

**12<sup>th</sup>  
STD**



**BIO - ZOOLOGY**



# **12th- BIO-ZOOLOGY STUDY MATERIAL**

**KRISHNAGIRI DISTRICT**

**2023-2024.**

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தெய்வத்தான் ஆகா தெனினும் முயற்சிதன்  
மெய்வருத்தக் கூலி தரும்.

**12th Std.**

**ONE MARK QUESTIONS (ZOOLOGY, BIO - ZOOLOGY)**

We inform you that the one-mark questions in the 12th standard Botany, Bio-botany textbook, with the help of GeoGebra software, are designed to enhance the learning skills of the students by providing a maximum of three opportunities to choose the correct answer to a question.

**Note:** The software has been developed in hi-tech lab for students to practice by scanning the QR code or clicking on the link.

ZOOLOGY, BIO - ZOOLOGY



<https://www.geogebra.org/m/n8zma24k>

# 1. REPRODUCTION IN ORGANISMS

## ONE MARK QUESTION/ANSWERS:

01. In which type of parthenogenesis only males are produced - **Arrhenotoky**
02. The individuals which are giving birth young ones are called - **viviparous**
03. The reproduction in Bacteria is - **conjugation**.
04. In which type of reproduction, there are no variation seen – **Asexual reproduction**
05. In which kind of reproduction there are variation seen in offsprings – **sexual reproduction**
06. Male-honey bees are produced through the - **parthenogenesis**.
07. During unfavourable conditions, Amoeba multiplies by - **sporulation**.
08. The oblique binary fission is seen in - **ceratium**
09. The gravid proglottids of tapeworm are cut off by - **Apolysis**
10. The external fertilization is seen in - **sponges, fishes and Amphibians**
11. The internal fertilization is seen in - **reptiles, Aves and Mammals**
12. The period of growth between the birth of the individual upto reproductive maturity is - **Juvenile phase/vegetative phase**
13. The reproductive phase is also known as - **Maturity phase**
14. The degeneration sets in the structure and functioning of the body is called - **senescent phase**.
15. The process of fusion of dissimilar gametes is called as ----- (**Anisogamy**)
16. In \_\_\_\_\_ parthenogenesis is the larvae produce a new generation of larvae by parthenogenesis. (**paedogenetic**).

## TWO MARK QUESTIONS :

### 1. What is Parthenogenesis? Give two examples:

The Process of development of an egg into a complete individuals without fertilization. Ex: Annelid and Sea urchin`

### 2. Which type of reproduction is effective? Asexual or 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?

In the tapeworm gravid proglottids are regularly cut off either singly or groups from the posterior end.

### 4. How is Juvenile phase different from reproductive phase?

JUVENILE PHASE	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 regrowth in the injured region.  
Ex: Hydra, Planaria.

**THREE MARK QUESTIONS:**

**1. What is budding, Write 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

SYNGAMY	FERTILIZATION
Two haploid gametes form in zygote	It is the process of fusion of dissimilar gametes
It denotes fusion of cells occur in invertebrates	It denotes fusion of gamete occur in vertebrates

**3. What is Plasmotomy give examples?**

The division of multinucleated parent into many multinucleated daughter individuals`  
Ex:Opalina, Pelomyxa.

**4. Differentiate Seasonal and continuous breeders with example?**

SEASONAL BREEDERS	CONTINUOUS BREEDERS
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.

**FIVE MARK QUESTIONS:-**

**1. What is Parthenogenesis? Explain with types?**

**Parthenogenesis**

Development of an egg into complete individuals without fertilization is known as parthenogenesis.

**Types of Parthenogenesis:**

**I. Natural Methods:**

It occurs regularly, constantly and naturally in their life cycle.

**a) Natural complete parthenogenesis:**

There are no male, only represented by female  
No bi- parental sexual reproduction.

**b) Natural Incomplete parthenogenesis:**

Both sexual and parthenogenesis occurs E.g In Honeybee fertilized egg developed into queen, unfertilized egg developed into drone.

**Arrhenotoky :** Only male are produced Eg:Honeybee.

**Thelytoky :** Only females are produced Eg:Solenobia

**Amphitoky :** Egg may develop into individuals of any sex Eg: Aphis

**II. Artificial parthenogenesis**

The unfertilized egg is induced to develop into a complete individuals by physical or chemical stimuli.

Ex; annelid and sea urchin eggs.

## LESSON 2.HUMAN REPRODUCTION

### ONE MARK QUESTIONS:

1. The milk secreted by the mammary glands soon after child birth is called - **colostrum**
2. Colostrum is rich in – **IgA**
3. -----is the hormone stimulates the process of spermatogenesis – **testosterone**
4. ----- synthesis testosterone -**Leydig cells**
5. Foetus heart starts function on----- week of the development - **4<sup>th</sup>**
6. The false labour is called-----**Braxter - Hick's contractions**
7. Castration or surgical removal of testis is called - **orchidectomy**
8. **Spermarche** is- the first ejaculation of the semen
9. Siamese twins are called as - **conjoined twins**
10. The whole process of spermatogenesis takes about - **64 - days**
11. The sperm production for one days - **200million**
12. The coagulating enzyme which enhances sperm motility is - **vesiculase**
13. The mature sperms are stored in the\_ (**Epididymis**)
14. The male sex hormone testosterone is secreted from (**Leydig Cell**)
15. The glandular accessory organ which produces the largest proportion of semen is (**Seminal vesicle**)
16. The male homologue of the female clitoris is\_ (**Penis**)
17. The site of embryo implantation is the\_\_\_ (**Uterus**)
18. The foetal membrane that forms the basis of the umbilical cord (**Allantois**)
19. Mammalian egg is\_\_\_\_\_ (**Alecithal and non cleidoic**)
20. The process which the sperm undergoes before penetrating the ovum is----(**Capacitation**)
21. The Androgen Binding Protein(ABP) is produced by\_\_\_ (**Sertoli cells**)
22. The gametes of the reproductive system are the\_\_and\_\_\_ (**sperms and ovum**)
23. Embryo gets embedded in the inner wall of the uterus and the process is called as\_ (**implantation**)
24. Each testis is covered by an outermost fibrous\_\_\_ (**tunica albuginea**)
25. Each testis is/the scpta about\_\_\_\_lobules.(**200 to 250**)
26. The ovary is an elliptical structure about\_to\_\_\_\_cm long. (**2 to 4**)
27. The ovary remains attached to the pelvic wall and the uterus by an ovarian ligament called .(**mesovarium**)
28. The cells of the\_\_\_opens in to mammary tubules.(**alveoli**)
29. The process of release of mature sperms is called as.(**spermiation**)
30. Head of human sperm comprises\_\_\_\_\_and\_\_\_\_\_. (**Acrosome and Nucleus**).
31. The smallest human cell is\_\_\_\_\_(**sperm cell**).
32. The biggest human cell is\_(**ovum**)

**TWO MARK QUESTIONS:-**

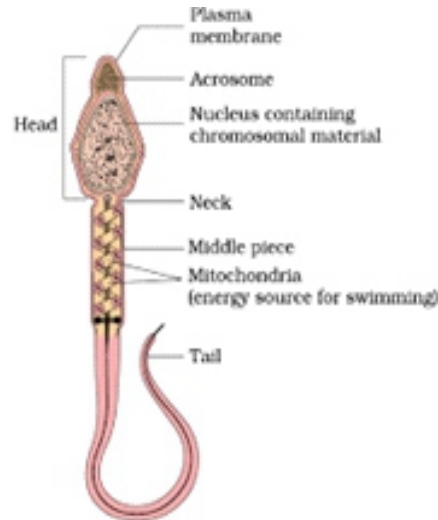
1. **Name the three layers of uterus**
  - a) Perimetrium
  - b) Myometrium
  - c) Endometrium
2. **Accessory glands of female Reproductive system.**
  - a) Bartholin's glands
  - b) Skene's glands
3. **Embryonic Endodermal derivative organs are**
  - ❖ Gastro intestinal and respiratory tract
  - ❖ Liver and pancreas
  - ❖ Thyroid and parathyroid glands.
4. **Write the Functions of sertoli cells ?**
  - ❖ Production of ABP (Androgen Binding Protein)
  - ❖ Provides nourishment to sperms
  - ❖ Secretes the hormone inhibin
5. **Accessory Glands of male Reproductive system**
  - ❖ Paired seminal vesicles
  - ❖ Paired Bulbourethral glands
  - ❖ Single prostate gland
6. **Mention the differences between spermatogenesis and**

<b>Spermatogenesis</b>	<b>Spermiogenesis</b>
It is the process of formation of haploid spermatozoa from germinal cells.	It is the process of differentiation of spermatozoa from a spermatid.

7. **Expand the acronyms:**
  - (a) FSH - Follicle stimulating hormone
  - (b) LH - Luteinising hormone
  - (c) HCG - Human chorionic gonadotropin
  - (d) HPL - Human placental Lactogen
8. **Define Gametogenesis ?**  
Formation of gametes by spermatogenesis and Oogenesis.
9. **What is Cryptorchism?**  
The failure of one or both testes to descend down into the scrotal sacs is known as cryptorchism.
10. **What is the composition for semen?**  
It is an alkaline fluid with fructose sugar, ascorbic acid, prostaglandin and vesicles.
11. **What is meant for nebenkern?**  
In sperm middle piece possesses mitochondria spirally twisted around the axial filament.

**12. What is Ectopic Pregnancy?**

If the fertilized ovum is implanted outside the uterus, it results in ectopic pregnancy.

**13. Draw labelled sketch of spermatozoan?****14. What is inhibin? State its functions?**

- ❖ Sertoli cells in the stratified epithelium of seminiferous tubule secretes 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 anti microbial agent.
- ❖ It has less lactose, no fat.
- ❖ It has proteins, vitamin-A, minerals.

**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 gametes.
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.?**

- i) It is microscopic, non-cleidoic and alecithal
- ii) It's cytoplasm is called Ooplasm.
- iii) Ooplasm contain large nucleus – germinal vesicle.
- iv) Ovum consists of vitelline membrane, corona radiate, and zona pellucida coats.
- v) Between the vitelline membrane and zona pellucida is a narrow space – perivitelline space.

**2. Explain the various phase of the menstrual cycle.?**

- ❖ It occurs in every 28/29 days. It is from puberty to menopause.

**Menstrual phase (3-5 days)**

- ❖ Progesterone, Oestrogen level decreases.
- ❖ So uterine endometrial lining and the blood vessels break.
- ❖ Menstrual flow occurs.

**Follicular phase (5-14 days)**

- ❖ Endometrium regenerates, follicular development is stimulated.
- ❖ Oestrogen is secreted by the follicle cells.

**Ovulatory phase (about 14th day)**

- ❖ LH and FSH attain peak level.
- ❖ LH induces the rupture of graafian follicle.
- ❖ Ovum is released from Ovary into peritoneal cavity.

**Luteal Phase or Secretory Phase:(15-28 days)**

- ❖ Remaining part of graafian follicle becomes corpus luteum, it secrete progesterone.
- ❖ After fertilization, progesterone helps in implantation of ovum.
- ❖ During pregnancy all events of Menstrual cycle stop.
- ❖ Absence of fertilization corpus leuteum degenerates, leaves scar tissue corpus albicans.

## Lesson 3: REPRODUCTIVE HEALTH

**ONE MARK QUESTIONS:**

1. HIV is a \_\_\_\_\_ pathogen.
2. Candiiasis is a \_\_\_\_\_ fungal STI
3. Trichomoniasis is a \_\_\_\_\_ protozoan STI
4. Which disease will be treated with antibiotics - **Gonorrhoea, syphilis**
5. **Match it & find the correct option:**
  - i. Copper Releasing IUDS - Multiload-375
  - ii. Hormone Releasing IUDS - LNG-20
  - iii. Non-medicated IUDS - Lippes loop
  - iv. Oral Contraceptives - Saheli.
6. Ovulation occurs at about the **14<sup>th</sup> day** of the menstrual cycle.

7. Ovum Survived for about - **2 days**
8. Sperm remains alive for about **72 hours/3 days** in the female reproductive tract.
9. An unreliable form of birth control is- **lactational amenorrhoea**
10. During the lactation period which hormone prevent the menstrual cycle **prolactin**
11. Condoms are made of -----(**Polyurethane, Latex and Lambskin**)
12. Condoms are safeguards the user from **STD and conception.**
13. Oral contraceptive-pills are used to prevent ovulation by inhibiting the – **FSH and LH hormone.**
14. Saheli, contraceptive pills contain a non steroid preparation called—**Centchroman.**
15. Untreated STIs are –**Viral STIs**
16. Cervical cancer is caused by---**HPV(Human papilloma virus.**
17. The human zygote upto-----cell stage gets implanted in Uterus— **8 blastomere.**
18. Amniocentesis is generally performed between the **15<sup>th</sup> and 20<sup>th</sup> weeks** of pregnancy.
19. which instrument issue to monitor the foetal heart-rate-**foetoscope**
20. The average foetal – heart rate is between -**120 and 160 beats per miuate**
21. Breast –cancer can be detected by the instrument known as **Mammogram**
22. Antisterility- vitamin- **vitamin-E**
23. World population day is observed on **july-11<sup>th</sup>**
24. World AIDS day-**1<sup>st</sup> December**
25. International diseases are - **syphilis and gonorrhoea**

### **TWO MARK QUESTIONS:-**

#### **1. What are the Bacterial STDs/STIs?**

- a) Gonorrhoea
- b) Syphilis
- c) Chlamydiasis
- d) Lymphogranuloma venerum.

#### **2. Name the viral STI ?**

Genital herpes, genital warts, hepatitis –B and AIDS.

#### **3. What are the functions of contraceptive-pills.?**

To prevent the secretion of FSH and LH and prevents ovulation.

#### **4. Causes of cervical cancer?**

Having multiple sexual partners ,prolonged use of contraceptive pills.

#### **5. Mention the screening techniques to detect the cervical cancer?**

PAP-smear diagnosis

HPV-test

#### **6. Define- Azoospermia?**

The absence of spermatozoa in the ejaculate semen on atleast two occasions.

**7. What are the diagnostic methods for breast-cancer?**

- ❖ Mammograms are done for woman above the age of 40 yrs.
- ❖ Ultrasound of the breast aids in early diagnosis of breast-cancer for young girls and woman below 40 yrs.

**8. Define the term Mayer-Rokitansky syndrome?**

- ❖ All woman are born with ovaries but some donot have functional uterus.
- ❖ This condition is called mayar-Rokitansky syndrome.

**9. Write about the Preventive measures of STD's?**

- a) Avoid sex with unknown Partners/multiple partner.
- b) Use Condoms.
- c) In case of doubts, consult a doctor for diagnosis and get complete treatment.

**10. Differentiate foeticide and infanticide.**

**Foeticide:**

Aborting the female in the mother's womb.

**Infanticide:**

Killing the female child after her birth.

**11. Expand the following:**

- (a) ZI FT - Zygote Intra Fallopiian Transfer  
 (b) ICSI - Intra Cytoplasmic sperm Injection

**12. Importance of POCSO Act?**

- ❖ Prevention of Children from Sexual offences.
- ❖ Prevention of Sexual harassment at work place for male and female.

**THREE MARK QUESTIONS:-**

**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 where by 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 in to the urethra.	It prevents the fertilization.
Both vas deferens are cut and tied up.	A small portion of both fallopiian tubes are cut and tied up.

**FIVE MARK QUESTION – ANSWER:****1. What are the Major tasks carried out under RCH (Reproductive & Child Health Care) Programmes?**

- To build a healthy – society.
- Introducing sex – education in schools.
- Educating about the available birth control methods and family planning norms.
- Creating awareness about care for pregnant women, post natal care and the importance of breast feeding.
- Encouraging to improve the birth control methods.

**2. What are the causes of Infertility?**

- Tumours formed in the reproductive organs.
- Malformation of the cervix, fallopian tubes.
- Heavy use of alcohol, tobacco, marijuana.
- Long – term stress and damages in menstrual cycle.
- Aging.
- Low body fat or anorexia in women
- Tight clothing in men.
- Undescended testes.
- Female ,may develop antibodies against her partner's sperm.
- Auto immune response to own sperm.

**3. How the STI's get transmitted?**

- Sexual contracts with multiple partners.
- BY sharing of infusion needles.
- By sharing surgical instrument with infected people.
- Blood- transfusion from infected person's.
- Infected mother to baby.

**4. How to prevent the cervical cancer?**

- By vaccinating the girls aged 9 -13 years with HPV- Vaccination.
- Healthy diet and Modification in Life- Style.
- Avoiding tobacco usage.
- Preventing early – marriages.
- Practicing Monogamy.
- Regular exercise

**5. What are the Barrier methods of Contraceptive?****(a) Chemical barriers :**

The Chemical agents that inactivate the sperms in the vagina.  
Ex: Foaming tablets, jellies and creams.

**(b) Mechanical Barriers :**

- In male condoms are used to cover the penis, in female condoms are 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 in the uterus through the vagina.
- It has a success rate of 95% to 99%
- IUDs increase phagocytosis of sperm within the uterus.

**6. What is Assisted Reproductive Technology Explain any two methods. (ART)**

A collection of procedures, Handling of gametes or embryos 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 ova 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 QUESTIONS:**

1. The inheritance of multiple alleles are called as - **Multipleallelism**
2. Who discovered two kinds of antigen called antigen A and antigen B on the surface of RBCs of human blood? - **Karl Landsteiner**
3. Who discovered blood group AB? - **Von De castelle and Sturli**
4. Which number of chromosome are concerned with the determination of blood group in any person? - **Chromosome-9**
5. Genes for blood group AB together are, - **Co dominant**
6. How many phenotypes are possible in blood groups - **Four**
7. Rh- factor was first found in, - **Rhesus Monkey**
8. The term Rh factor refers to, - **Immunogenic D antigen**
9. XX-XO type of sex determination is seen in of,  
a) Bugs    b) Cockroach    c) Grasshopper    d) All the above
10. Which have one barr body? – **XXY –males**
11. Which one has no barr body? – **XO female.**
12. When normal visioned man marries a colourblind women?  
a) All sons will be normal visioned    b) All daughter will be colourblind  
c) All sons will be colour blind    d) All children will be colourblind.

13. Which substance to arrest cell division at metaphase stage in mitosis? - **Colchicine**
14. Which disease characterised by severe mental retardation, light pigmentation, **Huntingtons chorea**
15. Trisomic condition of chromosome-21 result in - **Downs syndrome**
16. Symptoms of Trisomy-13 result in, **Malformation of the brain and internal organs.**
17. Klinefelters syndrome is characterized by a karyotype of, - **XXY**

**TWO – MARK QUESTIONS/ANSWER :**

**1. What is heplodiploidy?**

- In this system the sex is determined by the number of sets of chromosome it receives.
- In honey bee Fertilized egg developed into female (Queen/Worker)
- Un fertilized egg by parthenogenesis develop into male.
- Male have haploid number of chromosome, whereas female have diploid set of chromosome.
- So the name haplodiploidy for this type of sex determination

**2. Distinguish between heterogametic and homogametic sex determination?**

<b>Heterogametic</b>	<b>Homogametic</b>
In male produces two types of gametes	Female produces only one type of gametes
sex chromosomes X,Y are heteromorphic.	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 XChromosome.
- 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?**

When three or more allele of a genes that control a particular trait occupy the same locus, on the homologous chromosome of an Organism are called multiple alleles.

**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.

**THREE MARK QUESTIONS:****1. 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 trait when they inherit 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 heterogametic male?**

- In XX – XY type of sex determination, the male individual can produce two 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 heterogametic female?**

- 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.) Gypsomoth, 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. (R1, R2, RO, RZ, r, r1, r11, ry)
- Rh+ will have a genotypes carry a dominant “R” allele (R1, R2, RO, RZ)
- Rh- will have a genotypes carry a double recessive genotypes (rr, r1r1, r11r11, ryry)

**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 28th and 34th 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.

**FIVE 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 1st 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 (R1, R2, RO, RZ, r, r1, r11, ry) at a single

- Rh+ve will have a dominat “R allele (R1, R2, RO, RZ) Rh-verr, rr1, rr11, rry

**2. Explain the genetic basics of ABO blood groups in man?**

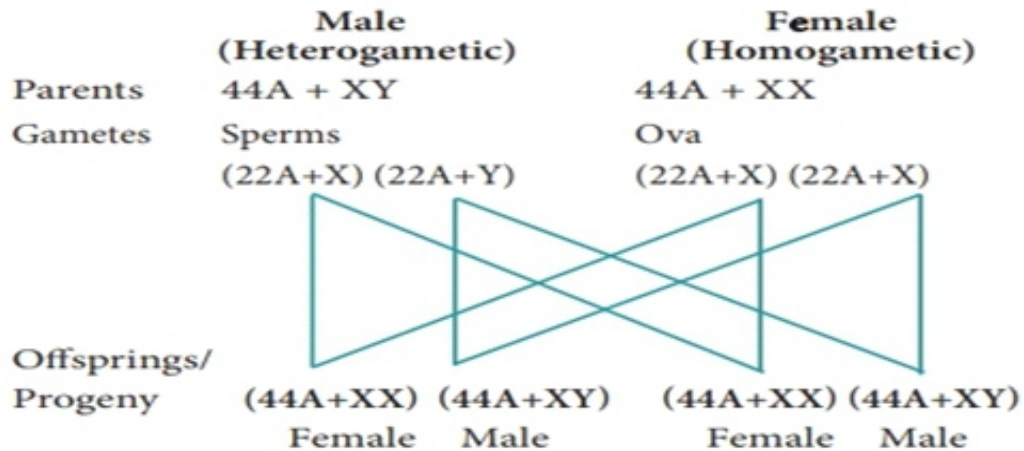
- The determination of Blood Group of any person is determined by three autosomal alleles present in the 9th chromosome.
- The gene controlling Blood Group is labelled as L or I.
- The gene I exists in three allelic forms namely IA, IB, IO
- From the crosses of different combination it is evident that IA = IB



Genotype	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
$I^A I^B$	Type - AB	AB	No Antibody
$I^O I^O$	Type - O	Noantigen	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 sperm 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 Symptoms are,	1.It is due to 13 trisomy Symptoms are,
I) Severe mental retardation ii) CNS is under developed iii) Increased separation between the eyes iv) Flattened nose v) Ears are malformed. vi) Mouth is constantly open vii) Tongue protrudes	I) Multiple and severe body mal-formation ii) Profound mental deficiency iii) Small head with small eyes iv) cleft palate v) Malformation of the brain and internal organs.

## 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 44AA + XXY Karyotype	Kary Result 44AA + XO
Persons with 47 Chromosome	With 45 Chromosomes
They are sterile males tall	They are sterile female
Obese with long limbs	Low low stature
Have feeble breast	Under developed breast
Under developed genitalia	Rudimentary gonads without menstruation during puberty
High pitched voice	Webbed neck

## 5. MOLECULAR GENETICS

ONE MARK QUESTIONS:

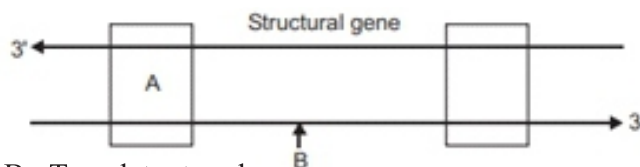
- One gene - **one enzyme hypothesis, George Beadle and Edward Tatum**
- Which one is not true?  
(a) A=T, G=C    (b) A=G, T-C    (c) C=G, A    (d) G=C,
- Who proposed the central dogma in molecular biology? - **Francis Crick**
- UAA, UAG and UGA codons are designated codons are known as, - **Non sense codons or stop codon**
- Wobble hypothesis was proposed by, - **Crick**
- Human genome is said to have approximately, - **3x10<sup>9</sup>bp**
- Which enable formation of all the required enzymes needed for lactose metabolism?  
**Lac mRNA**
- Largest gene in human is, - **Dystrophin**
- A mRNA molecule is produced by,  
a) Replication    b) Transcription  
c) Duplication    d) Translation

TWO 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

## 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 <sup>1</sup> →5 <sup>1</sup> polarity	It is a coding strand with 5 <sup>1</sup> →3 <sup>1</sup> 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 nitrogen 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 genepore**

DNA of prokaryotes, circular and lack of chromatin is called genepore

**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 "TATABox's"

**THREE 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 :**

- A gene that codes for the aminoacids
- It is the gene mRNA required by the cell

**(ii) Regulatory gene :**

- It is present in between promoter site and operator site. 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  $3 \times 10^9$  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.**FIVE 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, being dystrophic 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**

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

**ONE MARK QUESTION ANSWER:**

1. Haldane coined the term, - **Prebiotic soup**
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 molecules such as DNA, RNA and protein across generations? - **Molecular evolution**
5. Jean Baptiste de Lamarck was the first to postulate the theory of evolution in his famous book,
  - a) The origin of species by natural selection
  - b) Philosophie Zoologique
  - c) Both (a) and (b)
  - d) The origin of species by Natural selection
6. Charles Darwin explained the theory of evolution in his book, **The origin of species by Natural selection**
7. Sudden and large variations were responsible for the origin of new species by, **Hugo de Varies**
8. Industrial melanism is clear through, **Natural selection**
9. Industrial melanism is a classical case natural selection exhibited by, **Peppered moth**
10. "Golden age of Reptiles", - **Mesozoic**
11. Select Hardy Weinberg equation,  $(p+q)^2=p^2+2pq+q^2$
12. Modern man belongs to which period? - **Quaternary**
13. The Neanderthal man had the brain capacity of - **1400cc**

### 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?**  
( Large colloidal particles that precipitate out in aqueous medium) Are the first pre-cells which gradually transformed into living cells.
7. **What are vestigial organs?**  
Structures that are of no use to the possessor and are not necessary for their existence are called vestigial organs.  
Ex. Human appendix, wisdom teeth, mammalian in man.
8. **What are called connecting link and give an example?**  
The Organisms which possess the characters of two different groups are called connecting link (&) Peripatus 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.  
Ex. 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?**

Australopithecus ----- Homo erectus ----- Homosapiens----- Ramapithecus -----  
Homo habilis

**Ans : Ramapithecus ----- Australopithecus ----- Homo habilis ----- Homo erectus --  
----- Homo sapiens**

**THREE 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

**3. 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.



**4. Write about the Lamarck's theory of evolutions?**

The two principles of Lamarckism are,

➤ **The theory of use and dis-use theory.**

Organs used often are .will increase in size and not used will degenerate.

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 of an organism are called acquired characters and these are then inherited.

**5. 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 20th too born with tail.

➤ And proved that changes in the somatoplasm will not be transferred to the next generation.

➤ But changes in the germ plasm will be inherited.

➤ This theory is called Germplasm theory

**6. 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 tusks in extinct mammoths, oversized antlers in extinct Irish deer etc.

**7. 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 soot 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.

**FIVE MARK QUESTION:****1. How does Hardy-Weinberg's expression ( $P^2 + 2pq + q^2$ ) 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.
 
$$(p+q)^2 = P^2 + 2pq + q^2 \quad (P=0.3) \quad (q=0.7)$$

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

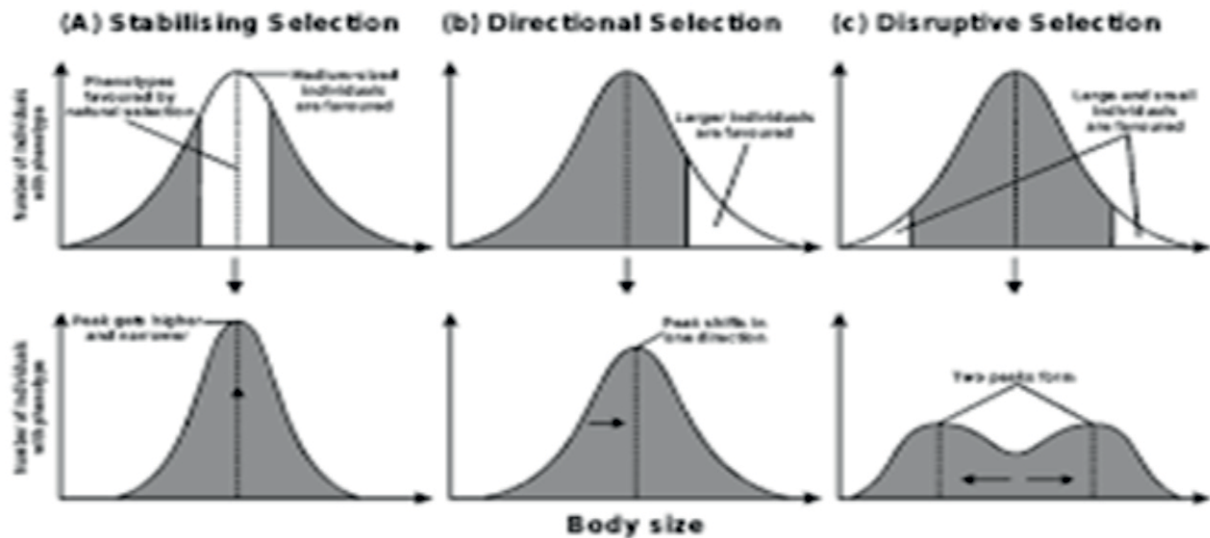
$$2pq = (0.3)(0.7) = 0.42 \quad =42\% Aa$$

$$q^2 = (0.7)^2 = 0.49 \quad =49\% aa$$
- Hence the beetle population appears to be in equilibrium
- **Factors affecting the Hardy-Weinberg law.**

(1) Gene flow    (2) Mutation    (3) Crossing over    (4) natural selection

**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 other end of phenotypic distribution	In this organisms of both the extreme phenotype are selected.
Extreme individuals from both the ends eliminated	Peaks shift in one direction	Average phenotypic individuals are eliminate
No speciation phenotypic stability in maintained.	Size differences between male and female,	This in rare form of selection leads to the formation of 2 or more different species
Sparrow that escape storm		Darwin finches beak size in relation to seed size
Peaks gets higher and narrow	Female show more weight and directional selection	



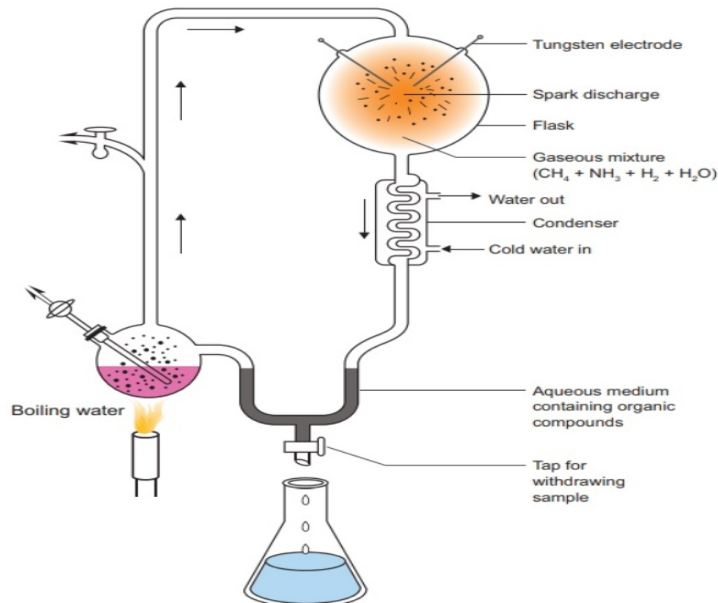
### 3. Explain Darwin's theory of Natural selection?

- 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 as follows
  1. **Over Production:** All organism increase their population in large number.  
E.g. Salmon fish produces about 28 million eggs.
  2. **Struggle for existence:** Organisms struggle for food space and for mate. As these become a limiting factor.
  3. **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.
  4. **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.

## Urey and Miller's Experiment



## LESSON- 7, HUMAN HEALTH AND DISEASES & Lesson-8, IMMUNOLOGY

### ONE MARK QUESTION-ANSWER:

1. A 30 year old woman has bloody diarrhoea for the past 14 hours, which one of the following organisms is likely to cause this illness? - **Shigella dysenteriae**
2. Exo-erythrocytic schizogony of plasmodium takes place in, - **Liver**
3. The sporozoites of Plasmodium vivax are formed from - **Oocysts**
4. Amphetamines are stimulants of the CNS, whereas barbiturates are - **CNS depressants**
5. Choose the correctly matched pair - **Amphetamines-Stimulant**
6. The Athlete's foot disease in human is caused by - **Fungi**
7. Cirrhosis of liver is caused by chronic intake of - **Alcohol**
8. The sporozoite of the malarial parasite is present in - **Saliva of infected female Anopheles mosquito.**
9. Where do the following events in the life cycle of plasmodium take 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, - **Antigen binding site on variable regions.**
11. Allergy involves, - **IgE**
12. Spread of cancerous cells to distant sites is termed as, - **Metastasis**
13. AIDS-virus has, - **Single stranded RNA**
14. B-cells that produce and release large amounts of antibody are called, - **Plasma cells**

**TWO MARKS AND THREE MARKS:****1. What are interferons? Mention their role?**

Interferons induce antiviral state in the uninfected cells.

**2. List out chemical alarm signals produced during inflammation**

Serotonin, Histamine, Prostaglandins.

**3. A person is infected with HIV? How will you diagnose for AIDS?**

ELISA – Presence of HIV antibodies  
Western blot test – confirmation test

**4. Why do you think it is not possible to produce a vaccine against the common cold?**

- Common cold is caused by more than 150 different strains of Rhinovirus.
- RNA genome often gets mutated.

**5. Differentiate Paratope and Epitope?**

- Epitope – Active part of Antigen  
Binds with the antibody
- Paratope – active part of Antibody  
Binds with the antigen.

**6. Define Anaphylaxis?**

- Is the classical immediate hypersensitivity reaction.
- It is a sudden, systematic, severe and immediate hypersensitivity reaction occurring as a result of rapid generalized mast-cell degranulation.

**7. What are antibodies?**

- Immunoglobulin protein molecules.
- Synthesized on attack of body by antigen.
- Types of Immunoglobulin/ antibody, (GMMADE)
- **IgG**
- **IgM**
- **IgA**
- **IgD**
- **IgE**

**8. Widal test?**

Typhoid fever can be confirmed by Widal test.

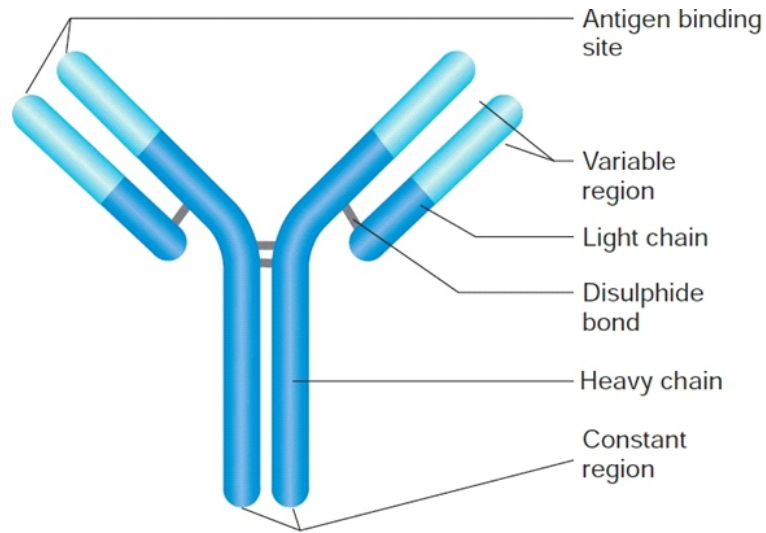
**9. A patient was hospitalized with fever and chills. Merozoites were observed in her blood. What is your diagnosis?**

- She suffers from malaria
- Haemozoin toxin and erythrocyte debris into the blood stream.

**FIVE MARK QUESTIONS:****1. Prevention of Malaria?**

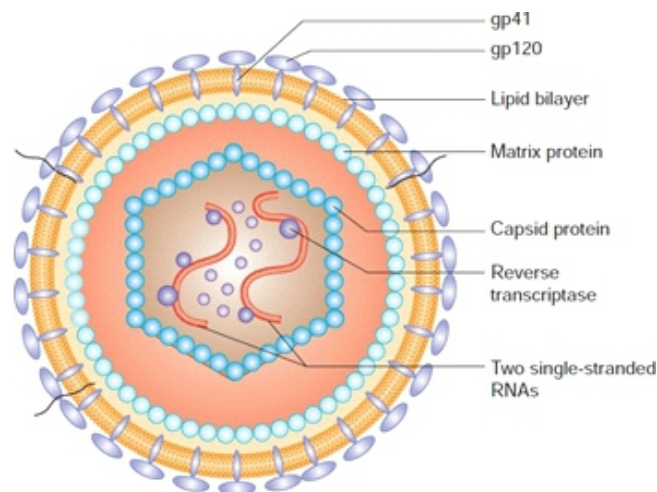
- |   |                                      |
|---|--------------------------------------|
| a. Use of mosquito bed nets                 | d. Use <i>Bacillus thuringiensis</i> |
| b. Prevent mosquito bites                   | e. Close drainage                    |
| c. Cultivate Gambusia fish in water bodies. |                                      |

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 together by di sulphide(s-s)body

### 1. Structure of HIV?



- The human immune deficiency virus
- Genus lentivirus.
- Spherical in shape.
- 100-120nm in diameter
- Glycoprotein (gp)spikes termed gp41 and gp120
- Two large single stranded RNA.
- Attached to the RNA are molecules of reverse transcriptase.

## 4. Differences between active and passive immunity?

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

## LESSON- 9, MICROBES IN HUMAN WELFARE

### ONE MARK QUESTIONS:

- Which of the following micro organism is used for production of citric acid in industries?  
**Ans : Aspergillus niger**
- Which of the following pair is correctly matched for the product produced by them?  
**Ans : Saccharomyces cerevisiae – Ethanol**
- The most common substrate used in distilleries for the production of ethanol is **Ans : Molasses**
- Cyclosporin–A is an immunosuppressive drug produced from,  
**Ans : Trichoderma polysporum**
- The purpose of biological treatment of waste water is to **Ans : Reduce BOD**
- The gases produced in anaerobic sludge digesters are,  
**Ans : Methane, hydrogen sulphide and CO<sub>2</sub>**
- Archaeobacteria** are likely to be present in deep sea water.
- Aspergillus niger** microorganism is used for production of citric acid in industries.
- The most common substrate used in distilleries for the production of ethanol is **Molasses**.
- Cyclosporin –A is an immunosuppressive drug produced from - **Trichoderma polysporum**.
- CO<sub>2</sub> is not released during **Lactate fermentation**.

### TWO- MARK QUESTION ANSWER :

- 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.
- What is Pasteur Effect?**
  - The Pasteur Effect is the inhibiting effect of oxygen on the fermentation process.
- 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.
- What is bioremediation?**
  - The use of naturally occurring or genetically engineered microorganisms to reduce or degrade pollutants is called bioremediation.

**THREE- MARK QUESTION 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.
- It has full potential as an effective antibody.
- Penicillin is produced by the fungi *penicillium notatum* and *penicillium chrysogenum*.

**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 mis use and over use of antibiotics.
- 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 *Zymomonas mobilis* and *sarcina ventriculi* also involved in ethanol production.

**5. Give any two bio active molecules produced by microbes and state their uses?****Cyclosporine – A:**

- It is a bioactive molecule
- It is produced from the fungus *Trichoderma polysporum*
- **Uses :**
- Used in organ transplantation

Ø It is also used for its anti-inflammatory, Anti-fungal and anti-parasitic properties.

**Statins:**

- It is a bio active molecule
- It is produced by the yeast *monascus purpureus*
- **Uses :**
- Used to lower blood cholesterol levels.
- PET Plastics are no more environmental hazardous substances. why?  
*deonella sakaiensis* 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.



**FIVE - 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) Ideonella sakaiensis                      (c) Microbial fuel cells

**(a) Brewer's Yeast :**

- “Saccharomyces cerevisiae” commonly called brewer's Yeast.
- It is used fermenting malted cereals and fruit juices to produce various alcoholic beverages.

**(b) Ideonella sakaiensis :**

- 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 de aminase deficiency maybe cured permanently by **Introducing bone marrow cells producing ADA or SCID into embryo at an early stage of development.**
6. **Chain A has -21 and Chain B has 30 amino acids** are arranged in the two chain of Insulin.

7. PCR proceeds in three distinct 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 whole organism are called **Sub unit recombinant 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 lactalbumin.
  - 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 and Germ 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 – toti potency&Plari potency ?**
  - Toti potency – Is the ability of a single cell to divide and produce all of the differentiated cells in an organism.
  - Pluri poency – Refers to a stem cells that has the potential to differentiates into any of the three germ layers –ectoderm, endoderm and mesoderm

**4. What is patents?**

- The legal gut 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 this 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:**

- This alters evolution which will have an impact on population and the ecosystem.
- The process is difficult 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.
- 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 Phototropism - **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/ Manganese.**
22. Coriolis effect is – **rotation of the planet.**
23. Osmo Regulators – **Birds, Mammals.**
24. Osmo Conformers – **Fishes.**
25. Example for mimicry – **Stick insect.**
26. Example for camouflage (or) Crypsis.— **Chameleon**
27. Lowest rainfall – **Atacama Desert**
28. Cold desert in India – **Ladakh.**

### **TWO MARK QUESTION-ANSWER:**

#### **1. What is 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. Q10 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 and Stenotherms- Differentiate?**

<b>Eurytherms</b>	<b>Stenotherms</b>
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.**

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

**10.**

<b>Regulator</b>	<b>Conformer</b>
Organisms maintain constant body condition E.g. Birds, mammals	Organisms cannot maintain constant internal condition. E.g. Fisher, Frogs

**11.**

<b>Hibernation</b>	<b>Aestivation</b>
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 habitat 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.**

<b>Natality Birth rate (B)</b>	<b>Mortality – Death rate (D)</b>
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 ⇌ Fresh water E.g. Salmon	Freshwater ⇌ Sea E.g. Eel

16.

J-shaped growth curve	S-shaped growth curve
Population increased fastly and stop due to suddenly appeared limiting factors. E.g. Insects in rainy season	Population increased slowly at first then more fastly more fastly and 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.
- Living for many organisms.
- Water storage and purification.
- 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
- At 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 through 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 rheoreceptors.
- 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 from crocodile tooth (+)

➤ **Commensalism**

In this association one benefits and other 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 – **In situ 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 destruction is - **Amphibians.**
9. Organism which extinct by mass extinction - **90% shallow water marine invertebrates.**
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 animal 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 Pigeon, 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 Sanctuaries.**
28. 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 O2 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 man made habitat.
Save the animals from predators	Conservation of rare plants/ animals in place outside their nature home.
E.g. National parks wild life sanctuaries.	E.g. Botanical gardens zoological parks.

**6. Endangered organisms/Endangered species**

A Species that identified as to become extent of.  
E.g. Monarch butterfly, Panda

**7. Reason for 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 down new 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 launched this project tiger.

It covers 50 tiger conservation.

E.g. Jim Corbett National Park.

**14. Sacred grove or sacred woods.**

Any grove or 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
Indira 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.

**(a) 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.

**(b) WWF**

- World wildlife Fund
- Non-governmental organisation 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 pollutants 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-diethylmetatolumide) 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 – **Chloro fluoro carbon**

20. PAN – Peroxyacetylene 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 – Peroxy Acetylene 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. Block the sunlight
3. Cause bad taste and odour.

#### **5. Effect on earth – without greenhouse effect**

- Green house gases 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<sub>2</sub>, Methane, Nitrous oxide, CFC, O<sub>3</sub>

**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 – Sundarlal Bahuguna
- 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<sub>2</sub>, SO<sub>2</sub> + rain water 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, Reuse, 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

1. **Limit generation** : Limiting the generation of waste is the first and most important.
2. **Dilute and disperse** : for wastes having low radioactivity, dilution and dispersion are adopted.
3. **Delay and decay** : is important strategy because the radioactivity in nuclear reactors and accelerators is very short lived.
4. **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<sub>2</sub> 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

### 1. 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.,

## 2. 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.