

**HIGHER SECONDARY – SECOND YEAR**

**ZOOLOGY**

***QUESTION BANK***

***(Based On New Syllabus 2019)***

**CHENNAI DISTRICT**

## CHAPTER – 1

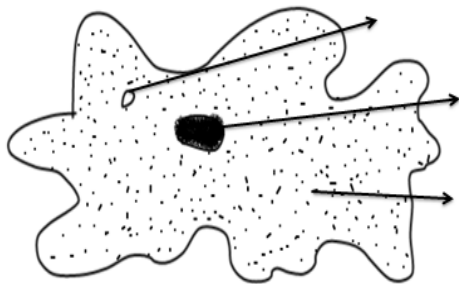
### REPRODUCTION IN ORGANISMS

#### Two Marks Questions:

1. Why is reproduction significant for organisms ? (1)
2. Define sporulation ? (4)
3. What is plasmotomy ? (4)
4. List the difference between schizogony and sporogony. (3)
5. Define apolysis ? (6)
6. How apolysis is significant in the life cycle of tapeworm. (6)
7. Write the technique for cultivation of sponges ? (6)
8. Why sexual reproduction is more important than asexual reproduction. (2)
9. Define paedogamy ? (8)
10. Gemmules can withstand adverse conditions? Justify.(8)

#### Three Marks Questions:

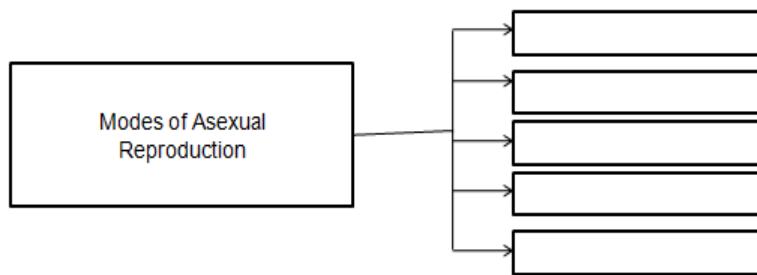
1. All modes of reproduction have basic features ? List out ? (8)
2. Difference between asexual and sexual type of reproduction ? (1)
3. What is binary fission ? mention its type ? (2)
4. Give reason for this statement ?  
“Multiple Fission is called as Repeated Fission” (3)
5. Define Regeneration and its types ? (6)
6. Label the following diagram ? (2)
  - i. Amoeba



7. Compare and contrast how amoeba reproduces during favourable and unfavourable conditions ? (4)
8. What is endogenous and exogenous budding ? (5)
9. Hydra maintain their polarity in regeneration ? Justify (6)
10. List down the contrast features of the following
  - a) External and Internal Fertilization (6)
  - b) Isogamy and Anisogamy (7)
11. Is conjugation in prokaryotes a mode of reproduction? Justify with suitable answer ? (7)
12. Give three examples each:- Seasonal and continuous breeders ? (8)
13. In which organism both sexual reproduction and parthenogenesis takes place ? How ? (8)
14. Differentiate between transverse and longitudinal Binary Fission ? (2)

### **Five Marks Questions :**

1. Complete the column :  
(A)



- (B) Write about the special type of Transverse fission in Aurelia?
2. Draw and label the diagram of Gemmule in sponges (5)
3. Give an account on Epimorphosis and its two types ? (5)
4. Explain the three phases of life ? (7)
5. Define parthenogenesis and mention its types in details. (7 & 8)
6. Development of embryo inside the mother without the supply of food by mother ? How it is possible ? Explain with example? (9)
7. A) In Natural parthenogenesis modes of Reproduction any one sex of the individual is produced ? Discuss ? (8)  
B) Define Amphitoky? (8)
8. Match the following and choose the correct one
- |                              |                  |
|------------------------------|------------------|
| A Transverse Binary Fusion   | (i) Aurelia      |
| B Multiple Fission(Repeated) | (ii) Hydra       |
| C Spore Formation            | (iii) Paramecium |
| D Strobilation               | (iv) Amoeba      |
| E Budding                    | (v) Vorticella   |
- a) A (iii) B(i) C(v) D(iv) E(ii)  
b) A (i) B(ii) C(iii) D(iv) E(v)  
c) A (iii) B(v) C(iv) D(i) E(ii)  
d) A (ii) B (i) C(iv) D(v) E(iii)

### **Higher Order Thinking [ Hot ]**

1. Why higher organisms resorted to sexual reproduction in spite of their complexity ?
- It enables them to tide over unfavourable conditions.
  - Induces genetic variation and adaptability for better survival.
2. Aquatic organisms produce large number of gametes during external fertilization? Why?  
Gametes and off springs become easily vulnerable to predatory attacks and chances of survival is always under threat.

3. Why development of young ones in viviparous advantageous than oviparous?

It is because, in oviparous young one developing inside the egg shell outside the mothers body are exposed to adverse environmental factors and predators.

4. Unicellular organisms which reproduce by binary fission are immortal. justify?

Unicellular organisms are immortal since they reproduce by binary fission which is a asexual during unfavourable and adverse conditions.

5. Why is the offspring formed by asexual reproduction referred as a clone?

Since asexual reproduction involves only one individual, the off springs show uniparental inheritance without any genetic variation and also identical as clones.

6. Give reasons for the following:

a) some organisms like honey bees are called parthenogenetic animals.

b) A male honey bee has 16 chromosomes. Where as its female has 32 chromosomes

Ans:

a) Honey bees are exhibiting in complete parthenogenesis where unfertilized eggs develops into male(drones) by parthenogenesis. Therefore called parthenogenesis animals.

b) Since male honeybees(drones) develop by Parthenogenetic involving only unfertilized eggs they are haploid having only half the number i.e. 16 chromosomes whereas queen (female) develops from fertilized eggs have diploid  $2n$  number of chromosomes i.e. 32 due to the fusion of gametes during sexual reproduction.

## **CHAPTER 2**

### **HUMAN REPRODUCTION**

#### **Two Marks Questions**

1. Why are scrotal sacs present outside the body in males? (14)
2. Distinguish between primary and secondary sex organs (18,14)
3. Name the accessory sex glands in males and write their functions (15)
4. Explain the terms:
  - a. Menarche (234/21)
  - b. Menopause (23)
  - c. Scrotum (14)
  - d. Hymen (17)
  - e. Gestation period (25)
  - f. Epididymis (15)
  - g. Ectopic pregnancy (24)
  - h. Clitoris (17)
  - i. Amenorrhea (36)
5. What is capacitation (23)
6. Why is oxytocin called rapid birth hormone? (26)
7. What forms corpus luteum? What is its function? (21)
8. What is corona radiata ? Where it is found? (20)
9. Name the process of rupture by Graafian follicle and the subsequent release of the egg from the ovary. Which phase of menstrual cycle it happens? (21)
10. Name the sperm lysin. Which organelle secretes it? What is its function? (19)
11. Name few materials used to manage menstruation. (23)
12. Write a note on oogenesis. (20)
13. What is Corpus Albicans? (22)
14. How is polyspermy prevented? (23)
15. What is placenta? Give its function (25)
16. How does parturition take place? (26)
17. Write the functions of reproductive system. (13)
18. What is rete testis? (15)
19. What is mesovarium? (16)
20. What is Colostrum? (26)
21. Name the accessory structures of female reproductive system. (16)
22. How do Leydig cells help in spermatogenesis? (14)
23. Define crypto Chism (15)
24. What is inhibin? Mention its function. (14)
25. What is tunica albuginea? (14,16)
26. What is vesiculase? What is its function? (16)
27. Write the composition of seminal plasma (15)
28. Mention the functions of seminal fluid. (16)
29. Name the following:
  - a. The enlarged end of the penis is called \_\_\_\_\_
  - b. The loose fold of skin which covers the male external genitalia is \_\_\_\_\_

30. Name the location
  - a. Fundus (17)
  - b. Fimbriae (16)
31. What is areola? What is its function? Where are they found? (17)
32. What are Bartholin's glands/ greater vestibular glands? Mention their role. (17)
33. The size of the breast does not have an influence on the efficiency of lactation- explain (18)
34. a. What is meant by spermiation? (19)  
 b. Time taken to complete the process of spermatogenesis is \_\_\_\_\_ days
35. What is mitochondrial spiral/ nebenkern? Where is it located? (19)
36. Explain the terms:
  - a. Amenorrhoea (30)
  - b. Dysmenorrhoea
  - c. Menorrhagia
  - d. Oligomenorrhoea
37. What do you know about ectopic pregnancy? Why does it happen? (24)
38. What is trophoblast? (23)
39. What are chorionic villi? (25)
40. What do you know about Braxter-Hicks' contraction? (26)
41. Absence of hymen cannot be considered as an indicator of a woman's virginity. Justify (17)
42. What is Ferguson reflux or neurohormonal reflex? (26)
43. Mention the role played by relaxin (26)
44. What is after birth? Is it safe to be retained in the body after parturition? If not what are the consequences of retaining it in the body? (26)
45. What is "let-down" reflex? How does it happen? (26)
46. "mother loses her beauty if she feeds her child with breast milk". Is this statement true or false?
47. Why do the rural babies look brighter and intelligent than the urban babies? (27)
48. Name the two organisations which stress their importance of breast feeding (28)
49. When is 'world breast feeding week' celebrated? Name the various projects initiated by government of tamilnadu to highlight the importance of breast feeding to infants (28)

### **Three Marks Questions**

1. Give a brief account of the changes in the following organs in different phase of the menstrual cycle. (21-22)
  - a. Ovaries
  - b. Uterus
  - c. Fallopian tube
2. Describe the following
  - a. Foetal membrane (25)
  - b. Placenta (25)
  - c. Parturition (26)
3. Distinguish between proliferative and secretory phases of menstrual cycle. (21)
4. Mention the layers of uterus and specify their nature (16)

5. Write a few lines about human ovum (20)
6. What is LH surge? What is its role? (21)
7. Why do we call luteal phase as secretory phase? (22)
8. Name 4 extra embryonic membranes and explain their role in the development of an embryo with a diagram. (25)
9. Name the hormones secreted by the placenta and explain their role (25)
10. How are vasa efferentia and vasa deferentia different from each other? (15)
11. Write a short note on seminal vesicles (15)
12. Mother's milk is considered very essential for the new born infant. Why? (26)
13. How does placenta act as an endocrine gland during pregnancy? (25)
14. State the levels of ovarian and pituitary hormones during menstrual cycle (21)
15. Why is follicular phase in the menstrual cycle also called as proliferative phase? (21)
16. Enumerate the events that occur in a Graafian follicle at the time of ovulation and lactation. (21)
17. Write short notes on lactation. (26)
18. Draw a diagram of a mature human sperm. Label any three parts and write their functions. (19-20)
19. What is the function of Leydig cells in male reproductive system? (14)
20. Sertoli cells secrete androgen binding protein and inhibin. Explain their functions. (14)
21. How does cortical granules prevent the entry of additional sperms into ovum? (14)
22. How does the production of progesterone increase in the secretory phase? (21)
23. How does implantation take place in the uterine wall? (23)
24. Explain the role of different hormones during parturition (26)
25. How are the germ layers formed in the human embryo? (25)

### **Five Marks Questions**

1. Explain the structure and function of the testes of human male with relevant diagram.(14)
2. What is spermatogenesis? Write down the steps. (18)
3. What is menstrual cycle? Write down the process (21)
4. What is foetal membrane? Give their names and mention the functions of each with diagram.(21)
5. With the help of a labelled diagram describe the reproductive system of female. (16)
6. With the help of labelled diagram, describe the reproductive system of male. (14)
7. Describe the hormonal control of menstrual cycle in humans (21)
8. How does oogenesis take place? Describe the stages of process (18)
9. Describe the ultra-structure of human sperm and human ovum. (20-21)
10. Explain the major reproductive events in human beings. (13)

## CHAPTER - 3

### REPRODUCTIVE HEALTH

#### Two Marks Questions

1. What do you understand about the term 'Reproductive health' as per WHO? (34)
2. 'Protection of reproductive system from infectious diseases is necessary' why? (34)
3. List out any four Health care programmes taken up at the national level by the Govt. of India? (35)
4. Differentiate 'Female foeticide from Female infanticide. (35)
5. Name the Laws and Acts of Govt. of India in creating secured environment for both male and females. (35)
6. In what way 'Saheli;' is advantageous from other contraceptives pills? (37)
7. Name some copper releasing IUDS. (37)
8. Write the role of copper ions in preventing pregnancy.(37)
9. Name the various temporary birth control methods. (36)
10. Match the following : (36)

#### I

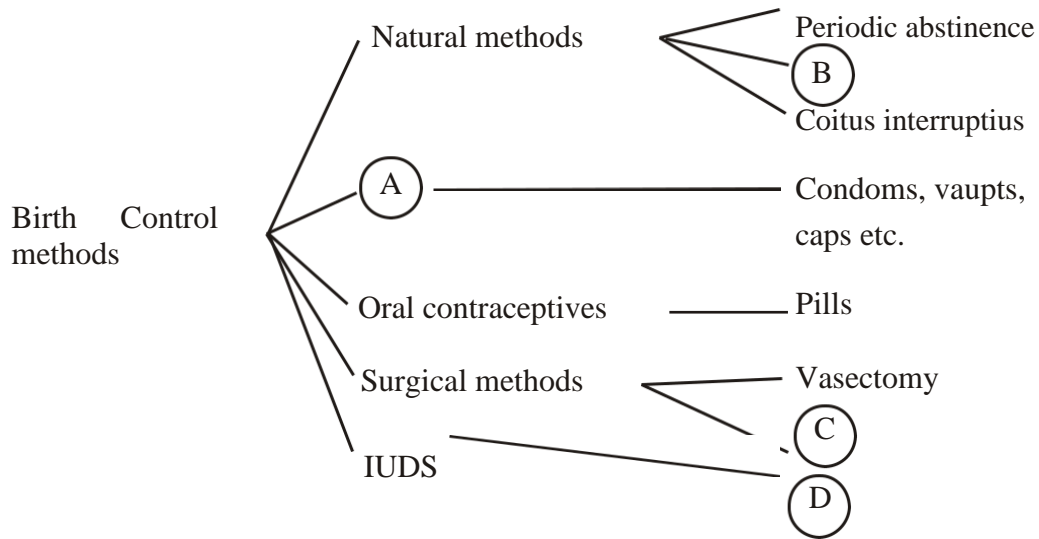
#### II

- |                          |   |   |
|--------------------------|---|---|
| 1. Coitus interruptus    | - | Not to have coitus for a defined period.  |
| 2. Continuous abstinence | - | Prevents the ovaries from releasing the ova.  |
| 3. Periodic abstinence   | - | Male partner withdraws his penis before ejaculation.  |
| 4. Hormonal barrier      | - | Ovulation occurs at about 14th day of Menstrual cycle. Coitus to be avoided during that time. |
- 
11. What are called intrauterine systems? Mention its use. (37)
  12. Mention the types of permanent birth control methods which are commonly adapted? (37)
  13. Differentiate tubectomy from vasectomy. (37)
  14. What are the conditions under which Govt. of India legalized MTP. (38)
  15. What are the psychological consequences that the females will get affected after MTP :  
Ans : Guilt, anxiety, depression, thoughts of suicide, alcohol or drug abuse, eating disorders, avoid seeing pregnant women and children and flash backs to the abortion itself.
  16. Expand the following :  
(41) (35) (37) (43)  
ART, POCSO ACT, IUD, NACO



17. In India the female and male child sex ratio is 919 : 1000. What is the reason for this discrimination? How can it be corrected? (35)
18. Write down the main aims of PCPNDT Act. (35)
19. What are the factors which enhance population explosion? The present population growth in India is alarming. How can it be controlled? (36)
20. Name some Chemical Barriers. (36)
21. What are the materials used for making condoms? (37)
22. Differentiate Genital warts from Genital herpes. (39)
23. Undescended testes in males may leads to infertility why? (40&15)
24. Name some STIs caused by Bacteria.(39)
25. Write the causative agent of the following diseases. (39&40)
  - a) Gonorrhoea
  - b) Chlamydiais
  - c) Cervical Cancer
  - d) Hepatitis - B
26. What is called 'Mayer - Rokitansky' syndrome. (41)
27. Defines the term 'ART' (41)
28. 'Ultra sound scanning' performed for the detection of foetal disorders causes discomforts. Do you think it is a safe procedure for a pregnant women? (42)
29. Which is considered as the latest ultrasound technology? why? (42)
30. What is CVS? (43)
31. What is Foetoscope. (43)
32. What is the purpose of using doppler device during labour? (43)
33. Name two International STI diseases. (43)
34. Correct the following statements.
  - a) The STD Chlamydiasis is caused by Treponema paladium.
  - b) Condoms are made of plastic or stainless steel.
  - c) Surgical sterilization in women is called vasectomy.
  - d) Saheli contains synthetic progestorone and FSH and it is a steroidal Preparation called centchroman.

35. Select the correct term from the bracket and complete to given branching tree.



(Barriers, Lactational amenorrhoea, CuT and Tubectomy.

36. Correct the following statements.

- Transfer of an ovum collected from donor into the fallopian tube is called ZIFT.
- Transferring of an embryo with more than 8 blastomeres into uterus is called GIFT.
- Multi load 375 is a hormone releasing IUD.

37. Expand the following ?

(41)

(42)

a) ZIFT

b) ICSI

38. What do you mean by the term coitus - interruptus? (36)

39. What are the characters of a good contraceptive. (36)

40. What are non-medicated IUDS? (37)

41. How can the STIs be treated? (38)

42. Define Azoospermia. (42)

### **Three Marks Questions:**

- Mention the name of the technique used to detect the chromosomal abnormalities of the foetus? Mention its other significant aspect of this technique. Is it to be banned? Why? (35)
- A Gynaecologist accepted to perform MTP against law after identification of the sex of the foetus as female. Mention the act that would prevent her from doing so. (35)
- How lactation prevents conception? What is that condition called? (36)
- What are the barriers that a female has to follow to prevent pregnancy temporarily? (37)

5. What are called STIs? How they are transmitted? (37)
6. What is MTP? Has it got its impact over the fertility of women? (37 & 38)
7. How can the STDs be prevented? (38)
8. How the STD - Syphilis shows serious symptom in three different stages?(39)
9. Write any three common causes of infertility in females. (40&41)
10. 'Hormone - releasing IUD's prevent unwanted pregnancies" How? (37)
11. What is meant by surgical sterilisation method? (37)
12. Write in detail about the STIs caused by fungus and protozoan? (40)
13. Write the preventive measures against cervical cancer. (40)
14. What are the various techniques adopted under 'ART' to improve the chances of pregnancy in infertile couples. (41)
15. Name the technique adopted to treat in infertile men with low sperm count(1). How is it done among infertile couples (2). (41)
16. What is IVF? Under what circumstances is it carried out? (41)
17. What is ZIFT? (41)
18. What is cryopreservation? Write the advantages of it? (41)
19. Make a difference in the following techniques ZIFT and GIFT. (41&42)
20. What a surrogacy? When is it required? (42)
21. What does ICSI stands for? Describe the technique. (42)
22. How oral contraceptives acts as a barrier to prevent pregnancies. (37)
23. List out the various microbes and the STI diseases caused by them. (39)
24. The procedure of GIFT involves the transfer of female gametes into fallopian tube, can gametes be transferred to the uterus to achieve the same result? Explain?(39)
25. What is called Micro-testicular sperm extraction. (42)

### **FIVE MARKS QUESTIONS**

1. a) What are the common symptoms of cervical cancer (2). (40)  
a. What are the risk factors of getting cervical Cancer (2).  
b. How can it be diagnosed? (1).
2. Explain the procedure involved in 'Test tube baby' technique. (41)
3. List out the general reasons for infertility in both sexes. (40&41)

4. Healthy reproduction, legally checked birth control measures and proper family planning programmes are essential for the survival of mankind. Justify.
5. What are the various strategies to be implemented in India to attain total reproductive health.(36)
6. Write about the various natural methods of contraception in detail. (36)
7. Give an account on the various types of IUDS. (37)
8. What are the various ways of detecting the foetal disorders during early pregnancy write short note of each. (42&43)

## **CHAPTER - 4**

### **PRINCIPLES OF INHERITANCE AND VARIATION**

#### **BIO-ZOOLOGY**

##### **Two Marks Questions**

1. What is Genetics ? (47)
2. What is sex linked inheritance ? (53, 54)
3. What are Holandric Genes ? (53, 54)
4. Three or more alleles occupy the same locus on the homologous chromosome. Name the type of inheritance and causes of it. (47)
5.  $I^0I^0$  is called as 'Null allele'. Why ? (48)
6. What are secretors ? (48)
7. Pick up the gene types that produce Rh positive blood group. (49)

**Cdd; CDE; cDE; Cde**

**$Rr^1$ ;  $r^1r$ ;  $R^zR^o$  ;  $r^{11}r^y$**

8. Write the genotypes of heterogametic female with examples. (51)
9. Write the genotypes of heterogametic male with example. (50)
10. Give examples for X-linked gene inheritance. (53, 55)
11. What is the criss-cross pattern of Inheritance?

It is a pattern of inheritance in which a gene is transmitted from mother to son or father to daughter

12. What causes Chromosomal abnormalities ? (57,58)
13. What is called Cooley's anaemia ? (56,57)
14. Mention the type of sex determination in the following organisms : (50-51)
  - a. Gypsy moth
  - b. Drosophila
  - c. Cockroach
  - d. Butterflies

15. what is aneuploidy ? (57,58)
16. what is called syndrome? (57,58)
17. How do the alleles  $I^A$ ,  $I^B$  and  $I^o$  differ in their functions? (48)
18. What is Idiogram? (54,56)

19. What is pedigree analysis? (55,57)
20. What is 'Y' linked inheritance? Give example. (54,56)
21. As per Lyon's hypothesis, how many Barr bodies may present in the following chromosomal pairs? (52,54)
  - i) XXY ii) XXX iii) XY iv) XX
22. What is called mendelian disorder ? Give an example. (56,57)

### **Three Marks Questions**

1. Enumerate the characteristics of 'XO' female (human beings) and name the syndrome. (57,59)
2. State the effects when following happens: (49)
  - When  $RH^+$  man receives the  $RH^-$  blood
  - When  $RH^-$  man receives the  $RH^+$  blood
3. Compare: Universal donor; Universal recipient. (48)
4. What is Erythro blastosis foetalis ?/ Explain Haemolytic disease of the new born. (49-50)
5. What are the measures taken by the doctors to prevent Erythroblastosis foetalis ? (50)
6. Explain different regions of 'Y' Chromosome ? (52)
7. What is Kin Selection ? (53,54)
8. Why do we say Hemophilia follows the criss cross pattern of inheritance? (53,55)
9. Why are the sex linked recessive characters more common in the male human beings? (53,54)
10. What is DOPA ? Write its significance. (56,58)
11. What is Down's syndrome (Trisomy-21) ? Enumerate its symptoms. (57,58)
12. What is Patau's Syndrome (Trisomy-13) ? List its symptoms. (57,58)
13. Differentiate Klinefelters Syndrome from Turners Syndrome. (57,59)
14. What is Lyonisation ? (52,54)
15. Explain the genetic basis of ABO blood grouping in man. (49)
16. What are the applications of Karyotyping ? (55,56)
17. Give two examples for the following disorders in Human being: (56-57, 57-59)

- i. Mendelian Disorders
- ii. Autosomal aneuploidy
- iii. Allosomal abnormalities

**18.** What is Rh factor? Explain its role in blood grouping? (49)

**19.** What is Thalassemia ? How is it classified ? (56,57)

**20.** What causes Huntington's Chorea ? What are the symptoms of it ? (56,58)

### **Five Marks Questions**

**1.** Explain Haplodiploidy in honey bees. (53,54)

**2.** Explain the inheritance of colour blindness between normal visioned woman and colour blind man. (54,55)

**3.** Explain the inheritance of colour blindness between normal visioned man and colour blind woman. (54,55)

**4.** What is Phenylketonuria ? why is it caused ? (56,58)

**5.** What is karyotyping? How is it prepared? (54-55,56)

**6.** Explain sex determination in human beings. (52)

**7.** What is Barr body? How does Barr body involve in dosage compensation in the organisms? 52,54

# **ZOOLOGY**

## **Two Marks Questions**

1. What is called extra chromosomal inheritance? (59)
2. Extra nuclear / chromosomal inheritance does not follow the mendelian results. Why ? (59)
3. What are Gynandromorphs ? (54)
4. What is negative eugenics? (62)
5. What are the two types of Paramecium aurelia? (60)
6. What is Eugenics ? (62)
7. Differentiate super male drosophila from super female drosophila (53)

## **Three Marks Questions**

1. How can we eliminate the defective germplasm from the society ? (62)
2. What is Euthenics? How can it be achieved? (62)
3. Find the sex index and the pheno types of Drosophila when a triploid female is crossed with a Diploid male. (53)
4. The inheritance of the extra chromosomal genes is found to exhibit maternal influence. How? (59)
5. What is Euphenics? Give its significance. (62)

## **Five Marks Questions**

1. Comment on the method of Eugenics. (62)
2. List some Eugenic measures to increase the desirable traits / What are the positive Eugenic attempts taken to increase the desirable traits ? (62)
3. Establish a coiling pattern in the snail Limnea peregra, when dextral female(Dd) is crossed with sinistral male(dd). (59-60)
4. Explain the inheritance of kappa particles in paramecium. (59-60)
5. What is sex index? Explain how the sex is determined in the Drosophila ? (52)

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## **CHAPTER-5**

### **MOLECULAR GENETICS**

#### **Two Marks Questions**

1. Define a gene. Who first explained the concept of gene? (64)
2. What did Hershey and Chase prove in their experiment on T<sub>2</sub> Bacteriophage?(67)
3. What are the three components of a nucleotide subunit? (67)
4. Write about “One-gene-One Enzym” hypothesis. (64)
5. What is Nucleoside? (67)
6. Give Reason:  
Acidic Property of D.N.A and R.N.A (67)
7. Write a note on “Phosphodiester bond” (5’-3’) (68)
8. Complete the following: (68)  
Based on the x-ray diffraction analysis of \_\_\_\_\_ and \_\_\_\_\_ the double helix model for DNA was proposed by \_\_\_\_\_ and \_\_\_\_\_ in 1953.
9. What was the observation of Erwin Chargaff? (68)
10. Name four properties that a molecule should have to act as a genetic material. (69)
11. Give Reason:  
DNA is more stable than RNA (69)
12. What is called Genophore? (70)
13. What is called Nucleosome? (70)
14. What is known as Ribozyme? (70)
15. Differentiate between Euchromatin and Heterochromatin. (72)
16. How do “Origin of replication” differ in Prokaryotes and Eukaryotes? (72)
17. Which is known as “Kornberg” Enzyme and Mention its function. (72)
18. What are the Enzymes involved in the mechanism of DNA replication? (72)
19. Write a note on “Y shaped Replication Fork” (73)
20. When does DNA Replication take place?  
What are the three hypothesis proposed for DNA Replication? (70)
21. What is Transcription? (73)

22. What is called Pribnow (TATA box) box? (73)
23. In DNA, if acoding strand has this sequence in a transcription unit, what would be in mRNA strand? (74)  

$$\overline{\text{A T G C A T C G A C G T A C G T T}} \text{ ( coding strand )}$$
24. Differentiate MonocistronicmRNA from PolycistronicmRNA. (74)
25. Write the stop codon's triplet. (77)
26. What do you mean by “Degenerate code”? (77)
27. Why do we call “tRNA” as an adapter molecule? (79)
28. What is called Aminoacylation? (79)
29. Complete the sequence. (73)  
DNA -----?----- RNA -----?----- protein.
30. What is meant by genetic code? Who developed it? (76)
31. What is called translation in Genetics? (80)
32. Which is known as Shine – Dalgarno sequence? (S-D sequence) (81)
33. What is known as ORF? (Open Reading Frame) (81)
34. What is DNA finger printing? (87)
35. What are called “VNTR”? (87)
36. What is called “reading frame”? (80)
37. The sequence of coding strand of the DNA in a transcription unit is given:-  

$$3' \text{ G C C A T G G T A C T } 5'$$
  - (i) Write the complementary strand for it.
  - (ii) Make mRNA strand from it.
38. Give reason:  
The entire DNA strand does not open in one go.
39. Name the methods by which DNA fragments aresequenced (65)
40. Name the two major approaches of the HGP? (Human Genome Project) (65)

### **Three Marks Questions**

1. What is known as Transformation phenomenon? (65)
2. Draw a simple diagram of nucleosome and label it. (69)
3. Differentiate “Leading strand” from “Lagging strand” (72)
4. Draw a schematic sketch of mechanism of Replication. (72)
5. How do 5’ end of DNA differ from its 3’ end? (68)
6. State key differences between DNA and RNA (68)
7. How do you measure the length of DNA double helix in a cell? (69)
8. What is the importance of Wobble Hypothesis? (69)
9. “Genetic code is universal” Justify. (77)
10. Write down the steps involved in charging tRNA.(77)
11. What are the uses of DNA finger printing? (88)
12. What is meant by Satellite DNA? (87)  
How is it classified? (87)
13. What is SNIPS? Why is it so important to study? (86)
14. A Single base pair change (mutation) in a gene may alter the phenotype of a character. Justify the statement with suitable example. (78)
15. Enumerate the salient features of Human genome project (HGP). (85)

### **Five Marks Questions**

1. What are the Properties of the Gene? (64)
2. Describe the semiconservative method of DNA replication. (71)
3. Explain four important properties of a genetic material. (68)
4. Explain the process of transcription in Eukaryotes with diagram. (76)
5. Enumerate the salient features of genetic code. (77)
6. Explain the regulation of gene expression using ‘Lac Operon model’ with diagram. (84)
7. What is Translation? How is it initiated? Explain with the help of diagram. (81)
8. Describe the steps involved in DNA fingerprinting technique. (87)

9. Write about the process of Transcription in Prokaryotes with the help of diagram. (74, 75)
10. What are the two major approaches in methodologies of the Human Genome Project? (85)

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## **CHAPTER 6**

### **EVOLUTION**

#### **Two Marks Questions**

1. What is germ plasm theory? (100)
2. Define bottle neck effect. (105)
3. What do you know about founder principle? (105)
4. What is industrial melanism? (102)
5. How did Lamarck account for the long fore legs and neck of giraffe? (100)
6. What are the differences between convergent and divergent evolution? (98)
7. What are coacervates? (94)
8. Explain the terms:
  - a. Phenotypic plasticity (234)
  - b. Absolute dating. (96)
9. What is petrification? (97)
10. Mention the difference between Neanderthal humans and homosapiens. (107)
11. Write the characteristic features of 'cro-magnon'. (107)
12. Name the sub classes of mammals ( 96)
13. Name the basic factors involved in the process of organic evolution. (102)
14. Write any 2 salient features of mutation theory (102)
15. Name 4 neoDarwinians or the supporter of NeoDarwinism. (101)
16. Name 4 NeoLamarckians. (100)
17. What are molecular clocks? (100)
18. Define molecular evolution. (100)
19. Mention 4 objections to Darwinism (101)
20. Define theory of inheritance of acquired characters. (100)
21. Population in Hardy Weinberg is not evolving. How? (106)
22. What are atavistic organs? Give an example (99)
23. What are coprolites? How is it used as a paleontological evidence? (98)
24. Why do we call Mesozoic era as golden age of reptiles? (95)
25. Define the theory of biogenesis (94)
26. What is pre- biotic soup. (94)

#### **Three Marks Questions**

1. Distinguish between homologous and analogous organs. Give examples of homologous and analogous organs found in humans. (98)
2. What is vestigial organ? Give some examples of vestigial organs. State their significance. (99)
3. What do you understand by:
  - a. Actual remains (97)
  - b. Divergent evolution (98)
4. Define fossilization. (97)

5. What are connecting links? Explain why do we consider the below mentioned organisms as connecting links. (99)
  - a. Euglena
  - b. Peripatus
  - c. Archaeopteryx
  - d. Ornithorhynchus (duck bill platypus)
6. Explain biogenetic law with suitable example. (99)
7. Define theory of spontaneous generation. (94)
8. What are homologous organs? How does homology of organs serve as evidence for evolution? (98)
9. Define genetic drift. How does it produce founder effect and genetic bottleneck? (105)
10. Mention the two major groups of selection. (104)
11. Thorn of bougainvillea and tendrils of Pisum represent homology? How? (98)
12. What do you know about centrifugal selection? (104)
13. What causes change in allele frequencies within a population? (103)
14. What do you know about artificial selection? Give reasons. (103)
15. What were the views regarding the origin of new species by Devis, Lamarck and Darwin?(102)
16. How does prokaryotes and eukaryotes evolve? (96)
17. Name the methods to calculate the age of fossils. Mention the types (96)
18. What is cenozoic era? Mention the epochs? (96)
19. Mention the differences between 'Probiotics and Liposomes'. (96)
20. What made the ancestors of Monera and Protista to evolve different methods of food procurement. Specify the types. (96)

### **Five Marks Questions**

1. What are the similarities of vertebrate embryos that support the concept of evolution? (99)
2. Explain evolution by Anthropogenic sources. How will you explain this with industrial melanism? (102)
3. How did Urey and Miller explain the synthesis of organic compounds by Abiogenetic method. (96-97)
4. Darwin finches and Australian marsupial are the best examples for adaptive radiation. Justify and explain. (103)
5. Explain Hardy Weinberg's assumptions. (106)
6. Explain modern synthetic theory. (102)

**CHAPTER 7**  
**HUMAN HEALTH AND DISEASES**

**Two Marks Questions**

1. How can we define health? (111)
2. Introduce the microbe 'Virus' with its special characters ( 112)
3. Write the causative agents of the following diseases. ( 113)
  - a. a) Diphtheria                      c) Tetanus
  - b. b) Cholera                         d) Typhoid
4. Match the following :- ( 113,114)

I		II
1. Typoid fever	-	Lungs
2. Common Cold	-	Droplet infection
3. Tuberculosis	-	Widal Test
4. Chicken pox	-	Rhino Viruses
5. Complete the following :-( 113,114)

1. Bacillary dysentery	-	.....
2. ....	-	Severe diarrhoea and dehydration
3. Peumonia	-	.....
4. ....	-	Enlargement of the parotid glands
6. What is called "Zoonotic Virus"? Give example (115)
7. what are the symptoms of swine flu ? (115)
8. Write the causative agent of the following. (113& 115)
  - a. Bacillary dysentery
  - b. Amoebicdesentry
9. Draw and label the diagram of Entamoebahistolytica ( 115)
10. What are the various parts of the body that get affected due to Kala Azar ( 116)
11. Write the symptoms of Kala Azar ( 116)
12. What is called "signet ring stage" ( 116)
13. What is ookinete? ( 116)
14. Which situation results in malarial paroxysms ( 117)

15. Match the Correct pair. ( 118,119)

I		II
1. Ringworm of the feet	-	Roundworm
2. Ascariasis	-	RTS,S
3. Filariasis	-	Athlete's Foot
4. Malaria Vaccine	-	Elephantiasis of the limbs, Scrotum and mammary glands

16. In what way contaminated food, water and soil are responsible for transmitting ascariasis ( 119)

17. What are the symptoms of ascariasis? ( 119)

18. Define the term dermatomycosis (118)

19. What does 'personal hygiene' refers to? (119)

20. What do you mean by 'drugs abuse'? ( 134)

21. Name some of the abused drugs commonly used ( 134)

22. List out some of the medicines used to treat insomnia ( 135)

23. When will a person show 'withdrawal symptoms after dependence?' and write some of the withdrawal symptoms. ( 135)

24. Define depression ( 137)

### **Three Marks Questions**

1. "Health is wealth" is a famous saying.

What are the things needed to maintain good health ( 111)

2. "Malfunctioning of the mind or body" how can it be named? ( 111)

What else causes these changes?

3. Write the broad classification of diseases (1)

Differentiate them (2) ( 111,112)

4. What are pathogens? How are they transmitted?

Give examples. ( 111)

5. Name some diseases caused by bacteria ( 113)

6. Is it all the non-infectious diseases leads to death? What are the main causes for non\_infectious diseases? ( 112)

7. How can we define the term 'Bacterial resistance'? ( 112)



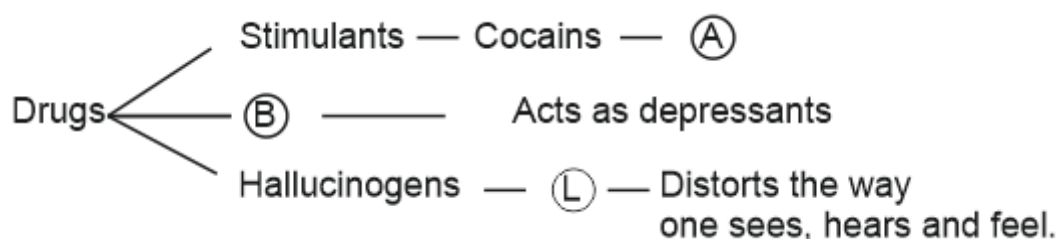
8. Classify viral diseases based on the organ of infection write examples for each. ( 112)
9. Write the vectors for the following protozoan parasites.
  - 1.Entamoebahistoltyica ( 113,114)
  2. Trypanosoma species ( 113,114)
  3. Plasmodium ( 113,114)
10. Name the three species of trypanosome (115)
11. Which causes sleeping sickness in human beings. ( 115,116)
12. List out the types of plasmodium Species (2)
 

Which species is highly fatal? (1) ( 116)
13. Write the three phases of plasmodium and its host of the respective phases. ( 117)
14. What is the causative agent for the disease "Ringworm" or Athelet foot? (1)
 

What are the symptoms of Athelet's foot? (2) ( 116)
15. How does advancement in science and technology help as a tool to control Various diseases? ( 119)
16. Match the following : ( 134)

(I)		(II)
1) Nicotine	-	Surgery
2) Heroin	-	Hempplant
3) Morphine	-	Tobacco
4) Cannabinoids	-	Poppy Plant
5) Cocaine	-	Hallucinations
6) Atropabelladonna	-	Extythroxyllum Coca

17. Complete the following :( 134)



18. How does Tobacco affect our health? ( 135)
19. What is the state called 'euphoria'? ( 135)

20. How will you define 'Mental health' and

Why it is so important? ( 136)

21. Classify the different types of Malaria

Write its causative agent and duration of Erythrocytic cycle (4) ( 117)

### **Five Mark Queetions**

1. Write shortly about the various perving measures of Malaria? ( 118)

2. Write short note on Filariasis (4) ( 119)

How can we conserve good health? ( 119)

3. Write about the life cycle of plasmodium in human. ( 116)

4. Write about any five viral diseases in detail. ( 114)

5. Define "addiction" Explain How the addictive behavior can be destructive to a person? ( 135)

6. How abuse of alcohol shows long term effect in a person? (4) ( 135)

Name the Commonly caused memory disorder by alcohol misuse (1) ( 135)

7. List out the perving measure of drug and alcohol abuse. ( 136)

8. What are the various signs of mental depression and how one can be relieved from this? ( 137)

9. What are the various lifestyle disorders in humans beings? ( 131)

10. How can we modify our life style to lead a health life? ( 131)

## **CHAPTER-8**

### **IMMUNOLOGY**

#### **Two Marks Questions**

1. What is Immunology? (119,136)
2. Define Immunity. (120,136)
3. What is called as Susceptibility? (120,)
4. Define Antigen. (120,137)
5. Define Innate immunity. (120,137)
6. Name the cells involved in phagocytosis. (120,137)
7. What is Hematopoiesis? (122,138)
8. What are lymphoid organs? (123,139)
9. Differentiate primary and secondary lymphoid organs. (123,140)
10. Name the lymphoid organ that encounters the antigen first when it enters the tissue spaces and the types of WBC packed in it. (124,141)
11. What does the swollen lymph node indicate? (125,142)
12. Differentiate Lymphocytes from other WBC. (126,143)
13. What is Cytokine? (126,143)
14. What is Phagocytosis? (126,143)
15. What are called Dendritic Cells? What are their types ? (126,143)
16. What is called Adjuvants? (127,144)
17. Differentiate Epitope and Paratope. (127,144)
18. What is Antigenicity? (127,144)
19. Define Antibodies. (127,144)
20. At what circumstances antibodies are secreted and name the cells involved in it. (126,143)
21. Classify Antibodies based on their physiological and biochemical properties. (127,144)
22. Compare Exogenous antigens with Endogenous antigens ? (127,144)
23. What are the three factors involved in the Antigen-Antibody reaction ? (128,145)
24. Name the chemical bonds involved in Antigen-Antibody Reaction. (128,145)
25. What is opsonization? (128,145)
26. What is Antitoxin? (129,146)
27. What is Vaccine? (129,146-147)
28. Classify first generation vaccine.(129,147)

29. Why do we administrate Vaccinations? (129,147)
30. Why do we give booster Vaccination doses? (129,147)
31. What is DPT vaccine? (130,147)
32. What is MMR vaccine? (130,147)
33. What is Toxoid Vaccination? (130,147)
34. What kind of vaccine does the hepatitis-B vaccine belong to? What does it contain?  
(130,147)
35. What is third generation Vaccine? (130,147)
36. Match their types of Vaccine with their developers:- (130,147)
 

i) Polio Vaccine	- Louis Pasteur
ii) Rabies Vaccine	- Calmette and Guerin
iii) BCG Vaccine	- Edward Jermes
iv) Smallpox	- DR. Jones Salk
37. When do we say the body is immunized? (130,147)
38. Give some symptoms of Allergic reactions. (131,148)
39. What are the Allergens? Give some Examples. (130,147)
40. Our natural defense mechanism couldn't fight against the HIV infection. Give reason.  
(131,148)
41. Write some routes of HIV transmission. (131,148)
42. Differentiate ELISA from Western blot test. (132,149)
43. What is autoimmunity? (132,149)
44. What are called autoantigens? (132,149)
45. Give examples for organ specific auto immune diseases. (132,149)
46. Give examples for non-organ specific auto immune diseases. (132,149)
47. Name the primary lymphoid organs. Write their significances. (124,141)
48. Name the secondary lymphoid organs. Write their significances. (124,141)
49. What is Neoplasm? (132,149)
50. What is Metastasis? (132,149)
51. What is contact Inhibition? (133,150)
52. Define Immunotherapy. Give its significance? (133,150)
53. What is the role of immunotherapy in cancer treatment? (133,150)
54. Name the various steps involved in cancer treatment. (133,150)
55. Why does our immune system find it difficult to control cancer cells? (133,150)
56. What causes tissue rejection? (127,144)

### **Three Marks Questions**

1. What are the fundamental features of the Immune system? (120,137)
2. What is called as Diapedesis? Name the chemicals involved in it. (120,137)
3. What is acquired Immunity? Mention their salient features? (121,138)
4. Differentiate cell mediated Immunity and Humoral Immunity. (121,138)
5. Differentiate Active and Passive Immunity. (122,139)
6. What are called Chemical mediators? How do they work? (120,137)
7. Secondary Immune response is also called boosters response. Why? (122-123,139)
8. Write a note on three different zones of Lymph node. (125,142)
9. Mention the types of WBC and their counts per mL. (125,142)
10. Write a note on B-cells. (126,143)
11. Classify T-cells and mention their functions? (126,143)
12. Differentiate Antigen and Haptens. (127,144)
13. On encountering an Antigen, how does the B-cells response to it?(126,143)
14. Write about the terminals of L and H chains. (128,145)
15. What is the basis for humoral Immunity? Explain the different stages of it. (128,145)
16. State the application of Antigen-Antibody reaction. (128,145)
17. What is Allergy? Mention the type of substances involved in it. (130,148)
18. Differentiate Vaccination from Immunization. (130,147)
19. What is Anaphylaxis? What makes it happens? (131,148)
20. Define Immunodeficiency. How can we classify it? (131,148)
21. Mention the causes for primary and secondary immune deficiency? (131,148)
22. How does HIV affect the immune system? (131,148)
23. Macrophages acts as a HIV factory. How? (132,149)
24. HIV infected person becomes immune deficient. Why? (132,149)
25. List some preventive measures of AIDS. (132,149)
26. Differentiate Immunodeficiency disease from Autoimmune disease. (131&132,148&149)
27. Differentiate normal and cancer cells. (132-133,149-150)
28. The primary function of the immune system is to “seek and destroy”the malignant cells.  
However, we get affected by cancer. Why? (133,150)

29. When will the cells undergo uncontrolled growth? (133)

Ans: when the regulatory mechanism of cell growth and differentiation is break down.  
Cell lose the property of contact inhibition. A lapse in “seek and destroy” surveillance of immune system.

30. Give some scope for immunology. (133,150)

31. Why is opsonization efficient in phagocytosis? (128-129,145-146)

### **Five Marks Questions**

1. Classify innate immunity and explain their mechanism. (120,137)
2. What is called acquired immunity? Explain the components of it. (121,138)
3. Differentiate primary immune response from secondary immune response. (122,139)
4. Write a note on Thymus. (123,140)
5. What is MALT? Explain its types. (125,142)
6. Describe the structure of Immunoglobulin. (127-128)
7. Explain the types of different Antigen-Antibody reactions. (128-129,145-146)
8. What is a Vaccine? How is it classified? (129-130)
9. Describe the structure of HIV with diagram. (131,148)
10. Explain the process of replication of retro virus after it gains entry into the human body. (131-132, 149)
11. Autoimmunity is a misdirected immunity. Justify. (132, 149)
12. Locate the following secondary lymphoid tissues and mention their role in immunity. (124, 141)
  - i. Peyer's patches
  - ii. Tonsils
  - iii. Spleen
  - iv. adenoids
13. Explain the role of lymphocytes in immunity. (126, 143)

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## **CHAPTER - 9(8)**

### **MICROBES IN HUMAN WELFARE**

#### **Two Mark Questions:**

1. Name any 2 bacteria (GEMS) involved in Bioremediation? (151)
2. UV radiation is an ideal disinfectant for waste water? why? (148)
3. “Curd is more nutritious than milk”? Justify (143)
4. Define: (a) Zymology (145) (b) Oenology (145)
5. Write any two uses of Cyclosporin-A. (146)
6. What are Methanogens? Give an example. (148)
7. When does Antibiotic resistance occur? (144)
8. What is BOD? (147)
9. What is SCP? (143)
10. Give Reason :
  - (a) Flavour in Yogurt (143)
  - (b) Large holes in Swiss Cheese (143)
11. Write an Example for:
  - (a) Bacteriostatic antibiotic (144)
  - (b) Bactericidal antibiotic (144)
12. Define:
  - (a) Antibiosis (144)
  - (b) Superbugs (144)
13. What are probiotics? Give two examples. (142)
14. Write about the beneficial effects of Lactic acid Bacteria. (LAB) (142)
15. Who derived the term “Antibiotic”? Name the antibiotic discovered by him. (143)
16. The first antibiotic was extracted from fungus and it is also referred as “queen of drugs”. (144)
  - (a) Who discovered this?
  - (b) Name the fungal species used.
17. Differentiate: Broad - Spectrum Antibiotics and Narrow - Spectrum Antibiotics. (144)
18. Write an Equation of Alcoholic Fermentation. (146)
19. Genetically engineered streptococci are used in medicine. How? (146)

20. Complete the following:

Organic acid	Microbes
(a) Acetic acid	.....?.....
(b).....?.....	Aspergillus niger
(c) Fumaric acid	.....?.....
(d) .....?.....	Clostridium butyricum

21. Statins is obtained from the yeast *Monascus purpureus*. Mention its medical role. (146)

22. What is activated Sludge? (147)

23. Write a brief note on The Ganga Action plan. (148)

24. Which group of insects can be controlled by using Delta - Endotoxin? (149)

25. Name two viruses used as Biocontrol agents which have narrow spectrum insecticidal applications. (150)

26. Rhizobium bacteria acts as Biofertilizer. Give reason. (150)

27. Name four Prokaryotic Blue green algae which can fix atmospheric Nitrogen. (150)

28. *Pseudomonas putida* - Pollution abatement - Comment. (151)

29. Name any two free living Nitrogen fixing bacteria. (150)

30. Complete the following

Identify the microbes used in Bioremediation (151)

(a) PET Plastics .....?..... Terephthalic acid and Ethylene glycol

(b) Toxic Trichloro Ethane .....?..... Non Toxic Ethane

(*Pestalotiopsis microspora*, *Ideonella sakaiensis*, *Dechloromonas aromatica*, *Dehalococcoides* species)

### **Three Mark Questions:**

1. Write any three key features of organic farming. (150)
2. Give an account on Microbial Fuel Cell (MFC). (148)
3. What are the key differences between the primary and secondary sewage treatment? (147)
4. Differentiate Prebiotics and Probiotics. (143)
5. How yogurt is produced? (143)
6. Name the scientists who were awarded the Nobel Prize in 1945 for the discovery of Penicillin. (144)
7. Write a short note on "Pathaneer". (145)



8. Write down the uses of the following Enzymes extracted from microbes for commercial productions. (146)

Enzymes	Uses
(a) Lipases	?
(b) Pectinase, Cellulase, Protease	?
(c) Rennet	?

9. Name the Act enforced by Government to conserve water body. Write any two important assignments of the Act. (148)
10. Write a note on Bioreactor. (143)
11. Name the fungus commonly called as Baker's Yeast. What are the uses of this Yeast? (145)
12. Write a note on Biogas (Gobar gas). (148)
13. What are biopesticides? Give some examples. (149)
14. Write about the insects resistant activity of *Bacillus thuringiensis*. (149)
15. What is Mycorrhiza? How does it enhance plant growth? (150)
16. Define Bioremediation. Write its types. (150)
17. What are Bioherbicides? Give example. (149)
18. What are Biofertilizers? Mention their role in agriculture. (150)
19. Mention the role of Cyanobacteria in promoting plant growth. (150)
20. Write a note on *Penicillium*. (144)

### **Five Mark Questions:**

1. Tabulate the microbes used for the production of organic acid and enzymes. (146)
2. Draw the flowchart for Sewage treatment Process. (147)
3. Explain about Biogas plant. (149)
4. Tabulate the role of microbes as a Biofertilizer - (150)
5. Differentiate between Aerobic and Anaerobic Microbes involved in Bioremediation (151)

### **Higher Order Thinking Skills (HOTS) Questions:**

1. A patient have undergone myocardial infarction recently.
  - (a) Name the substances that can be used to remove the clot from his blood vessels.
  - (b) Mention the microbes from which it is produced.

Ans: (a) Clotbuster, Streptokinase - to remove blood clot.

(b) Genetically engineered *Streptococci* bacteria.

2. National policy on Biofuel was approved by the Govt. of India in December 2009 and identified suitable oil seeds for the production of biodiesel .

(a) Name the suitable oil seeds for biodiesel productions.

(b) Write their beneficial effects on environment .

Ans: (a) Jatropha curcas, Pongamia Species

(b) Beneficial effects

Non- toxic, Biodegradable and produce lower level air pollutants.

3. Do you agree that microbes can be used as source of energy. If so, How?

Ans: Microbes are not the direct source of energy. But are used in production of bio fuels and organic matter under anaerobic conditions.

Ex: biogas, Bio alcohol, Biodiesel etc.

## **CHAPTER 10(9)**

### **APPLICATIONS OF BIOTECHNOLOGY**

#### **Two Marks Questions**

1. Why is insulin important? (156)
2. Nowadays, Insulin is produced by recombinant DNA technology to treat diabetic patients. How were they treated in early years? (156)
3. Why is it not advisable to administer “animal insulin” to a diabetic patient? (156)
4. Which was the first ever pharmaceutical product of recombinant DNA technology? Mention the trade name under which it was marketed? (156)
5. Many factors are required for normal blood clotting process
  - a) What causes Hemophilia? (158)
  - b) What is Hemophilia characterized by? (158)
6. Interferons are antiviral substances. How do they act against viruses? (158)
7. Is it possible to isolate interferon from blood? Why is it not practiced? Suggest a solution to overcome this issue (158)
8. The yeast *Saccharomyces cerevisiae* is more suitable for the production of Recombinant interferons than *E. Coli*. Give reason (158)
9. What are the therapeutic applications of interferon? (158)
10. Suggest a corrective therapy for a person born with a hereditary disease and define the same (159)
11. What are sub unit recombinant vaccines? (158)
12. What are attenuated recombinant vaccines? (158)
13. Name the two strategies involved in Gene therapy? (159, 161)
14. Differentiate gene Augmentation therapy and gene inhibition therapy. (161)
15. Differentiate somatic cell therapy and germ line therapy. (161)
16. “Stem cells exhibit cellular potency” Justify. (161)
17. “Stem cells are undifferentiated cells” Name the 2 main types of stem cells found in mammals. (161)
18. What is the source of Embryonic stem cells? State the most important application of Human stem cells. (161)
19. Differentiate Multipotency and Oligopotency (161)
20. Differentiate Totipotency and Unipotency (161)
21. Define Pluripotency (161)
22. SCID is an autosomal recessive metabolic disorder. How could it be cured permanently? (160)
23. Name the sources of stem cells. (162)
24. How are stem cells stored? (162)
25. Differentiate Amniotic cell banking and cord blood banking (162)
26. Molecular diagnostic techniques help in early detection of the disease. Name the techniques. (162)
27. Mention some diseases that could be detected by PCR. (164)
28. Several concerns are being raised in accepting genetically modified products. State some of them. (167)

### **Three Marks Questions**

1. What is Genetic Engineering? (155)
2. Define Recombinant DNA technology. (155)
3. Human insulin is synthesized by the B cells and islets of langerhans.  
What is it composed of? (156)
4. Name the first transgenic cow. How was it different from other cows? (157)
5. What are interferons? Classify them based on their structure. (158)
6. Diagrammatically represent the production of human growth hormone (157)
7. Name the different types of recombinant vaccines. How are they different from vaccines produced by conventional methods? (158)
8. What are edible vaccines? (158)  
Name some diseases for which they are produced. (158)
9. The immune response of the body is stimulated by a DNA molecule. How does a DNA vaccine act? (158, 159)
10. If you are a gene therapist, what would you ensure before carrying out a corrective procedure? (161)
11. Early detection of disease is not possible using conventional diagnostic methods. Give reasons (162)
12. ELISA is a biochemical procedure to detect the presence of specific antibodies or antigens in a given sample
  - a) Mention the kinds of ELISA.(163)
  - b) State its application (163)
13. What is polymerase chain reaction?  
List the steps involved. (163)
14. Explain how PCR technique is used to identify criminals. (164)
15. State any three uses of transgenesis (165)
16. Justify the role of animals as 'Bioreactors' (166)
17. "Cloning is unethical" Give reasons. (167)
18. Mention the advantages of cloning. (167)

### **Five Marks Questions**

1. In early days, insulin isolated and purified from the pancreas of pigs and cows were used to treat diabetes. Due to difference in structure, it caused allergic reaction. To solve this problem, insulin was produced using recombinant DNA technology. Explain this process. (156)
2. How is RGH produced using recombinant DNA technology? (157)
3. What are DNA vaccines? Explain. (158,159)
4. How can we treat a person suffering from Haemophilia? (159)
5. Explain the production of embryonic stem cells (161)
6. Write a note on adult stem cells. (161)
7. What are stem cell banks? (162)
8. Define gene therapy. Explain its types. (159)

### **Hot Questions:-**

1. Kary Mullis developed the PCR, an in vitro amplification technique for synthesizing multiple identical copies of DNA. How can the same technique be useful in clinical diagnosis?
2. Health care and pharmaceutical industries have been revolutionized by bio-technological proteins to treat diseases. How are bioreactors useful in treating various diseases in human?
3. Deficiency of human growth hormone (HGH) causes dwarfism using modern technique how would you help to treat growth disorders in children?
4. Vaccines are traditionally produced by culturing using chick embryo or continuous cell line culture. In the present day situation how are Vaccines produced using recombinant DNA technology?
5. The recombinant vaccine for hepatitis B (Hbs Ag) was the first synthetic vaccine launched in 1997 by USA. India is fourth in the world to develop indigenous hepatitis B vaccine. Diagrammatically explain the steps involved in the production of recombinant HB vaccine.

**CHAPTER 11(10)**  
**ORGANISMS & POPULATION**

**Two Marks Questions:-**

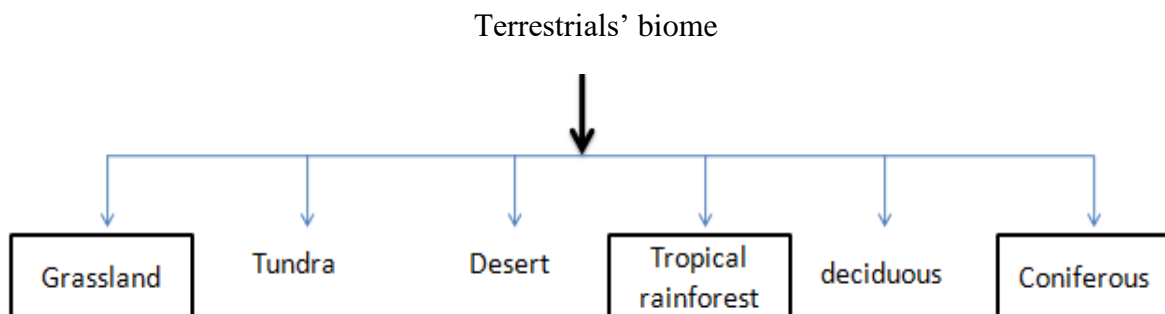
1. Define the following terms :- (171)
  - a) Ecology
  - b) Community
  - c) Biome
  - d) Ecosystem
  - e) Ecosphere
2. a) What is an environment? b) What are its biotic components? (172)
3. Define: a) Ecology b) Guilds c) Ecological equivalents (172)
4. What is the challenge to lives in aquatic media?(172)
5. Define: a) Vanthoff's rule
  - b) Bergmann's rule (173)
  - c) Allen's rule (173)
  - d) Jordan's rule (173)
6. Differentiate between Eurythermy and stenothermy? (174)
7. How Eurythermy is an evolutionary advantage? (174)
8. Differentiate permanent and temporary hard water? (175)
9. Define: a) Paedogenesis b) Porosity of soil c) Permeability of soil (176)
10. What is acclimatization? (176)
11. How do people adapt when they settle in higher attitudes? (176)
12. What are the major biomes of the earth? (178)
13. List down the important herbivores and carnivores of Tundra biome? (178)
14. Define: a) Diapause(183) b) Adaptation (183)
15. Give definition for the following: - (184)
  - a) Population
  - b) Population density

### Three Marks Questions:-

1. How camel withstand successfully in a Xerophytes habitat? (172)
2. Fill up the boxes based on the ecological niche in pond ecosystem? (172)

1. Catla	<input type="text"/>	Surface feeder
2. Rohu	<input type="text"/>	Column feeder
3. Mrigal	<input type="text"/>	Bottom feeder

3. What are the steps taken by organisms to adapt in care of extreme temperature? (174)
4. How light influences life in living organisms in an ecosystem? (174)
5. Differentiate between phototaxis and phototropism? (174)
6. What are the three major functions of soil? (175)
7. Define photo kinesis? (174)
8. What is Coriolis Effect? (176)
9. Differentiate between absolute and relative humidity? (176)
10. List the three characteristic features of a biome? (177)
11. What are three aquatic biomes of earth? (177)
12. Classify the terrestrial biomes of the earth and complete



13. List the important migratory herbivores and predators of Taiga biome? (177)

14. Mention the flora of alpine? (180)
15. What are the animals found in fauna of temperate forest? (181)
16. Define: - a) Conformers b) Ethology (183)
17. Differentiate between a) Hibernation and aestivation (183)
  - b) Natality and Mortality (185)
  - c) Emigration and immigration (186)
  - d) J shaped and S shaped growth curve (186 & 187)
18. Define the following:-
  - a) Biotic potential (187)
  - b) carrying capacity (187)
  - c) Environmental resistance (187)
19. List the behavioural adaptations of animals? (183)
20. Why birds migrate from Siberia to Vedanthangal? Give reasons? (183)

**Five Marks Questions:-**

1. "Cricket and grasshoppers live in same habitat manage without interfering each other's activities" Justify this statement with suitable reasons? (172)
2. What are essential properties of water? (175)
3. Compare and contrast the characters of Tundra and Taiga biome (178 , 179)
4. What are characters of grassland biome? List out in detail? (179)
5. Based on seasonal distribution of rainfall, classify the types of temperate forest? (181)
6. Tabulate the differences between hot and cold deserts (181 & 182)
7. List any five adaptations in aquatic animals? (184)
8. Difference between r selected and k selected species (187)
9. How do terrestrial animals adapt themselves? (184)
10. Give an account on population interaction? (188)



### **Higher Order Thinking (HOT) Questions**

1. Where would you expect more species biodiversity in tropics or in Polar Regions. Give reasons in support of your answer?

More biodiversity is found in the tropics. This is because tropical regions remain undisturbed from frequent glaciations as in Polar Regions. Also the tropics are seasonal and more constant.

2. Match the following based on their Adaptive methods during unfavourable extreme conditions

a)Snail	-	1.Diapauses	(d)
b)Seeds	-	2. Cyst	(f)
c)Bear	-	3. Spore	(e)
d)Zooplankton	-	4. Aestivation	(a)
e)Fungi	-	5. Dormancy	(b)
f) Bacteria	-	6. Hibernation	(c)

A)a (1) b(4) c(3) d(5) e(6) f(2)

B)a (1) b(5) c(4) d(2) e(3) f(6)

C)a (4) b(5) c(6) d(1) e(3) f(2)

D)a (4) b(6) c(1) d(5) e(2) f(3)

3. Name and explain the kind of interaction in the following:-

a) Head louse and humans b) Hermit crab and sea anemone.

a) This is a case of parasitism where louse is an ectoparasite. It derives nutrition and takes shelter in humans.

b) It is commensalism where one is benefited and the other species is neither benefited nor affected sea anemone is benefited as it get food and shelter, whereas crab does not.

4. Why is temperature considered to be the most relevant a biotic factor that influences the organism? Justify.

Because it affects the enzymatic activity that slows down the metabolic rate, behaviour, reproduction, development and even death in biosphere.

## **CHAPTER 12(11)**

### **BIO-DIVERSITY AND ITS CONSERVATION**

#### **Two Marks Questions**

1. Define 'Bio diversity'. (193)
2. What is called species richness?(194)
3. What is called the Taxonomic impediment? (195)
4. Name the hot spots of India. (204)
5. What are called protected areas? (206)
6. What are gene banks? (208)
7. Differentiate Insitu conservation from exsitu conservation. (208)
8. What is WWF? Mention its aim?(229)
9. Write a note on CITES. (229)
10. What do you know about offsite collections? (208, 229)
11. What is Biosphere Reserve (BR)?(207, 228)
12. What are called Sacred Groves? (208)
13. State the principle of the Stockholm Declaration, 1972. (205)
14. What is the indirect effect of human activities which results in the loss of biodiversity? (203)
15. Name the biogeographic zones of India. (198)
16. Write a note on Western Ghats. (198)
17. What are the three indices of biodiversity? (194)
18. What is called community diversity? (195)
19. Intensive agriculture may solve the problem of Food Security. However its possess threats to genetic diversity. Prove this statement. (223)

#### **Three Marks Questions**

1. Describe the different levels of biodiversity. (194)
2. We find nearly 1400 species of birds in Columbia, 105 species in New York, 50 species in Greenland, why do we have such variation in distribution of biodiversity in the globe? (196)
3. Enumerate the ecosystem services of biodiversity. (197)
4. What are the major threats to biodiversity due to human activities? Do you find any threats other than human activities? (200)
5. Habitat loss and fragmentation are the major causes for the loss of biodiversity. Prove this statement. (200, 201)
6. Exotic species invasion is the second major cause for the extinction of native species. Write your answer in support of this statement siting two suitable examples. (201)

7. Write short note on Hotspots. Do we have any of them in India? Name them. (204)
8. Name the organization working in the field of biodiversity conservation. Mention its location, mission, and function. (205)
9. What is called ex-situ conservation? What are the different strategies in its conservation? (208)
10. India holds over half the world's Tiger population. How did India achieve this status? (206)
11. Global climate changes a threat to the biodiversity. Substantiate this statement. (202)
12. 'Dodo' the flightless extinct bird of Mauritius Island. Do we have any impact of that birds extinction. Explain. (202)
13. Jhum cultivation – abane on biodiversity – Explain. (202)
14. What are the differences between National Park and Wild life Sanctuaries? (206, 207)
15. What is Red Data Book? Mention its purposes. (205)
16. Describe the species – area relationship. (197)
17. What are the reasons for the richness of biodiversity in the tropics? (196)
18. What is latitudinal gradient in biodiversity? (196)
19. Give an account on magnitude of biodiversity. (195)
20. Why is biodiversity so important and worthy of protection? (197)

### **Five Marks Questions**

1. What are the causes of biodiversity loss due to human activities? (201)
2. Write short note on i) Exotic species invasion ii) Jhum cultivation (201, 202)
3. Explain the levels of biodiversity. (194)
4. Can we create an artificial habitat for biodiversity conservation? What are the possible ways of such conservation? (208)
5. Write a note on the following. i) Project Tiger ii) The Madras Crocodile Bank Trust. (206, 208)
6. What is extinction? What are the different types extinction? (204)
7. Recently there was news on 'Chinna Thamby Elephant' roaming into the villages and agricultural lands, posing threats to the local people and crops. What could be the right cause for the man and animal conflict? Write the answer from the current learning of your text book. (200, 201)
8. What are called protected area? Add notes on its different categories in conservation of biodiversity. (274)

## **CHAPTER 13(12)**

### **ENVIRONMENTAL ISSUES**

#### **Two marks Questions**

1. What are called non-degradable pollutants? (214)
2. Define Air pollution.(214)
3. Name the sources of air pollutants.(215)
4. Write any two legal protection measures on air pollution.(216)
5. What are referred to as bio magnification?(221)
6. What is eutrophication?(222)
7. What is known as cultural eutrophication?(222)
8. What is organic farming? Who took initiatives in support of organic farming?(223)
9. How are radioactive wastes disposed?(225)
10. What are called Medical waste?(225)
11. What is E-Waste?What are the different types of E-Waste?(226)
12. Tamil nadu government implemented the ban on single use plastics. However people still use plastic bags. Can you suggest any best mantra for plastic waste pollution?(226)
13. There is an acute water scarcity in Chennai city, however people use a plenty of water to dispose human excreta. Do you have any potential solution to this problem?(229)
14. What is Ozone hole? Where is it found first?(228)
15. Differentiate oligotrophic stage from eutrophic stage.
16. What are called radioactive wastes?
17. Suresh is using mosquito repellents during night, is there any ill effect out of it? Give your answer.
18. What are called agro chemicals?(220)
19. What is referred to as community forestry?
20. Name the places where the world has witnessed nuclear disasters. (225)
21. Name two international environmental conventions held recently. (227)
22. Who is called 'Forest man of India'? Why? (229)
23. When do we observe world ozone day? Why?(228)
24. Who is Dr. Sultan Ahemed Ismail? What are his key contributions in solid waste management? (224)
25. What is called algal bloom?(219)

#### **Three Marks Questions:-**

1. How are pollutants classified in terms of ecosystem? (214)
2. What are the pollutants of air? (216)
3. List the effects of air pollution on human health.(215)
4. How do air pollutants affect our atmosphere? (216)
5. Suggest some control measure for air pollution. (214)
6. Describe the different types of water pollution sources. (217)
7. What are the effects of global warming? (226)
8. CFC overuse may deplete ozone layer fast. Do we have any effect due to ozone depletion?

9. Write note on 'Chipko Movement'. (228)
10. Tabulate the major sources of solid wastes. (224)
11. How is garbage collected in Chennai city managed? (224)
12. What are called medical waste? How are they disposed? (226)
13. What are the effect of water pollution on eco system? (218)
14. What are the effect of water pollution on organisms?
15. What are the effect of noise pollution? (220)
16. Enumerate the steps to be taken in checking noise pollution. (220)

**Five Marks Questions:-**

1. Describe the various methods of radioactive waste disposal methods. (225)
2. Plastic waste is one of the major threat to the green planet. How can we manage the menace?(226)
3. Answer the following
  - i). Ozone is a natural sun block – Justify.(227)
  - ii). Ozone depleting substances – Name the compounds and their sources.
  - iii). The effect of ozone depletion.
  - iv). Control measures of ozone loss.
4. Explain the integrated waste water management.(222)
5. Give an account on sources, effect and control measures of noise pollution.(220)
6. What is bio magnification? Describe with suitable example.(221)