BIOLOGY AND ZOOLOGY

12 – BIOLOGY AND ZOOLOGY SPECIAL GUIDE
KRISHNAGIRI DISTRICT
2025-2026

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1.Reproduction of Organisms

One mark question

- In which type of parthenogenesis are only males produced?(**Arrhenotoky**)
- In_____mode of reproduction variations are seen. (**Sexual**)
- Assertion: In bee society, all the members are diploidexcept drones.Reason: Drones are produced by parthenogenesis.
  (Ans: Both A and R are true and R is correct explanation for A)
- In_____the fusion of two haploid gametes takes place to producea diploidzygote. (**Syngamy**)
- The process of fusion of dissimilar gametes is called as .(**Anisogamy**)
- In_____parthenogenesis the larvae produce a new generationof larvaeby parthenogenesis. (**paedogenetic**).

Two Mark Questions:

1. What is Pathogenesis? Give two examples:
   The Process pf development of an egg into a complete individuals without fertilization.Ex: Annelid and Sea urchin`
2. Which type of reproduction is effective:
   Asexual of sexual and why?
   Sexual reproduction is effective because it contributes to the evolution of species by adding variation in a population.
3. What is apolysis?
   I tapeworm gravid proglottids are regularly cut off eighter singly or groups from the posterior end.
4. How is Juvenile phase different from reproductive phase?

It is a time period Between birth to just Before reproductive phase	Its an actual reproductive phase

5. Define Regeneration with example :
   Regeneration is re-growth in the injured region.
   Ex: Hydra, Planaria.
6. What is Encystment?

   During unfavourable conditions Amoeba withdraws its pseudopodia and secretes a three layered, productive, Chitinous cyst wall around its and become inactive.

7. What is Endogenous Budding?

In Noctiluca, hundreds of buds are formed inside the cytoplasm and many remain within the body of the parent.

8. What is Asexual Reproduction?

   Reproduction by a single parent without the involvement of gamete formation.

Three Mark Questions:

1. What is budding, types of budding:
   Bud originates from a small protuberance on the parent body.
   1. Exogenous budding 2. Endogenous budding
2. What is difference between syngamy and fertilization

1.	The fusion of cells in reproduction	If is the process of fusion of dissimilar garnets
2.	If denotes fusion of cells occur invertebrates	It denotes fusion of gamete occur vertebrates

3. What is Plasmotomy give examples?
   The division multinucleate parent into many multinucleated daughter individuals`
   Ex:Opalina, Pelomyxa.
4. Differentiate Seasonal and continuous breeders with example :

They reproduce at particular period of the year.	They reproduce throughout their sexual maturity.
E.g. Frogs, Lizards, deer's	E.g. Honey bees, Poultry rabbit.

1. Differentiate:- External Fertilization and Internal Fertilization?

EXTERNAL FERTILIZATION:

- The fusion of male and female gametes takes place outside the body of female organisms in the water medium.
- **Eg.** Sponges, Fishes and Amphibians.

INTERNAL FERTILIZATION:

- **T**he fusion of male and female gametes takes place within the body of female organisms.
- **Eg.**Reptiles, Aves and Mammals

Five Mark Questions:-

1. What is Parthenogenesis Explain with types:
   Development of an egg into complete individuals without fertilization types.

   1. Natural Parthenogenesis :
      It occurs regularly, constantly and naturally in their life cycle.
   2. Artificial Parthenogenesis:
      The Unfertilized egg is induced to develop into a complete individuals by physical or chemical stimuli.
      Ex: annelid and Sea urchin eggs.

2.Human Reproduction

One Mark Questions

- The mature sperms are stored in the_____. (**Epididymis**)
- The male sex hormone testosterone is secreted from_____. (**Leydig**

cell)

- The glandular accessory organ which produces the largestproportion of semenis _____. (**Seminal vesicle**)
- The male homologue of the female clitoris is _____. (**Penis**)
- The site of embryo implantation is the_____. (**Uterus**)
- The foetal membrane that forms the basis of the umbilical cord.(**Allantois)**
- Mammalian egg is_____. (**Alecithal and non cleidoic)**
- The process which the sperm undergoes before penetrating theovum is _____. (**Capacitation**)
- The Androgen Binding Protein (ABP) is produced by_____. (**Sertolicells**)
- The gametes of the reproductive system are the_____and_____. (**spermsand ovum**)
- Embryo gets embedded in the inner wall of the uterus and the processis calledas_ *implantation
- Each testis is covered by an outermost fibrous_____. (**tunicaalbuginea**)
- Each testis is / the sceptre inter about_____lobules. (**200 to 250**)
- The ovary is an elliptical structure about____to____cm long. (**2 to 4**)
- The ovary remains attached to the pelvic wall and the uterus by anovarianligament called_____. (**mesovarium**)
- The cells of the_____opens into mammary tubules. (**alveoli**)
- The process of release of mature sperms is called as_____.(**spermiation**)
- Head of human sperm comprises_____and_____. (**Acrosome andNucleus**).
- The smallest human cell is_____(**sperm cell**).
- The biggest human cell is_____(**ovum**)

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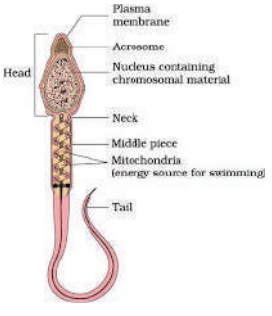
Two Mark Questions:-

1. Mention the differences between spermatogenesis and spermatogenesis

Spermatogenesis	Spermatogenesis
It is the process of formation of haploidspermatozoa from germinal cells.	It is the process of differentiation of spermatozoa from a spermatid.

2. Expand the acronyms:
   (a) FSH - Follicle stimulating hormone
   (b) LH - Luteinising hormone
   (c) HCG - Human chorionic gonadotropin
   (d) HPL - Human placental Lactogen
3. Define Gametogenesis :
   Formation of gametes by spermatogenesis and Oogenesis.
4. What is Ctyptorchism?
   The failure of one or both testes to descend down into the scrotal sacs is known as cryptochism.
5. What is the composition for semen?
   It is an alkaline fluid with fructose sugar, ascorbic acid, prostaglandin and vesicles.
6. What is meant for nebenkern.
   In sperm middle piece possesses mitochondria spirally twisted around the axial filament.
7. What is Eco topic Pregnancy?
   If the fertilized ovum is implanted outside the uterus it results in ectopic pregnancy.
8. Draw labelled sketch of spermatozoan:



9. What is inhibin? State its functions?
   - Sertolicells is in the stratified epithelium of seminiferous tubule, it secrete inhibin.
   - It is involved in the negative feedback control of sperm production.

Three Mark Questions:

1. What is colostrum's? Write its Significance?
   - It is a yellowish, nutrient rich fluid produced by human female after parturition.
   - It is a natural antimicrobial agent.

2. What are the phases of menstrual cycle?
    1. Menstrual phase
    2. Follicular phase
    3. Ovulatory phase
    4. Luteal or Secretory phase
3. What are the main functions of reproduction system?
    1. To produce garnets
    2. To transport and sustain gametes
    3. To nurture the developing offspring
    4. To produce hormones.

Five Mark Questions: -

1. Describe the Structure of human Ovum with a neat labelled diagram.
    1. It is microscopic, non-cleidoic and alecithal
    2. It's cytoplasm is called Ooplasm.
    3. Ooplasm contain large nucleus – germinal vesicle.
    4. Ovum consists of vitelline membrane, corona radiate, and zona pellucid coats
    5. Between the vitelline membrane and zonapellucida is a narrow space – pertivitelline space.
2. Explain the various phase of the menstrual cycle.
   It occurs in every 28/29 days. It is from puberty to menopause.
    1. Menstrual phase (3-5 days)
        - Progesterone, Oestrogen level decreases.
        - So uterine endometrial lining and the blood vessels break.
    2. Follicular phase (5-14 days)
        - Endometrium regenerates, follicular development is stimulated.
        - Oestrogen is secreted by the follicle cells.
    3. Ovulatory phase (about 14^{th} day)
        - LH and FSH attain peak level.
        - LH induces the rupture of graft ion follicle.
        - Ovum is released from Ovary wall into peritoneal cavity.
    4. Luteal Phase or Secretory (15-28 days)
        - Grabbingfollicle becomes corpus luteum, it secrete progesterone.
        - After fertilization, progesterone helps in implantation of ovum.
        - During pregnancy all events of Menstrual cycle.
        - Absence of fertilization corpus leuteum degenerates, leaves scar tissue corpus albicans.

3. Reproductive Health

Two mark questions:

1. Differentiate foeticide and infanticide
   Aborting the female in the mother's wombkilling the female child after her birth.
2. Expand the following:
   (a) 21 FT - Zygote Intra - Fallopian Transfer
   (b) ICSI - Intra Cytoplasmic sperm Injection

1. Avoid Sex with unknown Partners.
2. Use condoms.
3. In case of doubt, consult a doctor complete treatment.
4. Importance of POCSO Act?
   - Prevention of Children from Sexual offences.
   - Sexual harassment at work place.

Three MarkQuestions:-

1. What is amniocentesis?
   Amniocentesis a parental technique used to detect any chromosomal abnormalities in the foetus.
2. What is Surrogacy?
   It is method of assisted reproduction or agreement whereby a woman agrees to carry a pregnancy for another person.
3. Differentiate between vasectomy &Tubectomy?

Vasectomy	Tubectomy
It is a Surgical procedure for male sterilization	It is the surgical sterilization in woman.
It prevents the entry of sperm is to the urethra	It prevents the fertilization.
Both vas deferens are cut and tied up	A small portion of both fallopian tubes cut and tied up.

Five Mark Questions:-

1. What are the Barriermethods of Contraceptive?
   (a) Chemical barriers :
   The Chemical agents that in activate the sperms in the vagina.
   Ex: Foaming tablets, fellies and creams.
   (b) Mechanical Barriers :
   - In Female condoms is used to cover vagina to prevent the entry of semen into reproductive tract.
   - Diaphragms, cervical caps – prevent the sperms from entering the uterus.

   (c) Hormonal barrier:
   It prevents the ovaries from releasing the over which keeps the sperm away from ovum.
   (d) Intrauterine Devices (IUDS)
   - They inserted by the uterus through the vagina.
   - It has a success rate of 95% to 99%
2. What is Assisted Reproductive Technology Explain any two methods. (ART)
   A collection of procedures, Handling of gametes outside the body to achieve pregnancy is called ART.

1. **Intra – Uterine insemination (IUI)**
   - This is a procedure to treat infertile men with low sperm count.
   - The semen is collected donor and is introduced into the uterus through vagina by catheter after stimulate ovary to produce more ovary resulting in normal pregnancy.

2. **In vitro fertilization (IVF)**
   - In this technique, sperm and eggs are allowed to unite outside the body in a Lab.
   - 8-celled blasphemer then transferred in to uterus for successful pregnancy.

4.Principles of Inheritance and Variation:

one mark question

1 The inheritance of multiple alleles are called as

a)Single alleles **b)Multiple allelism** c)Mutation d)None

1 Who discovered two kinds of antigen called antigen'A' and antigen B 'on the surface of RBC's of human blood?
a)Karl Landsteiner b)Bernestein c) VonDe castelle d)Sturli

2 Who was discovered blood group'AB'?
a) VonDe castelle b)Sturli c) Bernstein **d)Both(a)and(b)**

3. Which number of chromosome are concerned with the determination of blood group in any person? a) Chromosome6 **b) Chromosome9** c) Chromosome12 d) Chromosome13

4 Genes for blood group AB together are

a) Dominant **b) Co –dominant** c) Recessive d) None

5 How many phenotypes are possible in blood groups?
a)Two **b)Four** c) Six d) Eight

6. Rh factor was first found in

a)Rhesus Monkey b)Man c)Rabbit d)Mice

7. The term 'Rhfactor' refers to

a)ImmunogenicD antigen b) Non–Immunogenic D antigen
c) OnlyD antigen d) Antibody only

8. XX-XO type of sex determination is seen in of

a) Bugs b) Cockroach c) Grasshopper d) Allthe above

9. Which have barr body?

a)XO female b)XX female **c) XXY males** d) YO males

10. When normal visioned man marries a colourblind women?

a) All sons will be normal visioned b) All daughter willbe colour blind c)All sons willbe colourblind d) All children will be colourblind

11. Which substance to arrest celldivision at metaphase stage in mitosis?

a) Colchicine b) Clochitonine
c) Both(a)and(b) d) Proteases

12. Which disease characterised by severe mental retardation ,light pigmentation
a) Huntington's chorea b) Albinism c) Phenyl ketonuria d) Thalassemia

13.Trisomic condition of chromosome-21 result in
a)Down's syndrome b)Patau's syndrome
c)Klinefelter's syndrome d)Turner's syndrome.

14. Symptoms of Trisomy-13 result in

a) Malformation of the brain and internal organs b) Sterile female
c)Rudimentary gonads lack of menstrual cycle. d) Sterile males

15. Klinefelter's syndrome is characterized by a karyotype of
a) XYY b) XO c) XXX **d) XXY**

2 – Mark Questions :

1. What is heplodiploidy?
   - In this sex is determined by the number of sets of chromosome it received.
   - In honey bee (Queen/Worker) Fertilized egg developed into female
   - Un fertilized egg by parthenogenesis develop into male.
   - Male have haploid number of chromosome, whereas female have diploid set of chromosome.
2. Distinguish between heterogametic and homogametic sex determination:

Heterogametic	Homogametic
It produces two types of gametes	It produces only one type of gametes
The sex chromosomes X,Y are heteromorphic	The sex chromosome XX are holomorphic

3. What is lyonisation?
   - Mary Lyon suggested that Barr bodies are an inactive chromosome.
   - The number of Barr bodies observed in cell was one less than the number of X-Chromosome.
   - XO Females have no Barr body.
   - XXY Males have one Barr body.
4. What is Criss-Cross inheritance?
   - It is a Sex linked inheritance.
   - In which a trait is transmitted from male parent to grandson through his daughter`e.g.: Colour blindness.
5. What are holandric genes?
   The genes that are carried on the Y chromosome.

6. Mention the Symptoms of Phenylketonuria?
   - Mental retardation
   - Light Pigmentation of Skin and hair.
   - The excretion of Phenyl pyruvic acid in the Urine.
7. Define Multiple alleles?
   Multiple allele of a genes that a particular trait is controlled by three or more allele of a gene, on the homologous chromosome of an organism.
8. What are secretors?
   Individuals who have antigen in their tears, saliva, urine, semen etc..... are called secretors.
9. What is Karyotyping?
   - Technique by which a complete set of chromosome is separated from a cell and arrange them in pairs.
10. What is meant by pedigree?
    - It is a family tree
    - Showing the inheritance path way for specific phenotypic character.
    - Used standard genetic symbol.

3 Mark Questions:

1. Why are sex linkedrecessive characters more common in the male human beings?
   - Why are sex linked recessive characters more common in the male human beings.
   - The Y linked genes have no corresponding allele in X chromosome
   - The Y linked genes inherit along with Y chromosome.
   - Males are homozygous and so express the train when theyinherit on mutant allele.
   - X – linked and Y linked genes in the differential region do not undergo crossing over during meiosis so sex linked recessive characters more common in the male human being.
2. Write down the Applications of Karyotyping.
   - It helps in gender identification.
   - It helps to identify the abnormalities of chromosomes like aneuploidy.
   - It is also used to predicting the evolutionary relationship between species.
   - It helps to identify chromosomal aberrations.
   - It helps to detect Genetic diseases in human
3. Mention the Symptoms of Down's Syndrome?
   - Severe mental retardation
   - Defective development of central nervous system.
   - Increased separation between eyes.
   - Flattened nose
   - Ears are malformed
   - Mouth is constantly open
   - The tongue protrudes.
4. Explain male heterogamete?
   - In XX – XY type of sex determination, the male individual can produce to type of sperm.
   - One sperm with X chromosome another with Y-chromosome
   - Types : (i) XX – XY type (e.g.) Human being and Drosophila
     (ii) XX – XO type (e.g.) bugs, cockroach, and grass hoppers.

5. Explain female heterogamete
   - In this type male possesses two X chromosome and produce only one type of gamete.
   - Female possesses one X-chromosome alone (or) one X and one Y chromosome
   - Female individual produces two types of gametes.
   - Types (i) ZO – ZZ – (E.g.) moths, butterflies domestic chicken
     (ii) ZW – ZZ – (E.g.) Gypsymoth, fishes, reptiles and birds
6. What is wiener hypothesis? Explain it briefly
   - It is proposed by wiener
   - It states that there are eight alleles of Rh factors at a single Rh locus. (R^1, R^2 ,R^O,R^Z, r, r^1, r^{11}, r^y)
   - Rh^+ will have a genotypes carry a dominant "R" allele (R^1, R^2 ,R^O ,R^Z)
   - Rh^- will have a genotypes carry a double recessive genotypes (rr, rr^1, rr^{11}, rr^y)
7. Explain the prevention method of Erythroblastosisfoetalis
   - If the mother is Rh^{-ve} and foetus is Rh^{+ve} – anti D antibody should be given to mother.
   - Anti – D – antibody given at 28^{th} and 34^{th} week of gestation as a prophylactic measure
   - This will destroy Rh^{+ve} foetal RBC before the mother's immune system in sensitized.
   - This will develops passive immunity and prevents the formation of ant – D – antibodies in the mother's blood,
8. Explain the mode of sex determination in Honeybee?
   - Haplodiploidy type of sex determination is seen in Honey bee.
   - In this, fertilized egg develops into either Queen or worker female honey bees have diploid sets of chromosome.
   - Un fertilized eggs develop into drone by pathogenesis and have haploid set of chromosome.

5 Mark Questions:

1. Give an account genetic control of Rh- factor
   - Kart Landsteiner and Alexander wiener discovered Rh- factor
   - First discovered in Macaca rhesus and later in human.
   - Rh – factor refers to D-antigen.
   - Person with D-antigen are called Rh^{+ve}
   - Person without D-antigen are called Rh^{-ve}
   - As per Fisher and Race. Rh – factor involve 3 pairs of gene labelled as Cc, Dd, Ee occur at different loci on 1^{st} homologous chromosome pair
   - The possible genotype will be Cor c, D or d, E or e,
   - Rh^{+ve} will have CDE/cde, CdE/cDe, cdE/CDe
   - Rh^{-ve} will have double recessive cde/cde
   - Wiener hypothesis
     Proposed there are 8 alleles (R^1, R^2 ,R^O,R^Z, r, r^1, r^{11}, r^y) at a single
   - Rh^{+ve} will have a dominat "R allele (R^1, R^2 ,R^O ,R^Z) Rh^{-ve}rr, rr^1, rr^{11}, rr^y

2. Explain the genetic basics of ABO blood groups in man?
   - The determination of BG of any person is determined by three autosomal alleles present in the 9th chromosome.
   - The gene controlling BG is labelled as L or I.
   - The gene I exists in three allelic forms namely I^A, I^B, I^O
   - From the crosses of different combination it is evident that $I^A = I^B > I^O$

Genotype	ABO- BG- Phenotype	Antigen present on RBC	Antibodies present in Blood plasma
$I^A I^A$	Type - A	A	Anti - B
$I^A I^O$	Type - A	A	Anti - B
$I^B I^B$	Type - B	B	Anti - A
$I^B I^O$	Type - B	B	Anti - A
$I^A I^{AB}$	Type - AB	AB	No Antibody
$I^O I^O$	Type - O	NO antigen	Anti -A &anti -B

3. How sex is determined in human being?
   - Sex – determination in human is by XX – XY type
   - Genes determining sex are located in X, Y chromosome are called allosomes.
   - The females are homogametic (XX) and produce only one type of eggs.
   - The Males are heterogametic (XY) and produces two types of sperm, one with X, another perm with Y
   - The sperm/Male determine the sex of an human individuals as follows`

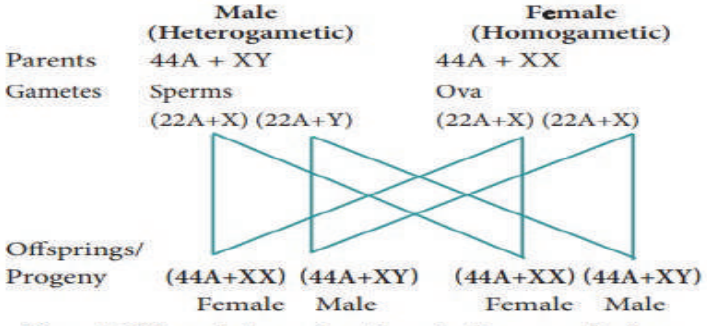


Fig. 4.6 Sex determination in human beings

4. Differentiate Patau's syndrome from Down's Syndrome

Down's Syndrome	Patau's Syndrome
1. It is due to 21 trisomy	1. It is due to 13 trisomy
2. Symptoms are	2. Symptoms are
i) Severe mental retardation	i) Multiple and severe body mal-formation
ii) CNS is under developed	Ii) Profound mental deficiency
iii) Increased separation between the eyes	iii)Small head with small eyes
iv) Flattened nose	iv)claft palate
v) Ears are malformed.	vi)Malformation of the brain and internal organs.
vii) Mouth is constantly open	

viii) Tongue protrudes	

5. Differentiate Turner's syndrome from Klinefelter's Syndrome

Klinefelter's Syndrome	Turner's Syndrome
It is due the presence of an additional X chromosome	It is due to the loss of a X chromosome
Results AAAA + XXY Karyotype	Karyotype is AAAA + XO
Persons with 47 Chromosome	With 45 Chromosomes
They are sterile males	They are sterile female
Obese with long limbs and Talk	Low stature
Have feeble breast	Under developed breast
Under developed genitalia	Rudimentary gonads without menstruation during puberty
High pitched voice	8, Webbed neck

6. Molecular Genetics

1 One gene-one enzyme hypothesis

a) George Beadle b) EdwardTatum **(c) Both(a)and(b)** (d) ColinMacleod

2. Who proposed the central domain molecular biology?

a) Griffith (**b) FrancisCrick** (c) FriedrishMiescher (d) MarthaChase

3 UAA, UAG and UGA codons are designated codons are knownas

a) Start codon **b) Non– sense** c) Tripletcodon d) None

4 Wobble hypothesis was proposedby

a)Holley b)Nirenberg c)Khorana **d)Crick**

5 Human genome is said to have approximately

a)$2x10^9$bp **b) $3x10^9$bp** c) $4x10^9$bp d)$2.5x10^9$bp

6 Which enable formation of all the required enzymes needed for lactose metabolism?

a) Lac mRNA b)Lact RNA c)Lac rRNA d)Lac DNA

7 Largest gene in human is

a) Dystrophin b) Insulin gene c) Oncogene d) β-globin+haemoglobin

8 A mRNA molecule is produced by

a) Replication **b)Transcription**

c)Duplication d)Translation

2 Mark Questions;-

1. Give reasons Genetic code is Universal
   - The genetic code is same in prokaryotic and eukaryotic organisms.
   - The same genetic code direct the synthesis of Protein from amino acid in all organism.

     (E.g.) UUU – codes Phenylalanine in all organisms

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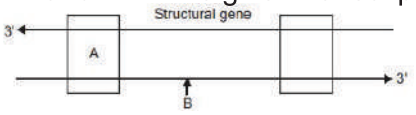
2. Name the parts marked ``A' and 'B' in the given transcription Unit



Ans: A –Promotor B – Template strand

3. Differentiate - Leading strand and logging strand

Leading Strand	Lagging Strand
It is a template strand with $3^1 \rightarrow 5^1$ polarity	It is a coding strand with $3^1 \rightarrow 5^1$ polarity
Replication occurs continuously	Here discontinuous
Require no ligase enzyme	Requires Ligase enzyme

4. Mention any two ways in which single nucleotide polymorphisms Identified in human genome can bring revolutionary change in biological and medical science.
   - SNPs helps finding the chromosomal location of a genetically disease and treated by gene therapy.
   - It also helps in tracing human history.
5. What are the three structural differences between RNA and DNA?

S.No	DNA	RNA
1.	The Sugar molecule is de-oxy ribose	The sugar molecule is ribose
2.	Double Stranded and stable	Single Stranded and unstable
3.	Adenine, Thyamine, guanine and cytosine are the bases present	Adenine, Guanine, Cytosine and Uracil are the nitrogen bases present.

6. Why tRNA is called adapter molecule?
   - T-RNA acts as a vehicle to pick up amino acids scattered in the cytoplasm.
   - It reads specific codes of m RNA molecules.
7. Name the anticodon required to recognize the following codons
   (i) AAU (ii) CGA (iii) UAU (iv) GCA
   Ans :
   UUA GCU AUA CGU
8. Define gene :
   A gene is defined as a basic physical and functional unit of heredity and occupies a specific region in a chromosome.
   Follows mendalian principles of heredity.
9. Define genephore
   DNA of prokaryotes, circular and lack of chromatin is called genophore
10. Write the central dogma of protein synthesis
    DNA →RNA→Protein
11. What is Pharmacogenomics
    Pharmacogenomics is the study of genes affecting a person's response to drugs.
12. What is TATA Box?
    Repeated sequence of adenine and thyamine in the promoter region of Eukaryotes is called "TATA Box's"

3 Mark Questions :

1. State any three goals of the human genome project
   - Identification of all genes in human DNA
   - Approximately 30000 genes are there in human DNA
   - To store the information of human genes in DATA bases
   - To improve tools for data base analysis of human genome.
2. In E.coli. Three enzymes 1) galactosidase,2)permease and 3)transacetylase are produced in the presence of lactose.
   Explain why these enzymes are not synthesized in the absence of lactose
   - When lactose is present in Ecoli, It acts as inducer of lactose
   - The repressor is inactivated by interaction with inducer – lactose
   - This allows RNA polymerase to link to the promoter site and transcribe the operon to produce lac – m RNA
   - This liable the formation of all the three enzymes for lactose metabolism`
   - If lactose is not present in inducer, the synthesis of the three enzymes will not take place.
3. Distinguish between structural gene, regulatory gene and operator gene
   (i) Structural gene :
   It is the gene mRNA required by the cell
   (ii) Regulatory gene :
   It is present in between promoter site and operatorsite. It refers to regulator or inhibitor
   (iii) Operator gene:
   These genes are present between promoter and structural gene.
4. Why the Human genome project is called a mega project?
   - It took 13 years to complete
   - It is the first vertebrate genome to be completed.
   - Human genome is about 25 times longer than the genome of any other organisms sequenced sofar.
   - Human genome is said to have approximately 3×10^9 BP
5. It is established that RNA in the first genetic national Justify giving reasons :
   - A typical cell contains about 10 times as much RNA as DNA
   - RNA play variety of Role in a cell.
   - RNA act a genetic material too (E.g.) TMV
   - Carl woes' proposed 'RNA world' as first stage in the evolution of life.
   - RNA catalysed all molecules necessary for survival and replication.
   - Walter Gilbert declared that RNA in the first genetic material on earth.
   - Now enough evidences are available to suggest essential life processes such a metabolism translation splicing are carried out by RNA.
6. List out the Application and future challenges of HGP.
   - It helps to identify genetic abnormalities.
   - This is extremely useful in diagnosing disease and to provides drugs

- This is helpful to provide genetic counselling and to those who planning to have children.
- This also provide possibilities for new gene therapies.
- Challenges
- Once genetic sequence becomes easier to determine some people may attempt to use their information for profit for political power.
- Insurance companies may refuse to insure people at 'genetic risk" This would save the
  Companies the expense of future medical bills incurred by "less than perfect" people
- Another fear in that attempt are being made to "breed out" certain genes of people from the human population in order to create 'perfect race'

7. List out the properties of gene
   - Number of genes in each organism is more than the number of chromosomes
   - Several genes are located on the same chromosome
   - The genes are arranged in a single linear order like beads on a string
   - Each gene occupies a specific position called locus
   - Genes may undergo sudden change in position and composition called Mutations.
   - Genes are capable of self-duplication producing their own copies.

8. List out the applications of DNA finger printing technique.
   - **Forensic analysis:**
     (i) It can be used in the identification of a person involved in criminal activities.
     (ii) For settling paternity or maternity disputes.
     (iii) Used for determining relationships for immigration
   - **Pedigree analysis:**
     (i) Identify inheritance pattern of genes through generations.
     (ii) Used for detecting inherited diseases.
   - **Conservation of wild life:** used for protecting endangered species.
   - **Anthropological studies:** It in useful in determining the origin and migration of human population and Genetic diversities.

5 Mark Questions

1. Mention the salient features of human genome project.
   - The human genome contains 3 billion nucleotide bases.
   - An average gene consists of 3000 bases.
   - The largest known human gene, beingdystrophic with 2.4million bases
   - Chromosome 19 has the highest gene density.
   - Chromosome 13 and Y chromosome have least gene densities.
   - There may be 35000-40000 genes in the genome and almost 99.9% Basepairs are exactly the same in all people.
   - Functions for over 50% of the discovered genes are unknown
   - Less than 2% of the genome code for proteins.
   - Chromosome 1 has 2968 genes. Whereas Y has 231 genes.

2. List the salient features of genetic code.
   - The genetic codon is a triplet code.
   - 61 codons are there in total to code all amino acids in living system
   - 3 codons do not code for any amino acids and function as a stop codon (Termination codon)
   - If there are more than one codon for an amino acid, those are called degenerate code Eg.GUU, GUC, GUA & GUG Code for Valine.
   - Codons are non-ambiguous as one codon will code for 1 amino acid.
   - Codons have fixed polarity. ie. they are always read 5' → 3' direction
   - AUG has two functions (i) Code for methionine and (ii) act an initiator.
   - UAA, UAG & UGA are known as "non-sense" and termination codon because they code for none.

6 EVOLUTION

IMPORTANT POINTS

- The approximate **age of** solar system **and earth** is around 4.5 – 4.6 billion years
- Earth's history has been divided into eras namely Palaeozoic, Mesozoic and cenozoic eras
- **Protobionts**are formed by the spontaneous assemblage of molecule into droplets, which enclose a watery solution
- **Monera** is ancestral to the modern bacteria and blue green algae
- **Palaeontology** is the study of prehistoric life through fossils
- **Ernst Von Haeckel** proposed the biogenetic law or theory **ofrecapitulation"**
- **Molecular evolution** is the process of changes in the sequence composition of molecule-DNA, RNA and protein
- **August Weisman**disproved the theory of inheritance of acquired characters.
- **Charles Darwin** proposed theory of Natural selection
- **Hugo-De-Virus**proposed Mutation theory.
- **Adaptive radiation** is the evolutionary process, which produces new species.
- **Microevolution** refers to the changes in allelic frequencies with in a population
- **Gene flow** refers to movement of genes through gametes or movement of Individual of a population
- **Genetic drift** is the change in allelic frequencies of a population over generations due to chance.
- **Mutation** is the sudden change in the genome of an Organism.
- The assumptions of Hardy – Weinberg law includes no mutation, random mating, How very large population size and no natural selection. no evolution

Two Mark Questions

1. List out the major gases seems to be found in the primitive earth.
   Ammonia, Methane and Hydrogen
2. Explain briefly about the theory of special creation

All the components of universe namely plants and animals are created by a supernatural power like God.

3. Define Biogenesis
   Life arose from pre-existing life
4. Define Evolution
   Heritable changes in one or more characteristics of a population of species from one generation to the other.
5. What is Abiogenesis
   Living Organisms Originated from non-living materials and occurred through stepwise chemical and molecular evolution over millions of years.
6. What are coacervates
   Are the first pre-cells which gradually transformed into living cells?
7. What are vestigial organs?
   Structures that one of no use to the possessor and are not necessary for their existence are called vestigial organs.
8. What are called connecting link and give an example?
   The Organisms which possess the characters of two different groups are called connecting link (&) Peripetus link between Annelida and Arthropod.
9. What is Atavistic organs' Give an example
   Sudden appearance of vestigial organs in highly evolved organisms is called atavistic organ (&) Tail in human baby.
10. What is adaptive radiation? Give an example
    The evolutionary process, which produces new species diverged from a single ancestral form becomes adapted to newly invaded habitats is called adaptive radiation (Eg) Darwin's finches
11. Re arrange the descent in human evolution?
    Austrolopithecus→Homo erectus →Homosapiens→Ramapithecus → Homo habilis

    Ans: Ramapithecus → Austrolopithecus → Homo habilis → Homo erectus → Homo sapiens

3 Mark Questions

1. Explain the three major categories in which fossilization occurs.

Actual remains:

- The original hard parts such as bones, teeth, shells are preserved as such in earth atmosphere.
- This is the most common methods of fossilization
- When marine animals die, their hard parts such as bones and shells etc.... covered with sediments and are protected from further deterioration.

1. **Petrification :**
   When the animal die and buried their original part may be replaced molecule minerals and the Original substances being lost through disintegration.
2. **Natural moulds and casts**
   Even after disintegration the organism leave an impression on the soft mud, which later become hardened into fossils are called moulds.

Casts:

The cavities of the moulds may get filled up by hard mineral and fossilized.

Coprolites:

Hardened faecal matter turned into fossils are called coprolites.

Analysis of the coprolites enable as to understand the diet of historic animals thrived on

2. Differentiate Convergent and divergent evolution with one example each.

Convergent Evaluation	Divergent Evaluation
Organs having different structure patterns but similar functions are called Analogous Structure.	Structures which are similar in origin but performs different functions are called homologous structure.
(E.g.) The wings of birds and insects. The structure is different but used for flight	(E.g.) fore limbs of vertebrates. The fore limbs of horse, man,whales having similar anatomical structure but used for different function.

3. Write about the Lamarck's theory of evolutions
   - The two principles of Lamarckism are
   - The theory of use and dis-use theory.
   - (i) Organs used often are .will increase in size and not used will degenerate.
   - (ii) E.g. Neck of Giraffe-for use
   - Absence of limbs in snakes –for disuse theory
   - The theory of inheritance of acquired character.
   - Characters that are developed the life time an organism are called acquired characters and these are then inherited.
4. Who disproved Lamarck's theory of acquired characters? And How?
   - Disproved by August Weismann
   - He conducted experiment on mice for 20 generations by cutting their tails and breeding them. But 20^{th} too born with tail.
   - And proved that changes in the somatoplasm will not be transferred to the next generation.
   - But changes in the germplasm will be inherited.
   - This theory is called Germplasm theory
5. Mention the main objections to Darwinism
   - Darwin failed to explain the mechanism of variation
   - Darwin explains the survival of the fittest but not the arrival of the fittest
   - He focused on small fluctuating variations that are mostly non-heritable.
   - He did not distinguish between somatic and germinal variations.
   - He could not explain the occurrence of vestigial organs over specialization organs like large tasks in extinct mammoths, oversized antlers in extinct Irish deer etc.
6. Taking the examples of peppered moth explain the action of natural selection, what do you call the above phenomenon?
   - There were two colours white and black lived in England
   - Before industrialization witnessed white coloured background of the wall of the building hence white coloured moths escaped from their predator.

- Post industrialization, the tree trunk become dark due to smoke and shoot let out from the industries
- The black moth camouflaged on the dark bark of the tree and white moths were easily identified by their predators.
- Hence the dark coloured moth population was selected by nature and their number increased when compared to the white moths.
- Nature offered positive selection pressure to the black coloured moths.
- Organisms that can adapt will survive and produce more progenies resulting in increase in population through Natural selection.

5 Mark Question

1. How does Hardy-Weinberg's expression (P^2 + 2pq + q2) explain that genetic equilibrium is maintained in a population?
   - Hardy-Weinberg's stated that the allele frequencies in a population are stable and are constant from generation to generation in the absence of gene flow, genetic drift, mutation, recombination and natural selection.
   - Evolution is a change in then allele frequencies in a population over time. Hence population in Hardy-Weinberg is not evolving
   - Explanation to the Equilibrium:
   - A large population of beetle taken as example
   - It has two colour – (i) dark grey, (ii) Light grey
   - Their colour is determined by "A" gene
   - Dark beetle have the genotype AA, Aa, and White has aa
   - A allele has frequency (P) of 0.3,
   - A allele has frequency (q) of 0.7 then (P+q) = 1
   - If a population is in Hardy Weinberg equilibrium, the genotype frequency can be estimated by hardy Weinberg equation.

     $(p+q)^2 = P^2 + 2pq + q^2$ (P = 0.3) (q = 0.7)

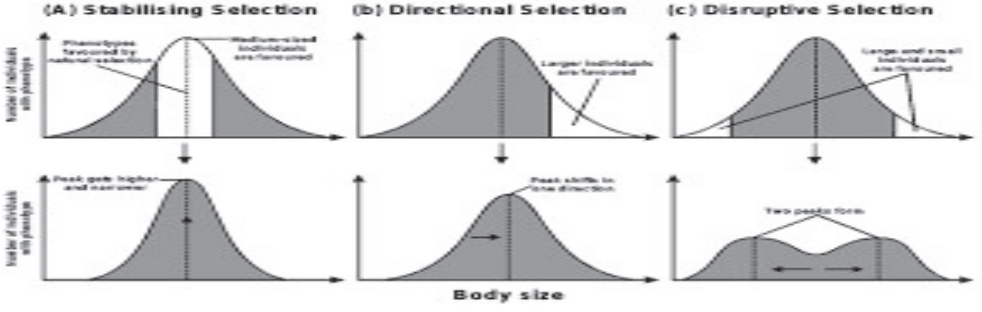
     $P^2 = (0.3)^2 = 0.09$ =9% AA

     2pq= (0.3) (0.7) =0.42 =42% Aa

     $q^2 = (0.7)^2 = 0.49$ =49% aa
   - Hence the beetle population appears to be in equilibrium
   - Factors affecting the Hardy-Weinberg law.
   - (1) Gene How (4) natural selection
     (2) Mutation
     (3) Crossing over
2. Explain stabilizing directional and disruptive selection with examples :

Stabilizing Selection	Directional Selection	Disruptive Selection
This selection operate in stable environment	This operate in gradually changing environment	This operate in when homogenous environment changes into heterogenous environment
The organisms with average phenotype survive	In this type removes the individual from one end to the otherend of phenotypic distribution	In this organisms of both the extreme phenotype are selected.
Extreme individuals from both the ends eliminated	Peaks shift in our direction	Average phenotypic individuals are eliminate

No speciation phenotypic stability in maintained.		This in rare form of selection leads to the formation of 2 or more different species
Sparrow that escape storm	Size differences between male and female,	Darwin finches beak size in relation to seed size
Peaks gets higher and narrow	Female show more weight and directional selection	



3. Explain Darwin's theory of Natural selection
   - Charles Darwin explained the theory of Natural selection in his book "The Origin of species by Natural Selection"
   - He explained his theory in four steps are as follows

   Over Production: All organism increase their population in large number.

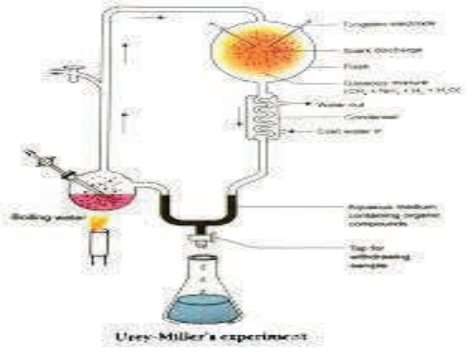
   E.g. Salmon fish produces about 28 million eggs.

   Struggle for existence: Organisms struggle for food space and for mate. As these become a limiting factor.

   Universal occurrence of Variations:
   - No two individuals are alike,
   - Even twins have variation
   - The useful variations found in an organism help them to overcome struggle and such a variations are passed on the 110 next generations.

   Origin of species by natural Selection
   - According to Darwin, nature is the most powerful selection force.
   - Darwin believed that the struggle for existence resulted in the survival of the fittest. Such a organism become better adapted to the changed Environment.
4. Explain Urey and Miller experiment.
   - Urey and miller conducted an experiment that proved the possibility of abiogenesis theory of origin of life.
   - In their experiments, a mixture of gases was allowed to circulate over electric discharge from an tungsten electrode
   - A small flask was kept boiling and the steam emanating from it was made a mix with the mixture of gases in a large chamber that was connected to the boiling water.

- Experiment was conducted continuously for a week and a liquid was analysed.
- Glycine, alanine, beta alanine and aspartic acid were identified.
- Later in similar experiments formation of all types of amino acids, and nitrogen bases were noticed.



1 Haldane coined the term
a. **Prebiotic soup** b) Biotoc soup c) Firs tliving cell d)All the above

2 Structures which are similar in organ but perform different function are called as
a. Analogous structures **b) Homologous structures**
c) Vestigial organs d) Atavistic organ

3 Homologous structures that brings about
a. Convergent evolution **b) Divergent evolution**
c) Vestigial organ d) Atavistic organ

4 Which evolution is the process of change in the sequence composition of moleculess uchas DNA,RNA and protein across generations?
a. Micro evolution **b) Molecular evolution**
c) Macro evolution d) All the above

5 Jean Baptiste de Lamarck was the first to postulate,the theory of evolution in famous book
a. The origin of species by natural selection **b) Philosophie Zoologique**
c)Both(a)and(b) d) The origin of species

6 Charles Darwin explained the theory of evolution in his book
a. **The origin of species by Natural selection** b) Philosophie Zoologique
c)Both(a)and(b) d)None

7 Sudden and large variations were responsible for the origin of new species by
a. **Hugo de Varies** b) Lamarck c) Darwin d) Both(a)and(b)

8 Industrial melanism is clear through
a. Artificial selection **b)Natural selection** c) Osilation d) All the above

ZOOLOGY

9 Industrial melanism is a classical case natural selection exhibited by
a. Arucheopteryx b) Peripatus **c) Peppered moth** d) WoollyMammoth

10 "Golden age of Reptiles"
a. Precambrian b)Paleozoic **c) Mesozoic** d) Cenozoic

11 Select Hardy–Weinberg equation
a) $2(p+q)^2=p^2+4pq+q^2$ b) $P^2+q^2=2p+pq+q^2$
c) $(p+q)^2=p+2pq+q^2$ d**)$(p+q)^2=p^2+2pq+^2$**

12 Modern man belongs to which period?
a. **Quaternary** b)Cretaceous c)Silurian d)Cambrian

13 The Neanderthal man had the brain capacity of
a) 650– 800cc b)1200cc c) 900cc **d)1400cc**

7.HUMAN HEALTH AND DISEASES

One marks:

1. A 30 year old woman has bleedy diarrhoea for the past 14 hours, which one of the following organisms is likely to cause this illness?

Ans: Shigella dysenteriae

2. Exo-erythrocytic schizogony of plasmodium takes place in

Ans: Liver

3. The sporozoites of *Plasmodium vivax* are formed from ----------

Ans: Oocysts

4. Amphetamines are stimulants of the CNS, whereas barbituratesare --

Ans: CNS depresants

5. Choose the correctly match pair.

Ans: Amphetamines - Stimulant

6. The Athlete's foot disease in human is caused by-------

Ans: Fungi

7. Cirrhosis of liver is caused by chronic intake of ------

Ans: Alcohol

8. The sporozoite of the malarial parasite is present in ----

Ans: Saliva of infected female *Anopheles* mosquito.

ZOOLOGY

9. Where do the following events in the life cycle of plasmodium takes place?

a) Fertilization - **Gut of mosquito**

b) Development of gametocytes - **Human RBC's**

c) Release of sporozoites - **From Mosquito to the human blood**

d) Schizogony - **Human liver cells**

10. Paratope is an

Ans: Antigen binding site on variable regions

11. Allergy involves

Ans: IgE

12. Spread of cancerous cells to distant sites is termed as

Ans: Metastasis

13. AIDS virus has

Ans: Single stranded RNA

14. B cells that produce and release large amounts of antibodyare called

Ans: Plasma cells

2 mark and 3 marks

1. What are interferons? Mention their role

   Antiviral state in uninfected cells
   Produced from leucocytes.

2. List out chemical alarm signals produce during inflammation
   Serotonin
   Histamine
   Prostaglandins

3. A person is infected HIV How will you diagnose for AIDS?ELISA
   – Presence of HIV antibodies
   Western blood test – confirmation test

4. Why do you think it is not possible to produce vaccine against common cold?
   Do not use an antibiotic to treat viral
   More than 150 different types.

5. Differentiate Paratope and Epitope
   Epitope - Active part of Antigen
   Binds with the antibody
   Paratope – active part of AntibodyBinds with the antigen

6. Define Anaphylaxis
   Immediate hypersensitivity reaction.

7. Antibodies
   - Antibodies are immune globium Ig (GMADE)
   - IgG
   - IgM
   - IgA
   - IgD
   - IgE

8. Widal test

Typhoid fever can be confirmed by widal test.

9. A Patient was hospitalized with fever and chills merozoites were observed in her blood.

What is your diagnosis?

Haemozoin toxin and erythrocyte debris into the blood steam.

10. Define- Health?

- WHO define health is 'A state of complete physical, mental and social wellbeing and not merely absence of disease.

11. Differentiate communicable and non-communicable diseases?

COMMUNICABLE DISEASES	NON- COMMUNICABLE DISEASES
Diseases which are transmitted from one person to another. Eg. AIDS, Cholera, Plague.	Disease which are not transmitted from infected person to healthy. Eg. Genetic disorders, Arthritis, Heart attack, stoke.

12. Write any five bacterial disease and causative agent?

1. Bacillary dysentery - Shigella sp.
2. Plague - Yersinia pestis.
3. Cholera - Vibrio cholerae
4. Typhoid - Salmonella Typhi
5. Pneumonia - Streptococcus pneumoniae.

13. Write any four viral disease and causative agent?

i. Common cold - Rhino virus
ii. Mumps - Paramyxo virus
iii. Hepatitis - Hepatitis-B virus
iv. Polio - Polio virus.

14.Define- Zoonotic disease?

- Diseases which are transmitted from animals to humans.
- Eg. Nipha virus fever- transmitted by bats. Rabis transmitted by infected dogs.

15. Write notes on Swine flu?

- It is caused by H1N1 virus strain.
- Symptoms- Fever, Cough, sore throat, chills, weakness and body aches.

16. Tabulate the types of malaria with their causative agent?

S.NO	TYPES OF MALARIA	CAUSATIVE AGENT
1.	Vivax malaria	Plasmodium vivax
2.	Quartan malaria	Plasmodium malaria
3.	Mild tertian malaria	Plasmodium ovale
4.	Malignant tertian or Quotidian malaria	Plasmodium falciparum

17. Is vaccine available for malaria? Give Reason?

- Yes, available.
- Vaccine RTS,s (Mosquirix)
- It requires four injections.
- Due to this low efficacy it does not given to babies between 6 and 12 weeks of age.

18. Write the causative agent for the following:

S.NO	DISEASES	CAUSATIVE AGENT
1.	Cholera	Vibrio cholera
2.	Chikun gunya	Alpha virus/ Toga virus
3.	Common cold	Rhino virus
4.	Bubonic plague	Yersinia pestis

19. What is Kala- azar?

- It is protozoan disease.
- Causative agent - Leishmania donovani
- Vector- Phlebotomus (Sand fly)
- Symptoms- Weight loss, anaemia, fever, enlargement of spleen and liver.

20. List out the withdrawal symptoms of alcoholic addicts?

- Tremors, convulsions, Fits, depressed mood, anxiety, nervousness, restlessness, irritability, insomnia, Dryness of throat.

21. Complete the following table:

DISEASE	CAUSATIVE AGENT	SITE OF INFECTION
Mumps	Mumps virus	Salivary gland
Chicken pox	Varicella zoster	Respiratory tract, skin nervous system
Dengue fever	Dengue virus or Flavi virus	Skin and blood

22. .Write the names of commonly abused drugs?

- Opoids, Cannabinoids, coca – alkaloids, barbiturates, amphetamines and LSD.

23. . What are the chemicals found in tobacco?

- Nicotine, Carbon monoxide, Tars.

24. . What is Alcoholic Anonymous?

- The foundation which helped each other alcoholics to stop drinking and stay sober.
- It was started in 1935 by a business man and a doctor who had been a hopeless drunk.

25. Define: Alcoholism?

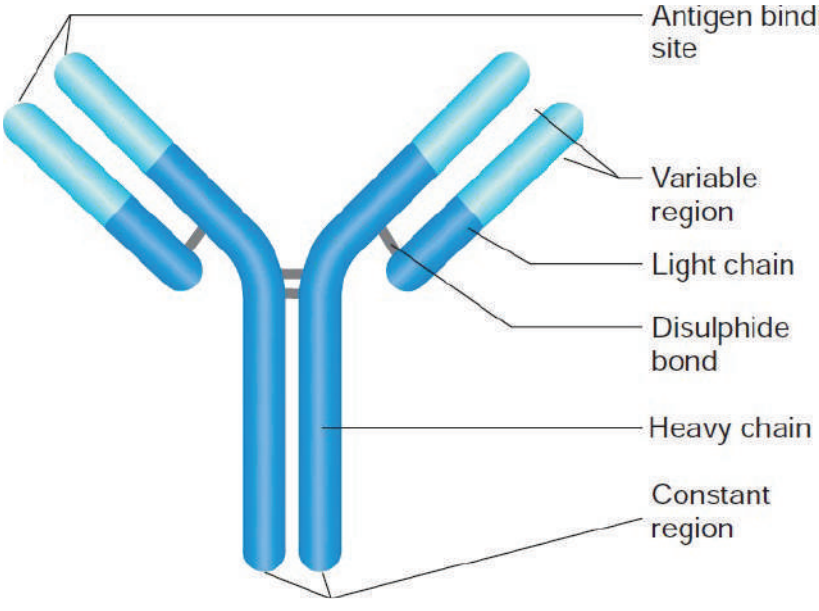
- Alcoholism is the inability to control drinking due to physical and emotional dependence on alcohol.

5 Mark:

10. Prevention of Malaria

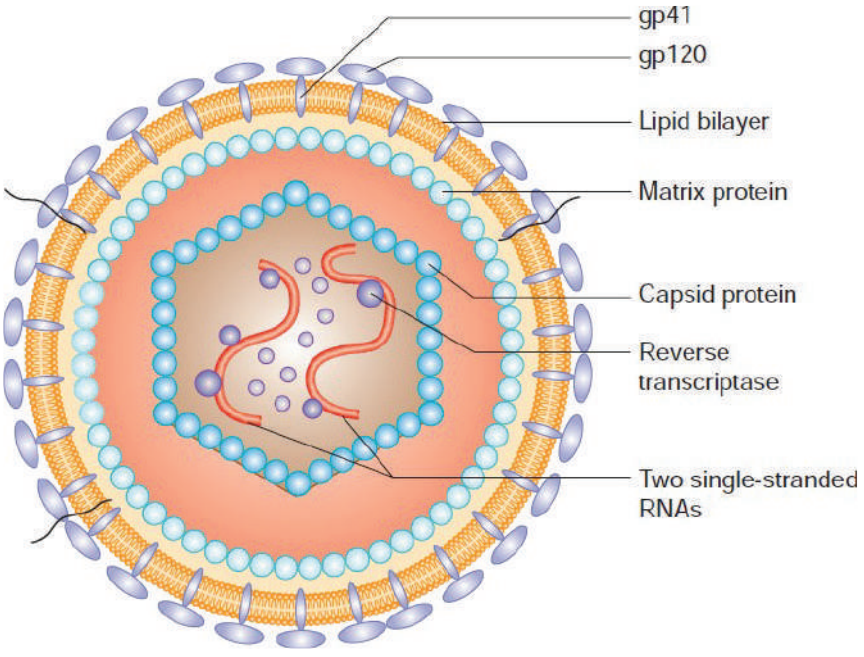
- Use of mosquito bed nets
- Prevent mosquito bites
- Use fish such cambusia
- Use Bacillus thuringiensis
- Close drainage
- In the 1950 (WHO) introduced the malaria. Eradication programme.

11. Explain the structure of immunoglobulin with suitable diagram



- Y shaped structure
- Comprises of 4 four polypeptide chains
- Light chains (L) of molecular weight 25000 Da (214 aminoacids)
- Heavy chains (H) of molecular weight 50000 Da (450 aminoacids)
- Linked to gather by disulphide (s-s) body

12. Structure of HIV



- The human immunodeficiency virus
- genus lent virus
- 100-120 nm in diameter
- Glycoprotein (gp) spikes termed gp 41 and gp 120
- Two large single stranded RNA
- RNA are molecules of reverse transcriptase.

13. Differences between active and passive immunity

Active Immunity	Passive Immunity
Hosts immune system	No active host participation
Durable	Transient
Memory is present	No memory
After a short period	Immunity develops immediately
Subsequent dos not possible	Subsequent dose is less effective

1. Explain the asexual methods of reproduction of plasmodium/ Life cycle of Plasmodium in man?

- On bite of infected female anopheles mosquito sporozoites enters in to human body through saliva of mosquito.
- Sporozoites enter into liver and form merozoites, Merozoites enter into RBC and developed in to trophozoites.

- After become signet ring stage trophozoites divides asexually to produce schizont.
- Schizont which in RBC divides and form merozoites and haemozoin toxin.
- Haemozoin is responsible for fever.

2. Write the scientific name of the filarial worm, symptoms and mode of transmission of filariasis?
   - Scientific name: Wuchereria bancrofti.
   - Symptoms- block the lymphatic system result in inflammation of lymph nodes, elephantiasis of limps, scrotum and mammary glands.
   - Mode of transmission; Female Culex mosquito.
3. What are the two most prevalent helminthic disease in human? Explain them?

Ascarisis

- Causative agent- Ascaris lumbricoides (Round worm)
- Mode of transmission- Ingestion of embroynated eggs through contaminated food and water. Children playing in contaminated soil also chance of transfer of eggs from hand to mouth.
- Symptoms- Abdominal pain, vomiting, headache, anaemia, irritability and diarrhea, stunted growth in chindren, Enteritis, Hepatitis and bronchitis.

Filariasis

- Scientific name: Wuchereria bancrofti.
- Symptoms- block the lymphatic system result in inflammation of lymph nodes, elephantiasis of limps, scrotum and mammary glands.
- Mode of transmission; Female Culex mosquito.

4. Write short note on various Protozoan diseases?

Amoebiasis / Amoebic dysentery:

- Causative agent : Entamoeba histolytica
- Mode of transmission: House fly
- Entamoeba lives in the human large intestine.
- Infective stage – Trophozoite.
- Which penetrates the walls of colon and secretes histolytic enzymes causing ulceration, bleeding, abdominal pain and stools with excess mucus.
- Symptoms: Diarrhea to dysentery with blood and mucus in the stool.

African sleeping sickness:

- Causative agent – Trypanosoma species
- Vector - Blood sucking Tse Tse flies.
- Symptoms – sleeping sickness.

iii. Kala- azar:

- It is Protozoan disease.
- Causative agent – Leishmania donovani
- Vector- Phelebotomus (sand fly)
- Symptoms – Weight loss, anaemia, fever, enlargement of spleen and liver.

iv. Malaria

- Causative agent – Plasmodium vivax
- Vector – Female Anopheles mosquito
- Symptoms – Fever, Human RBC destroyed by merozoites and releasing merozoites and haemozoin toxin into blood.

****

9. Microbes in Human Welfare

1- Mark Question Answer:

1. Which of the following microorganism is used for production ofcitric acid in industries?

Ans:*Aspergillus niger*

2. Which of the following pair is correctly matched for the productproduced by them?

Ans:*Saccharomyces cerevisiae* – Ethanol

3. The most common substrate used in distilleries for the productionof ethanol is –

Ans:**Molasses**

4. Cyclosporin – A is an immunosuppressive drug produced from

Ans:*Trichoderma polysporum*

5. CO2 is not released during

Ans:Lactate fermentation

6. The purpose of biological treatment of waste water is to _____

Ans:Reduce BOD

7. The gases produced in anaerobic sludge digesters are

Ans:Methane, hydrogen sulphide and CO2

8. Archaebacteria are likely to be present in deep sea water.

9. **Methane, hydrogen sulphide and CO2** gases are produced in anaerobic sludge digestyers.

10. Aspergillus niger microorganism is used for production of citric acid in industries.

11. The most common substrate used in distilleries for the production of ethanol is **Molasses.**

12. Cyclosproin –A is an immunosuppressive drug produced from **Trichoderma polysporum.**

13. CO2 is not released during **Lactate fermentation.**

14. The purpose of biological treatment of waste water is to **Reduce BOD.**

15. The gases produced in anaerobic sludge digesters are, **Methane, hydrogen sulphide and CO2.**

2- Mark Question Answer:

1. **How is milk converted into curd?**
   - The LAB bacteria grows in milk and convert it into curd and digesting the milk protein casein.
   - A small amount of curd added to fresh milk as a starter or inoculum. Under suitable temperature ($< 4°C$)Lactobacilli multiply and convert milk into curd.
2. **What is Pasteur Effect?**
   - The Pasteur Effect is the inhibiting effect of oxygen on the fermentation process.
3. **What is Biodiesel?**
   - Biodiesel is a fuel made from vegetable oils, fats or greases.
   - Biodiesel fuel can be used in diesel engine without altering the engine.
4. **What is bioremediation?**
   - The use of naturally occurring or genetically engineered microorganisms to reduce or degrade pollutants is called bioremediation.

3- MarkQuestion Answer:

1. **What is SCP (Single Cell Protein)?**
   - Single Cell Protein refers to edible unicellular microorganisms like spirulina.
   - Protein extracts from pure or mixed cultures of algae, yeasts, fungi or bacteria may be used as ingredient or as a substitute for protein rich foods and is suitable for human consumption or as animal feed.
2. **Write short notes on-Queen of drugs?**
   - Penicillin, discovered by Alexander Fleming in 1926.
   - Penicillin is produced by the fungi pencilliumnotatum and pencilliumchrysogenum.
   - Earnest chain and Howard Florey, when they treated the wounded soldiers in world war-II with Penicillin.
3. **When does antibiotic resistance develop?**
   - Antibiotic resistance occurs when bacteria develop the ability to defeat the drug designed to kill or inhibit their growth.
   - Antibiotic resistance is accelerated by the misuse and over use of antibiotics, as well as poor infection prevention control.
   - Antibiotics should be used only when prescribed by a certified health professional.
4. **What is referred to as industrial alcohol?**
   - Ethanol (or) Ethyl alcohol is called industrial alcohol.
   - Ethanol is used for industrial, laboratory and fuel purposes.
   - Bacteria such as Zymomonasmobilis and sarcinaventriculi also involved in ethanol production.

5. **Give any two bioactive molecules produced by microbes and state their uses?**

Cyclosporine – A:

- It is a bioactive molecule
- It is produced from the fungus Trichodermapolysporum`
- Uses :
- Used in organ transplantation
- It is also used for its anti-inflammatory, Anti-fungal and anti-parasitic properties.

Statins:

- It is a bioactive molecule
- It is produced by the yeast monascuspurpureus
- Uses :
- Used to lower blood cholesterol levels.

6. **PET Plastics are no more environmental hazardous substances why?**

- I deonellasakaiensis is a bacterium capable of breaking down and consuming the PET.
- It is currently tried for recycling of PET Plastics.
- These bacteria use PET-ase and MHET-ase enzymes to breakdown PET Plastics into terephthalic acid and ethylene glycol.

5 - MarkQuestion Answer:

1. **Define the following terms:**

(a) Antibiotics (b) Zymology (c) Super bug

(a) **Antibiotics**

- Antibiotics are Chemical substances produced by microorganisms which can kill or retard the growth of other disease causing microbes even in low concentration.
- Antibiotic means “against life”

(b) Zymology

- Zymology is an applied science which deals with the biochemical process of fermentation and its practical uses.

(c) Super bug

- “Super beg” is a term used to describe strains of bacteria that are resistant to the majority of antibiotics commonly used today.

2. **Write short notes on the following ;**

(a) Brewer’s Yeast (b) Ideonellasakaiensis (c) Microbial fuel cells

(a) Brewer’s Yeast :

- “Saccharomyces cerevisiae” commonly called brewer’s Yeast.
- It is used fermenting melted cereal and fruit juices to produce various alcoholic beverages.
- Wine and beer are produced without distillation.

(b) Ideonellasakaiensis :

- Ideonellasakaiensis is currently tried for recycling of PET – plastics.
- These bacteria use PET-ase and MHET-ase enzymes to breakdown PET Plastic into terephthalic acid and ethylene glycol.

(c) Microbial fuel cells : (MFC)

- It is a bio-electrochemical system that drives an electric current by using bacteria
- It mimicks bacterial interation found in nature.
- MFC –cells allow bacteria to oxidize and reduce organic molecules.

10. APPLICATIONS OF BIO TECHNOLOGY

One Mark Question – Answer:

1. Restriction endonucleases are enzymes which **Make cuts at specific positions within the DNA molecule.**
2. There is retriction endonuclease called EcoRI. What does 'co' part in it stand for- **Coli.**
3. The first Clinical gene therapy was done for the treatment of **SCID.**
4. Dolly, the sheep was obtained by a technique known as **Cloning by nuclear transfer.**
5. The genetic defect adenosine deaminase deficiency maybe cured permanently by **Introducing bone marrow cells producing ADa into embryo at an early stage of development.**
6. **Chain 21 and Chain B has 30 amino acids** are arranged in the two chain of Insulin.
7. PCR proceeds in tghree dintinct steps governed by temperature, they are in order of, **denaturation, Annealing, Synthesis.**
8. Which statements is true regarding DNA polymerase used in PCR? – **It remains active at a high temperature.**
9. ELISA is mainly used for, **Detection of Pathogens.**
10. Transgenic animals are those which have- **Foreign DNa in all their cells.**
11. Vaccines that use components of a pathogenic organism rather than the wholse organism are called **Subunit recombinate vaccines.**

2- MARK QUESTION ANSWER:

1. **What is genetically engineered Insulin?**
   - The insulin which is obtained by recombinant DNA –technology is called genetically engineered Insulin.
2. **What are transgenic animals? Give an examples?**
   - Transgenes is the process of introduction of extra DNA-into the genome of the animals to create and maintain stable heritable character.
   - Examples: Mice, Cow, Rabbit, Rat, goat, Sheep and fish.
3. **What are DNA – Vaccines?**
   - A DNA Vaccine consists of a gene encoding an antigenic protein.
   - It is inserted into a plasmid and incorporated into the cells in a target animal.
4. **What is Denaturation?**
   - The double stranded DNA – of interest is denatured to separate into two individual strands by high temperature. This is called denaturation.

3- mark question answer:

1. **Explain how "Rosie" – is different from a normal cow?**
   - In 1997, Rosie the first transgenic cow produced human protein enriched milk.
   - The milk contained the human alpha lactelbumin.
   - The protein rich milk (2.4 gm/litre) was a nutritionally balanced food for new born babies than the normal milk produced by the cows.

2. **Differentiate between somatic cell gene therapy andGerm line gene therapy?**

S.No	Somatic cell gene therapy	Germ line gene therapy
1.	Therapeutic genes transferred into the somatic cells.	Therapeutic genes transferred into the germ cells.
2.	Introduction of genes into bone marrow cells, Blood cells, skin cells, etc.	Genes introduced into eggs and sperms.
3.	Will not be inherited in later generations.	Heritable and passed on to later generations.

3. **Differentiates – totipotency&Plaripotency :**
   - Totipotency – Is the ability of a single cell to divide and produce all of the differentiated cells in an organism.
   - Pluripoency – Refers to a stem cells that has the potential to differentials into any of the three germ layers –ectoderm, endoderm and mesoderm
4. **What is patents?**
   - The legalght to be the only person or company to make or sell a product for a particular number of years (20 – years) or a document that give you thish right.

5- MARK QUESTION ANSWER:

1. **What are stem cells? Explain its role in the field of medicine?**
   - Stem cells are undifferentiated cells found in most of the multi cellular animals.
   - These cells maintain their undifferentiated state even after undergoing numerous mitotic divisions.

   - **Role of stem cells in field of medicine :**
     (i) Embryonic stem cells are isolated from the epiblast tissue of the inner cell mass of a blastocyst.
     (ii) When stimulated Es-can develop into more than 200-cells types of the adult body.
     (iii) Es – cells are immortal.
     (iv) Adult stem cells are found in various tissues of children as well as adults.
     (v) An adult stem cells or somatic stem cells can divide and create another cell similar to it.
     (vi) Human stem cells in the generation of cells and tissue that could be used for cell based therapies.
     (vii) Human stem cells could be used to test new drugs.

2. **Mention the advantages and disadvantages of cloning?**

   Advantages:
   - Offers benefit for clinical trials and medical research
   - It can help in the production of protein and drugs in the field of medicine.
   - Aids stem cells research.

   Disadvantage's:
   - Animal and human activity see it as a threat to biodiversity saying that this alters evolution which will have an impact on population and the ecosystem.
   - The process is tedious and very expensive.
   - It can cause animals to suffer.

- It might compromise human health through consumption of cloned animal meat.
- Cloned animals aged faster than normal animals and are less healthy than the parent organism as discovered in Dolly.
- Cloning can lead to occurrence of genetic disorders in animal.

More than 90% of cloning attempts fail to produce a viable offspring.

11. ORGANISMS AND POPULATIONS

ONE MARK QUESTION- ANSWER:

1. All populations in a given physical area are defined as – **Biome.**
2. Organisms which can survive a wide range of temperature are called- **Eurytherms**
3. The interaction in nature, where one gets benefit on the expense of other is,- **Commensalism.**
4. Predation and parasitism are which type of interactions- (**+ , -)**
5. Competition between species leads to – **Extinction**.
6. r – selected species are- **Insects.**
7. Animals that can move from fresh water to sea called as- **Catadromous.**
8. Some organisms maintain homeostasis by physical means- **Regulate.**
9. The first to use the term 'niche' – **Charles Elton (1927)**
10. Example for suspend are, - **Hibernation, Aestivation.**
11. The scientific study of animal behaviour – **Ethology.**
12. Positive Phototaxis – **Moths.**
13. Negative Photogropism - **Root of plants.**
14. Negative Phototaxis – **Euglena, Volvox.**
15. Positive photo tropism – Sun flower.
16. The maximum density of water occurs at- 4°C
17. Nocturnal animal – Crickets.
18. Q_{10} Value- 2.0
19. Antifreeze protein contain organisms- Arctic fishes.
20. Temporary Hardness can removed by – Boiling.
21. Salts responsible for hardness of water are - Sulphate / nitrates of calcium/ Mangnecium.
22. Coriolis effect is – rotation of the planet.
23. Osmo REgulatiors – Birds, Mammals.
24. Osmo Conformes – Fises.
25. Example for mimicry – Stick insect.
26. Example for camouslage (or) Crypsis.- – Chameleon

27. Lowest rainfall – Atacama Desert

28. Cold desert in India – Ladakh.

1. Habitat
   The place where an organism or a community live.
2. Ecological niche
   The physical space occupied by an organism and its functional role in the community.
3. Van't Hoff's rule
   Increase of every 10°C – Rate of metabolic activity double
   Decrease of every 10°C Rate of metabolic activity halved.
4. Q_{10} value / Temperature co efficient
   The effect of temperature on the rate of reaction
   Q_{10} value = 2.0
5. Bergmann's rule
   Birds and mammals – attain greater body size –colder region.
6. Allen's rule
   Birds and mammals – Shorter limbs, ears, appendages – colder region.
7. Jordon's rule
   Fish – more vertebrae – lives in cold aquatic region

8.

Eurytherms	Stenotherms
Organisms can tolerate wide range of temperature. E.g. Cat, dog, tiger, human	Organisms can tolerate only narrow range of temperature E.g. Fish, Lizards, Snakes

9.

Photo taxis	Phototropism
Movement of organism in response to light.	Growth or orientation of organism in response to light
E.g. Moths – moves towards light Earthworm – away from light.	E.g. Sunflower – moves towards light Roots – away from light

10.

Regulation	Conformer
Organisms maintain constant body condition E.g. Birds, mammals	Organisms cannot maintain constant internal condition. E.g. Fisher, Frags

11.

Hibernation	Aestivation
A state of reduced activity to escape from cold winter. E.g. Polar Bear	A state of reduced activity to escape from over heat in summer. E.g. Snails, fishes

12. Migration.

Animals move away temporarily from a stressful habital to new hospitable area and return.

Eg. Siberia birds ⇆Vedanthangal in Tamil Nadu.

13. Diapause.

Some lower animals suspend a certain phase of their life cycle Eg. Silk worm.

14.

Natality Birth rate (B)	Martality – Death rate (D)
Number of organisms born per female per unit time B=number of birth per unit time / Average population	Number of organism's death in population per unit time. d=number of deaths per unit time / Average population

15.

Anadromous	Catadromous
Sea $\overset{migrate}{\underset{back}{\rightleftarrows}}$ Fresh water E.g. Salmon	Freshwater $\overset{migrate}{\underset{back}{\rightleftarrows}}$ Sea E.g. Eel

16.

J-shaped growth curve	s-shaped growth curve
Population increased fatly and stop due to suddenly appeared limiting factors. E.g. Insects in rainy season	Population increased slowly at first gradually slow down due to environmental resistance then equilibrium is maintained E.g. Small mammals

17.

Anemometer	Hygrometer
Wind speed is measured with an Anemometer	Humidity is measured with a hygrometer.

18.

Pedosphere	Pedogenesis
The soil zone of earth is known as pedosphere	The soil is formed from rocks by weathering is known as pedogenesis.

19. Function of soil.

Medium for plant growth.
Water storage and purification.
Living for many organisms.
Change earth's atmosphere.

5 Mark Question and Answer:

1. **Properties of water**
   - Water is one of the main agents in soil formation
   - Medium for animals and plants
   - Water is heavier than air
   - Greater buoyancy
   - High heat Capacity
   - High latent heat
   - Less dense at solid (ice) state than liquid.
   - Water freezes at 0°C

- 4°C –Water –more density
- Universal solvent
- High surface tension

2. **Properties of soil**
   - **Texture of soil** – determined by the size of soil particles.
   - **Porosity** – the space present between soil particles.
   - **Permeability of soil** – Movement of water throw pore space
   - **Soil Temperature** – uses germination of seeds, growth of roots, inhabiting micro and macro organisms.
   - Soil water – Living place for plants and animals.
3. Adaptations of aquatic animals
   - Pectoral and dorsal fins – balancer, caudal fin – changing direction
   - Body muscles (myotomes) – helps in locomotion.
   - Stream lined structure – helps in swift movement
   - Gills – helps in respiration
   - Air bladders – helps in buoyancy
   - Lateral line system – helps in rhea receptors.
   - Mucous glands scales, excretory organ.

4. Adaptations of terrestrial animals
   - Earthworm, planarians – secrete mucus coat – helps in burrowing coiling respiration.
   - Arthropods – well developed tracheal system.
   - Many layered skin – vertebrates – preventing from loss of water
   - Obtain water - from food
   - Birds make nests, lay egg – before rainy season
   - Camels – Excrete high concentrated urine- with stand dehydration up to 25% of body weight.

5.

r-Selected species	K-Selected species
Reproductive Capacity	Carrying capacity
smaller size organisms E.g. Insects	Larger size organisms E.g. Human
Produced many offspring	Produced few offspring
Mature early	Late maturity
Short life span	Long life span
Reproduce one or few times	Reproduce many time
Only few reached adulthood	Most animals reached
Unstable environment	Stable environment
Density independent	Density dependent

6. Analysis of two species population interactions

Amensalism

Large and powerful animal inhibits lower organism growth

E.g. Elephant – neither benefitted nor harm (O)

Ant – Die under elephant foot. (-)

Mutualism
Favourable to both organism.
E.g. Crocodile – tooth cleaning by birds (+)
Bird – get food rots from crocodile tooth (+)
Commensalism
In this association one benefits and other neither neither benefits nor harm.
E.g. Shark – neither benefitted nor harm (o)
Sucker Fish – attaches with shark by sucker – get falling food pieces (+)
Competition
Each animal attacked by another.
E.g. Birds – fight with squirrel for nuts (-)
Squirrel – fight with bird and hurt (-)
Parasitism
Host affected by parasite
E.g. Man – host and get harm (-)
Tapeworm – parasite get benefit (+)

Predation
Large predator kills the prey.
E.g. Lion – kills Deer –get food (+)
Deer – killed by Lion (-)

➢

12.BIODIVERSITY AND ITS CONSERVATION

ONE MARK QUESTION ANSWER:

1. The region has maximum biodiversity – Tropical forest
2. Conservation of biodiversity within their natural habitat is – Insitu Conservation.
3. Example for exsitu conservation in- Zoological park.
4. Hotspot of biodiversity in India – Western ghats and Eastern Himalayas.
5. The Organisation which published the red list of species=IUCN
6. Who introduced the term Biodiversity – Walter Rosen.
7. Who Popularized the term Biodiversity – Edward Wilson.
8. High Risk extinction due to Habitat destraction is- Amphibians.
9. Organism which extinct by mass extinction - 90% shallow water marine invertibrates.
10. Paracoccus marginatus – Exotic species
11. Arborata means – gardens with trees and shrubs.
12. Name the active chemical found in Raawolfia Vomitoria- Reserpine.
13. State animel of Tamilnadu – Nilgiri Tahr.

14. Individual home range of Lion – 100 Sq.km.
15. The animals become extinct due to over exploitation by human - Dodo, Passenger Pegion, Stellers seacow.
16. Red list published by – IUCN.
17. Who defined hot spots - Norman Myers.
18. WPA – Wildlife Protection Act.
19. MAB- Man And Biosphere Guided by UNESCO.
20. Number of Biosphere Resources found in India – 18
21. Herpetology means- Branch of Zoology deals with reptiles and amphibians.
22. MSL- Mean Sea Level.
23. IUCN – International Union for Conservation of Nature.
24. WCU- World Conservation Union.
25. NTCA – National Tiger Conservation Authority
26. WPA – Wildlife Protection Act.
27. WLS – Wild Life Scantuaries.WWF – World Wild Find for Nature.

Short answer

1. Three level of Biodiversity
   - Genetic diversity
   - Species diversity
   - Community diversity
2. Amazon forest is considered to be lungs of the planet
   - Amazon forest in the tropical rain forest 14% of earth's land.
   - Living place for millions of species
   - It gives more O_2 for us.
   - It destroyed and replaced for agriculture.
3. Red Data Book

   Red Data book is a catalogue of taxa facing risk of extinction.
4. Extinction

   When none of one species members are alive any were in the word is called extinction. E.g. Dodo bird, Dinosaurs

   Types:
   1. Natural extinction
   2. Mass extinction
   3. Anthropogenic extinction.

5.

In situ conservation	Ex-situ conservation
Conservation in the natural habitat	Conservation in the manmade habitat.
Save the animals from predators	Conservation of rare plants/animals in place outside their nature home.
E.g. National parks wild life	E.g. Botanical gardens

ZOOLOGY

sanctuaries.	zoological parks.

6. Endangered organisms/Endangered species

A Species that identified as to become extent of.

E.g. Monarch butterfly, Panda

7. Decrease in biodiversity distribution in Polar region

Temperature, Precipitation, latitude, heavy rain, distance

8. Mass extinction ;

Death of mass organisms by environmental catastrophes.

E.g. Mass extinction in Permian period.

9. Shifting or Jhum cultivation:

Natural trees are burnt away and farming, after fertility of that land reduced, cut downnew forest for crop production.

Effects:.

1. Loss of forest area
2. Pollution
3. Habitat loss
4. climate changes.

10. Co-extinction

Extinction of one species will automatically cause extinction of the other species.

E.g. 1. Orchid bees – forest trees

2. Dodo bird - calvarias Tree.

11. Eutrophication

When water bodies enriched with nutrients increasing the amount of water plants and algae growth.

12. Intensive agriculture.

Farming high yielding crops by intensive result in affect genetic diversity.

13. Project tiger

In 1973 the Govt.of India lunched this project tiger.

It covers 50 tiger conservation.

E.g. Jim Corbett National Park.

14. Sacred grave or sacred words.

Any grove of trees that are of special religious importance to a particular culture.

E.g.Neem trees, Grave yards.

15. **National Parks**

National parks in Tamil Nadu	District
Guindy NP	Chennai
Mudumalai NP	Nilgiris
Mukurthi NP	Nilgiris
Indira Gandhi NP	Coimbatore

16. **Wild life sanctuaries**

WLS in Tamil Nadu	District
Vedanthangal Lake	Chengalpet
Mudumalai WLS	Nilgiris
Indra Gandhi WLS	Coimbatore

5 mark question answer:

1. Various causes for biodiversity losses.
   - Habitat loss, fragmentation and destruction of forest.
   - Pollution and Pollutant.
   - Climate changes.
   - Introduction of foreign species.
   - Over usages of resources.
   - Intensive agriculture and aquaculture.
   - Hybridization.
   - Natural disasters- Tsunami, forest fire, earth quake
   - Industrialization, Urbanization, Roads and shipping activity
   - Dam construction, monoculture.
   - Co-extinction.
2. Factors that drive habitat loss
   - Development of human society is unavoidable
   - Natural habitat destroyed for agriculture, mining, Industries and highways.
   - To fulfil the needs of overpopulation require additional land and water.
   - For additional land destruction of natural habitats. Like –
   - Filling wetlands, cutting trees, desilting rivers
   - Caving mountain, extracting ores, changing the direction of rivers, filling seashore.
3. Mention the major threats to biodiversity by human
   - Natural resources like land, water and organisms are utilized by human beings.
   - Direct human activities – change in local land use, species introduction or removal harvesting, pollution climate change.
   - Indirect human activity – demographic, economic technological, cultural and religious factors.
   - Indirect effects of human activities – are monsoon failure global warming ozone layer depletion, landslides in hilly area, pollution.
   - Hunting of one species affect food chain – leads to affect food web.
4. How can we contribute to promote biodiversity conservation?
   - Protection and scientific management of biodiversity.
   - Protect species from extinction
   - Protect their habitats and ecosystem.
   - Protect endangered species
   - Identify and protect critical habitats for feeding, breeding, nursing, and resting.
   - Air, water, and soil should be conserved first.
   - Wild life protection Act should be implemented.
5. **Write note on**

   (a) Protected areas:
   - Bio geographical areas where biological diversity along with natural and cultural resources is protected through legal measure
   - E.g. National parks, wild life sanctuaries.
   - In India 771 protected areas are there.

(b) Wild life Sanctuaries :

Sanctuaries are land where wild animals and fauna can be protected from hunting and poached.

- India has 544 wildlife sanctuaries.
- Some restricted human activities are allowed inside the sanctuary area.
- Ecotourism is permitted.

(c) WWF

- World wildlife Fund
- Non-governmentalorganisation founded in 1961.
- Works – wildlife conservation and reduction of human impact on environment.

13. ENVIRONMENTAL ISSUES

ONE MARK QUESTION- ANSWER:

1. Right to Clean Water is a fundamental right. Under the Indian Constitution- Article-21.
2. The thickness of Stratospheric Ozone layer is measured in – Dobson Units.
3. Highest per Capita emitter of Carbon dioxide in the world is,- China.
4. The use of microorganism metabolism to remove pollutionts such as oil spills in the water bodies is known as, - Bioremediation.
5. Which one is always decreases in a Food chain across tropic levels. – Energy.
6. E-Waste generated by the mobile phones contain the metal in most abundant is- Copper.
7. HCFC- compounds have the molecules – Chlorine.
8. Excess of fluoride in drinking water cases: Fluorosis.
9. An average human consumption of Oxygen per day is – 550 Lit.
10. An Oxygen produced by one healthy tree per year is- 1,00,375 lit.
11. Red tides means- eutrophication-algalblooms on sea water.
12. The threshold of pain sound is -120db.
13. The chemical found in mosquito Repellents are, DEET (n-n-diethylnetatolumide) and allethrin.
14. Supporter and expert of organic farming in Tamilnadu is –Nammalvar.
15. Nammalvar's Ecological Foundation – Vaanagam, Kudumbam
16. Indian Soil biologist and Ecologist of Tamil Nadu is,- Dr. Sulton Ahmed Ismail.
17. Vermitech and Vermicomposting introduced by- Dr. Ismail.

18. Basic of E- waste is- PCB(PolyChlorinated Biphenyl)
19. CFC – Chloroflurocarbon
20. PAN – Peroxy acetyl nitrate
21. AQI – Air Quality Index
22. BOD – Biological Oxygen Demand
23. COD – Chemical Oxygen Demand
24. STP – Sewage Treatment Plants.
25. ETP – Effluent Treatment Plants.

Short answer

1. Expand

CFC – Chloro fluoro carbon
AQI – Air Quality Index
PAN – Peroxyacetyle Nitrate.

2. SMOG

SMOG = Smoke + fog
It is a type of air pollution caused by tiny particles.

Effects

1. Create ground level ozone.
2. Reducing visibility
3. Make breathing difficult to asthma patients.

3. Eutrophication and control

When water bodies enriched with nutrients increasing the amount of water plants and algae growth.

Control measures

- By reducing the use of excessive fertilizers
- Checking run off from fields
- Planting trees along the stream beds.

4. Algal bloom

When water bodies enriched with nutrient leads to excessive growth of algae is called Eutrophication.

Effects

1. Leads to BOD 2. Black the sunlight 3. Cause bad tate and odour.

5. Effect on earth – without greenhouse effect

- Greenhousegases keeps our earth in optimum temperature.
- If no greenhouse effect earth's temperature will low to 0°F or -18°C
- Earth will cover ice. So life on earth would be difficult.

6. Catalytic converter

Device that used in vehicles convert toxic gases and pollutant into less toxic pollutants.

7. Ecosan toilets

- Ecological sanitation (Eco-san) acceptable system for handling human excreta by using dry composting toilets.
- It reduce water use.
- We can get natural fertilizers.

8. Green houses gases
   - Emitted into air by human activities
     E.g.Co_2, Methane, Nitrous oxide, CFC, O_3

Effect:

1. Warming of the earth
2. Raising sea level
3. Submerging of islands and seashore cities.

9. CHIPKO – movement
   - NGO – started for prevent cutting of trees in 1970.
   - Leader – SundarlalBahuguna
   - In this movement people hugging the trees and prevent from cutting.

10. colony collapse Syndrome
   - Due to pesticides usage the honeybees leads to destruction of hives.
   - Effect – lower agricultural productivity.

11. SAMEER
   - Is an app.
   - It provides hourly updates on the National AQI.
   - Published by CPCB.

12.4R
   - 4 R Refuse, Reduce, Reuse. Recycle
   - Best remedy for plastic waste pollution
   - TN Govt. ban single use plastics from 01.01.2019

13. Bio Magnification
   - Non-degradable substance enter into the food chain get transferred upto the trophic levels.
   - Increasing chemical concentration is termed as Bio magnification e.g.DDT

14. Acid rain

Atmospheric NO_2, SO_2 + rain water $\rightarrow$Acid rain (Sulphuric acid , Nitric acid)

Effects – Damage trees, crops
Affect marine animals
Induces corrosion

5 Mark Question and Answer

1. Role of an individual to reduce environmental pollution
   - Planting trees
   - Using catalytic converters in vehicles
   - Regulate the use of synthetic fertilizers and pesticides.
   - Regular servicing the Vehicles and Machines.
   - Avoid the usage of loud speakers.
   - Follow the '4R' mantra, Refuse , Reduce, Recycle
   - Avoid using single use plastics.
   - Switching off the electronic equipment when not in use.
   - Reduce CFC emission.

2. Solution for protect the environment from E-wastes and Medical waste

Management of Medical waste

- Safe removal of Bio-medical waste
- Recycle the hospital plastics
- Incineration, autoclaving
- Land fill and burying

Management of E-Waste

- Limiting the use of electronic goods.
- Following '4R' principle
- Disposal – Reuse Resale, Salvage, Recycling

3. Methods of disposal of radioactive wask
   - **Limit generation:** Limiting the generation of waste is the first and most important.
   - **Dilute and disperse:** for wastes having low radioactivity, dilution and dispersion are adopted.
   - **Delay and decay:** is important strategy because the radioactivity in nuclear reactors and accelerators is very short lived.

Concentrate and confine process

- Objective of treatment activity for longer – lived radioactivity.
- Waste is packed in corrosion resistant containers and transported to disposal sites.

4. Effects of air Pollution
   1. Affects animal respiration
   2. Causes irritation in throat, nose, lungs and eyes.
   3. Reduce body immunity
   4. Causes cardio vascular disease.
   5. Gas leaks can be lethal
   6. CO in the atmosphere interferes with O_2 transport because Hb has greater affinity for CO.
   7. At low concentration CO causes headache, blurred vision
   8. At high concentration CO causes coma and death.
5. Classification of pollutants
   I. Degradable pollutant :
      i. Rapidly degradable
      ii. slowly degradable

      Rapidly degradable Pollutant - broken down by natural process

      E.g. Domestic, Sewage, Vegetable waste

      Slowly degradable pollutant- Remains in environment for many years e.g. .DDT

   II. Non degradable pollutant

      These cannot be degraded by nature process.

      It leads to bio magnification

      E.g. Lead, mercury, cadmium, Chromium and nickel
6. Control of Air Pollution
   1. Planting more trees and indoor plants
   2. Using catalytic converters in vehicles.
   3. Using DEF-Diesel exhaust filters in vehicles.
   4. Using Electronic precipitators to reduce industrial pollutant.

5. Forests are carbon sinks and lungs of planet so save forest.

7.Control of water pollution.

- Regulate pollutants discharge in water bodies.
- Pre-treating of waste water.
- Setting up STP and ETP
- Restrict the use of synthetic fertilisers and pesticides.
- Create Public awareness.

8. Noise Pollution.

Noise – Unwanted and undesirable sound.

Noise Pollution – lots of noise in the environment.

Effect of noise pollution:

- Heart disease, sleep disruption, hearing loss.
- Increased stress and tension.
- Peptic ulcer, severe head ache, memory loss.
- Fire Crackers frighten animals.

Control of noise pollution:

- Planting trees
- Lubrication of machinery and servicing
- Regular service of automobile engines.
- Restriction of use of loud speaker.
- Using ear plug at work site.