptiles (d) Aschelminthes & platyhelminthic

iii) Versatile & exposed anthers producing large numbers of pollen are characteristic features of _____plants. **1**

(a) entomophilous (b) anemophilous

(c) epihydrophilous (d) hypohydrophilous

iv) Roots of a plant absorb _____ water from the rhizosphere. **1**

(a) Hygroscopic (b) Gravitational (c) Combined (d) Capillary

v) Scientific name for the technique of Test tube babies is …… **1**

(a) *in vivo* fertilization (b) *in situ* fertilization

(c) *in vitro* fertilization (d) artificial insemination

vi) Identify the type of food chain depicted below and choose the correct option. **1**

Grass ----------□ Deer ----------□ Leopard

(Producer) (Primary consumer) (Secondary consumer)

(a) detritus food chain (b) parasitic food chain

(c) grazing food chain (d) predatory food chain

vii) Hyposecretion of growth hormone in childhood causes _____. **1**

(a) Gigantism (b) Dwarfism (c) Cretinism (d) Goitre

viii) Malformed leaves of a plant, is the deficiency effect of ------- **1**

(a) Cl^- (b) Cu^{2+} (c) Zn^{2+} (d) Mg^{2+}

ix) Important objective of biotechnology in agriculture is to ----------. **1**

(a) produce pest resistant varieties of plants

(b) increase nitrogen content

(c) decrease the seed number

(d) increase plant weight

x) In an interaction if both the species are benefited then it is called _____. **1**

(a) Mutualism (b) Commensalism (c) Parasitism (d) Competition

Q.2. Answer the following.

i) Name the process by which large interspaces develop in the parenchyma in hydrophytes, for support and aeration. **1**

ii) What is Natural Eutrophication? **1**

iii) Give the function of velamen tissue. **1**

iv) What are biocontrol agents? **1**

v) What is biopiracy? **1**

vi) What is Lymph? **1**

vii) Name the trophic level formed by frogs in a food chain given below. **1**

Grasses□ Insects □ Frogs □ Snake

viii) What is the cause of Alzheimer's disease? **1**

SECTION B

Answer the following (Any EIGHT)

Q.3. What are Vestigial Organs? Give two examples of them found in man. **2**

Q.4. Write a note on the mechanism of sex determination in birds. **2**

Q.5. Mention any four properties of water. **2**

Q.6. Draw a well labelled diagram of the transcription unit. **2**

Q.7. Differentiate between Auxin and Gibberellin. (Any 4 points) **2**

Q.8. Complete the following table of cranial nerves. **2**

	NUMBER	**NAME**	**TYPE**
a)	VI	---------	Motor
b)	--------	Optic	Sensory
c)	VIII	---------	Sensory
d)	X	Vagus	---------

Q.9. Match the following pairs of carcinogens with the organs they affect. **2**

Carcinogen	**Organ affected in cancer**
1. Cadmium oxide	a. Urinary bladder
2. Mustard Gas	b. Prostate gland
3. Vinyl chloride (V(c)	c. Skin
4. 2- Naphthylamine	d. Lungs
	e. Liver

Q.10. Give the sequential steps in the process of succession in an aquatic ecosystem. **2**

Q.11. Enlist the sequential steps involved in Sewage treatment. **2**

Q.12. Draw a well labelled diagram of Structure of Antibody. **2**

Q.13. Match the blood vessels of the heart listed in column-I with the functions in column-II. **2**

	Column-I		Column-II
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

Q.14. Enlist any four microorganisms used as biofertilizers. **2**

SECTION C

Answer the following (Any EIGHT)

Q.15. What is genetic variation? Enlist various causes of it. **3**

Q.16. Explain the sequential steps involved in the absorption of water through root hair. **3**

Q.17. a) What is the growth curve in plants? **3**

b) Name any two types of growth curves.

c) What is grand period of growth

Q.18. Explain the terms Porogamy, Mesogamy & Chalazogamy. **3**

Q.19. Name the microbial sources of vitamin B2, vitamin B12 and vitamin C. **3**

Q.20. Draw the diagrammatic representation of DNA replication through PCR technique. Mention steps involved and temperatures required for each step. **3**

Q.21. Give an account of the Hershey-Chase experiment that proved, 'DNA is the genetic material'. **3**

Q.22. Complete the given flow chart for the process of eutrophication. **3**

Stinking eutrophic lake with coloured and turbid water

↓

Loss of species diversity

↓

_____

↓

_____

↓

Increase in organic loading of lake.

↓

Death of submerged plants due to reduced light

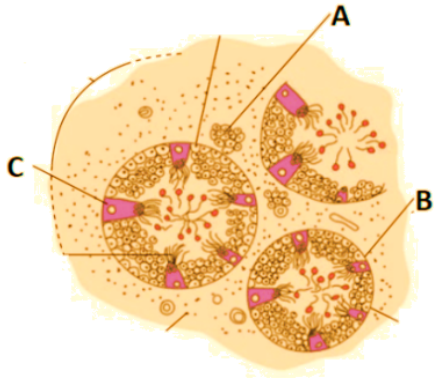
↓

Biological enrichment of water (algal bloom, planktonic algae and higher plants)

↓

_____

Q.23. Observe the following diagram and answer the following questions: - **3**



a. Name the hormone secreted by 'A'.

b. What is the chromosomal number of 'B'?

c. Give the function of 'C'.

Q.24. Sketch and Label- T.S. of Spinal cord **3**

Q.25. a) What is commensalism? **3**

b) Explain with the help of any one example.

c) How is it different from Ammensalism?

Q.26. In relation to composition of human blood, complete the statements given below: **3**

a) Plasma without _____ factors is called serum.

b) _____ and monocytes are phagocytic cells.

c) Eosinophils are associated with _____ reactions.

SECTION D

Answer the following (Any THREE)

Q.27. With the help of a neat and labelled diagram explain the process of double fertilization in angiosperms? **4**

Q.28. Explain the inheritance pattern of color blindness. **4**

Q.29. Explain ovarian cycle with its different phases. (Diagram not expected) **4**

Q.30. Answer the following with respect to human heart – **4**

a) Name the chamber where the heart beat starts.

b) Name the valve guarding the opening between the auricle and ventricle on the right side of the human heart.

c) Name the chamber of heart which pumps oxygenated blood to various parts of the body.

d) Name the blood vessels that supply blood to the heart wall.

Q.31. With the help of a suitable diagram explain the histological structure of the largest endocrine gland. **4**

Model Answers

SECTION A		
Q.1	**Select and write the most appropriate answer from the given options.**	
i)	Extranuclear DNA is present in **mitochondrion**	**1**
ii)	Archaeopteryx is a missing link between **birds & reptiles**	**1**
iii)	Versatile & exposed anthers producing large numbers of pollen are characteristic features of **anemophilous** plants.	**1**
iv)	Roots of a plant absorb **Capillary** water from the rhizosphere.	**1**
v)	Scientific name for the technique of Test tube babies is ***in vitro* fertilization**.	**1**
vi)	Ans. **Grazing food chain**	**1**

vii)	Hyposecretion of growth hormone in childhood causes **Dwarfism**	**1**
viii)	Malformed leaves of a plant, is the deficiency effect of **Zn^{2+}**	**1**
ix)	Important objective of biotechnology in agriculture is to **produce pest resistant varieties of plants.**	**1**
x)	In an interaction if both the species are benefited then it is called **Mutualism**	**1**
Q.2.	**Answer the following.**	
i)	Differentiation is the process by which large interspaces develop in the parenchyma in hydrophytes, for support and aeration. (Page 137)	**1**
ii)	Natural Eutrophication is the aging of a lake due to nutrient enrichment of water. (Page 335)	**1**
iii)	Velamen tissue helps the roots of the orchid plants to absorb water vapours from air. (Page 119)	**1**
iv)	Biocontrol agents are the living organisms that are used to control diseases and pests. (Page 265)	**1**
v)	Biopiracy is defined as 'theft of various natural products and selling them by getting patents without giving any compensation to the host country' (Page 289)	**1**
vi)	Lymph is the fluid connective tissue which is almost similar to blood except RBCs, platelets and certain proteins. (Page 177)	**1**
vii)	Secondary consumers. (Page 312)	**1**
viii)	The cause of Alzheimer's disease is the loss of neurons in the CNS. (Page 206)	**1**
SECTION B		
	Answer the following (Any EIGHT)	
Q.3.	Vestigial organs are the imperfectly developed, non-functional, degenerate structures which were functional in some related or other animal or in ancestors. Wisdom teeth and Nictitating membrane in the eye are examples of vestigial organs in man. (Page 108)	**2**

<table>
<tr><td>Q.4.</td><td>In birds the chromosomal mechanism of sex determination is ZW-ZZ type. Female is heterogametic and produces two types of eggs Viz. Z type and W type.
Male is homogametic and produces only one type of sperm viz. Z type. Thus, the sex of the new hatchling depends on the type of ova / egg fertilized by the sperm. (Page 65)</td><td>2</td></tr>
<tr><td>Q.5.</td><td>Water has a high specific heat. It has a high heat of vaporization. It also has a high heat of fusion. It acts as a thermal buffer. (Page 119)</td><td>2</td></tr>
<tr><td>Q.6.</td><td>Fig. 4.10 transcription unit. (Page 78)</td><td>2</td></tr>
<tr><td>Q.7.</td><td>Differentiate between Auxin and Gibberellin. (Pages 138- 141)</td><td>2</td></tr>
<tr><td>Q.8.</td><td>Complete the following table of cranial nerves.
<table>
<tr><td></td><td>NUMBER</td><td>NAME</td><td>TYPE</td></tr>
<tr><td>a)</td><td>VI</td><td><u>PATHETIC</u></td><td>Motor</td></tr>
<tr><td>b)</td><td><u>II</u></td><td>Optic</td><td>Sensory</td></tr>
<tr><td>c)</td><td>VIII</td><td><u>AUDITORY</u></td><td>Sensory</td></tr>
<tr><td>d)</td><td>X</td><td>Vagus</td><td><u>MIXED</u></td></tr>
</table></td><td>2</td></tr>
<tr><td>Q.9.</td><td>Match the following pairs of carcinogens with the organs they affect. (Page 236)
<table>
<tr><th>Carcinogen</th><th>Answers</th></tr>
<tr><td>1. Cadmium oxide</td><td><u>b. Prostate gland</u></td></tr>
<tr><td>2. Mustard Gas</td><td><u>d. Lungs</u></td></tr>
<tr><td>3. Vinyl chloride (V(c)</td><td><u>e. Liver</u></td></tr>
<tr><td>4. 2- Naphthylamine</td><td><u>c. Urinary bladder</u></td></tr>
</table></td><td>2</td></tr>
<tr><td>Q.10.</td><td>Succession of communities in an aquatic ecosystem is known as hydrarch succession.
It begins with Phytoplankton stage, Submerged plants stage, Submerged and Free-floating plant stage, Reed swamp stage, Marsh meadow stage, Scrub stage, and lastly Climax Forest.
(Write names of any four stages in correct order) (From fig. 14.13 on page 318)</td><td>2</td></tr>
</table>

Q.11.	**Preliminary treatment** composed of Screening and Grit chamber. **Primary, Secondary** and **Tertiary** treatment.	**2**
Q.12.	**Fig. 10.1** (Page 225) Structure of Antibody.	**2**
Q.13.	Match the blood vessels of the human heart listed under column-I with the functions given under column-II. **A = V, B = III, C = I, D = IV**	**2**
Q.14.	Microorganisms used as biofertilizers are ***Rhizobium, Anabaena, Azotobacter, Nostoc, Azospirillum, Azolla.*** (Page 266, 267)	**2**
	SECTION C	
	Answer the following (Any EIGHT)	
Q.15.	Any change in the gene and gene frequency is known as genetic variation. Genetic variations can be caused by gene mutation, genetic recombination, gene flow, genetic drift, and chromosomal aberrations. **(Page 100, 101)**	**3**
Q.16.	Root hairs of plants absorb water by employing three physical processes that occur in a sequence *viz*. Imbibition, Diffusion and Osmosis. (Explain each process in detail for 1 mark each) **(Page 120, 121)**	**3**
Q.17.	a) A graphical representation of the total growth of a plant against time is known as a growth curve. b) There are three types of growth curves namely linear exponential and sigmoid. c) The total time period required for all the phases of growth to occur is called the Grand period of growth. **(Page 137)**	**3**
Q.18.	Pollen tube formed by germinating pollen grains enters the ovule through the micropyle this is known as porogamy. In certain plants the Pollen tube enters the ovule through the integuments this is known as mesogamy. In some plants the Pollen tube enters the fuel through chalaza this is known as chalazogamy.**(Page 10)**	**3**
Q.19.	The microbial source of vitamin B2 is *Neurospora gossypii, or Eremothecium ashbyi.* For vitamin B12 the microbial source is *Pseudomonas denitrificans*. For vitamin C the microbial source is the fungus Aspergillus *niger*. **(Page 260)**	**3**

Q.20.	Diagrammatic representation of DNA replication through PCR technique. **(Fig. 12.1 on Page 274)**	**3**
Q.21.	Hershey and Chase worked with bacteriophages that were grown in a medium containing radioactive phosphorus and sulphur. These radioactive bacteriophages were allowed to infect *E. coli* bacteria grown on the medium containing normal Phosphorus and sulphur. Bacteria which were infected by viruses with radioactive DNA containing radioactive Phosphorus were radioactive indicating the DNA was the material that passed from viruses to bacteria. The bacteria which were infected with viruses having radioactive sulphur were not radioactive because sulphur was used for making protein coats of the bacteriophages. This experiment proved that DNA is the genetic material that passes from viruses to their host bacteria. **(Page 71, 72)**	**3**
Q.22.	Complete the given flow chart for the process of eutrophication. Stinking eutrophic lake with coloured and turbid water ↓ Loss of species diversity ↓ **Death of aquatic animals including fish** ↓ **Reduced contents of dissolved oxygen** ↓ Increase in organic loading of lake. ↓ Death of submerged plants due to reduced light ↓ Biological enrichment of water (algal bloom, planktonic algae and higher plants) ↓ **Nutrient enrichment of water** **(Page 335)**	**3**

Q.23.	Observe the following diagram and answer the following questions: - a) These are interstitial or Leydig cells secreting the hormone **Testosterone.** b) Part B is the germinal epithelium of seminiferous tubules, the chromosomal status of the germinal epithelium is **diploid (2n).** c) Part C are large pyramidal cells called Sertoli cells that **provide nourishment** to the developing spermatocytes. **(Page 20, 28)**	**3**
Q.24.	T.S. of Spinal cord - Fig 9.11 **(Page 195)**	**3**
Q.25.	a) Commensalism is a type of interspecific interaction where one species is benefited and the other species is unaffected. b) Example of commensalism is the interaction between cattle egrets and cattle. Due to movement of cattle in the grass the cattle egret gets insects as food and cattle are not affected. c) Amensalism is a type of interspecific interaction in which one species is harmed whereas the other species is unaffected. **(Page 302)**	**3**
Q.26.	In relation to composition of human blood, complete the statements given below: a) Plasma without **_Formed__** factors is called serum. b) **_Neutrophils_** and monocytes are phagocytic cells. c) Eosinophils are associated with **_allergic_** reactions. **(Pages 166, 167)**	**3**
SECTION D		
	Answer the following (Any THREE)	

Q.27.	The process of double fertilization in angiosperms - **Fig. 1.13 on Page 10.** Double fertilization is a complex fertilization mechanism in angiospermic plants. The Pollen tube containing the male gametes penetrates one of the synergids inside the ovule where the Pollen tube ruptures to release the two non-motile male gametes. Syngamy and triple fusion are two events of sexual reproduction in angiospermic flowering plants. Syngamy is the fusion of haploid male gamete with the haploid female gamete to produce diploid zygote. Zygote develops into an embryo. In triple fusion the second haploid male gamete fuses with the diploid secondary nucleus producing primary endosperm nucleus which develops into triploid endosperm of the seed. Since both the male gametes participate in the process of fertilization this is known as double fertilization.	**4**

Q.28.	Inheritance pattern of colour blindness. Colour blindness is an X-linked recessive disorder where a person is unable to distinguish between red and green colour as both of them appear as Grey. It is caused due to a recessive X-linked gene which prevents the formation of colour sensitive cone cells in the retina of the eye. The homozygous recessive females and recessive males are unable to distinguish between the red and green colours. Inheritance of colour blindness shows the Criss-Cross pattern. The marriage between a color blind male with a normal female will produce normal male and female offspring in F1 generation. The males will be normal but the daughters will be carriers for colour blindness. **Draw Fig. 3.10 on Page 63** Marriage between a carrier female /daughter with a normal male will produce female offerings with normal vision but half of them will be carriers for colour blindness. Similarly, half of the male offspring will have normal vision and the remaining half will be colourblind. **Draw Fig. 3.11 on Page 63.** **(Page 62, 63)**	**4**
Q.29.	Ovarian cycle also known as menstrual cycle is a characteristic feature of primates including human beings. It involves a series of cyclic changes in the ovary and female reproductive tract, mainly the uterus. The changes take place under the effect of gonadotropins and ovarian hormones. The cycles are repeated with the periodicity of approximately 28 days; the middle of each cycle is characterised by release of an egg. Each cycle can be divided into four phases- Menstrual phase, Proliferative or Follicular phase, Ovulatory phase and Secretory or Luteal phase. (Explain each of the four phases mentioned above with respect to hormones and changes taking place in the uterine wall) **(Page 26, 27)**	**4**

Q.30.	Answer the following with respect to human heart – a) The heart beat starts at the right **atrium.** b) Tricuspid valve. c) **Left Ventricle** is the chamber of the heart which pumps oxygenated blood to various parts of the body. d) **Coronary arteries** supply blood to the heart wall. **(Pages 170, 175)**	**4**
Q.31.	Histological structure of the largest endocrine gland. Thyroid gland is the largest endocrine gland in our body. Draw - **Part 'B' of Fig. 9.28 on page 212**. It is a bilobed gland, the two lobes of the thyroid gland are connected by means of a band called isthmus. The thyroid lobes are composed of rounded follicles held together by interfollicular connective tissue called stroma. This stroma contains blood capillaries and small groups of parafollicular cells also known as 'C' cells. Each thyroid follicle is externally surrounded by cuboidal epithelial cells resting on the basement membrane. the central cavity of the follicles is filled with a gelatinous substance called colloid. **(Pages 211, 212)**	**4**

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