BIOLOGY

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Total No. of Questions : 96]
Time : 3 Hr. 15 Min.]

Solved Question Paper : 2022

[Marks : 70

BIOLOGY

Section–A
(Objective Type Questions)

Question Nos. 1 to 70 have four options, out of which only one is correct. You have to mark your selected option, on the OMR-Sheet. Answer any 35 questions.

35 × 1 = 35

1. Hoolock Gibbon is found in ?
   (A) Gir National Park
   (B) Hazaribagh National Park
   (C) Corbett National Park
   (D) Kaziranga Bird Sanctuary Ans.—(D)
2. What is Antilope cervicapra ?
   (A) Vulnerable species
   (B) Endangered species
   (C) Extinct species
   (D) Critically endangered species Ans.—(B)
3. Species listed in Red Data Book are
   (A) Vulnerable (B) Threatened
   (C) Endangered (D) All of these Ans.—(D)
4. 'World Conservation Day' is observed on
   (A) 3rd December (B) 29th December
   (C) 26th December (D) 5th June
   Ans.—(All are wrong Option, 28 July)
5. Study of interaction of antigen and antibodies in the blood is called
   (A) Serology (B) Haematology
   (C) Cryobiology (D) Angiology Ans.—(A)
6. Leprosy is caused by
   (A) TMV (B) Salmonella
   (C) Mycobacterium (D) Monocystis Ans.—(C)
7. Which of the following is a pair of viral diseases ?
   (A) AIDS and Syphilis
   (B) Measles and Rabies
   (C) Tetanus and Typhoid
   (D) Whooping cough and Tuberculosis Ans.—(B)
8. Which of the following implants in the lining of uterus ?
   (A) Morula (B) Gastrula
   (C) Zygote (D) Blastocyst Ans.—(D)
9. Human embryo is protected in
   (A) Allantois (B) Amniotic cavity
   (C) Pleural cavity (D) Peritoneal cavity
   Ans.—(B)
10. Age of evolution of man is measured by
    (A) UV-radiation (B) Carbon dating
    (C) Chemical reaction (D) Radioactive dating
    Ans.—(D)
11. Dinosaurs are
    (A) Living reptiles (B) Extinct reptiles
    (C) Primitive reptiles (D) Extinct amphibians
    Ans.—(B)
12. Coenozoic era is known as
    (A) Age of Mammals and Modern flora
    (B) Age of amphibians and lycopods
    (C) Age of Mammals and Reptiles
    (D) Age of Reptiles and Gymnosperms Ans.—(A)
13. DNA formed from RNA is called
    (A) *B*-DNA (B) *Z*-DNA
    (C) *r* RNA (D) *c* DNA Ans.—(D)
14. Enzyme required for polymerase chain reaction is
    (A) Endonuclease (B) RNA polymerase
    (C) Ribonuclease (D) Taq polymerase
    Ans.—(D)
15. When carpel is attached together with Gynoecium it is called as
    (A) Apocarpous (B) Syncarpous
    (C) Monocarpellary (D) Multicarpellary
    Ans.—(B)
16. In humans, ringworm disease is caused by
    (A) Bacteria (B) Fungi
    (C) Viruses (D) Worms Ans.—(B)
17. Genetic material of AIDS virus is
    (A) Single stranded DNA (B) Single stranded RNA
    (C) Double stranded DNA (D) Double stranded RNA
    Ans.—(B)
18. Which of the following does nitrogen fixation ?
    (A) Rhizobium (B) Pseudomonas
    (C) Both (A) and (B) (D) Yeast Ans.—(C)
19. Frankia is a
    (A) Biofertilizer (B) Antibiotic
    (C) Group of Bacteria (D) Both (B) and (C)
    Ans.—(C)
20. An example of xerophytic adaptation is
    (A) Agave (B) Opuntia
    (C) Both (A) and (B) (D) Trapa Ans.—(C)

21. Lithosphere is
(A) Lifeless (B) Naked rocky regions
(C) Both (A) and (B) (D) Algal Ans.—(C)

22. Carbon monoxide is a major pollutant of
(A) Air (B) Soil
(C) Water (D) Air and Water
Ans.—(A)

23. Which of the following exhibits biomagnification ?
(A) DDT (B) Mercury
(C) Both (A) and (B) (D) SO_2 Ans.—(C)

24. The most adverse effect of radioactive pollutant is
(A) Tuberculosis (B) Polio
(C) Hepatitis (D) Gene mutation
Ans.—(D)

25. Heroin is
(A) Monoacetyl morphine (B) Triacetyl morphine
(C) Diacetyl morphine (D) Tetra-acetyl morphine
Ans.—(C)

26. Both deoxyribose and ribose belong to same class of sugars called
(A) Trioses (B) Pentoses
(C) Hexoses (D) Heptoses Ans.—(B)

27. Nucleotide arrangement in DNA can be seen by
(A) Electron microscope (B) X-ray crystallography
(C) Light microscope (D) Ultracentrifuge
Ans.—(B)

28. If an isolated piece of DNA is kept at 82°-90° C, then
(A) there is no effect on it
(B) it uncoils
(C) it divides into one million pieces
(D) it changes into RNA Ans.—(B)

29. Nucleic acid is fragmented by which enzyme ?
(A) Polymerases (B) Nucleases
(C) Proteases (D) Ligases Ans.—(B)

30. Human hand, wing of bat and flipper of whale represent
(A) Vestigial organs (B) Analogous organs
(C) Evolutionary organs (D) Homologous organs
Ans.—(D)

31. During PCR technique the pairing primers to ss DNA segment is called
(A) Isolation (B) Annealing
(C) Denaturation (D) Polymerization
Ans.—(B)

32. Which of the following is not a tool of RDT ?
(A) Vector (B) Introns
(C) Restriction enzyme (D) Polymerase enzyme
Ans.—(B)

33. Enzyme Taq polymerase is obtained from
(A) Thermus aquaticus
(B) Agrobacterium tumefaciens
(C) Trichoderma aquatic
(D) Both (A) and (C) Ans.—(A)

34. World Health Day is celebrated every year on
(A) 7th March (B) 7th April
(C) 7th May (D) 7th July Ans.—(B)

35. Amniocentesis involves the analysis of
(A) Amnion (B) Amino acids of protein
(C) Amniotic fluid (D) Both (A) and (B)
Ans.—(C)

36. Emasculation is related to
(A) Mass selection (B) Clonal selection
(C) Hybridization (D) Pure line Ans.—(C)

37. Mimicry is useful for
(A) Protection (B) Concealment
(C) Predation (D) Both (A) and (C)
Ans.—(B)

38. Mycorrhiza is a symbiotic association between
(A) Algae and roots of plants
(B) Fungi and roots of plants
(C) Algae and Fungi
(D) Bacteria and Viruses Ans.—(B)

39. Mutualism occurs between
(A) E.coli and human
(B) Butterfly and flower
(C) Zoochlorellae and Hydra
(D) Hermit crab and Sea anemone Ans.—(B)

40. pH of acid rain is below
(A) 5.6 (B) 6
(C) 6.5 (D) 7 Ans.—(A)

41. Photochemical smog consists of
(A) SO_2, *PAN* and smoke
(B) SO_3, *PAN* and oxides of nitrogen
(C) SO_2, CO_2 and hydrocarbon
(D) O_3, SO_2 and hydrocarbon Ans.—(B)

42. Capacitation is a natural process occurs in
(A) Epididymis
(B) Female reproductive tract
(C) Vas deferens
(D) Rete testis Ans.—(B)

43. Pusa shubhra is a variety of
(A) Wheat (B) Cauliflower
(C) Chilli (D) Cabbage Ans.—(B)

44. Production of plant without fertilization is done by
(A) Grafting
(B) Transplantation
(C) Vegetative propagation
(D) Both (A) and (B) Ans.—(C)

45. Triticum aestivum which is a hexaploid wheat possesses
(A) 7 chromosomes (B) 14 chromosomes
(C) 30 chromosomes (D) 42 chromosomes
Ans.—(D)

46. The site of production of ADA in the body is
(A) Blood plasma (B) Lymphocytes
(C) Osteocytes (D) Erythrocytes Ans.—(B)

47. α–1 antitrypsin is
(A) An enzyme
(B) Used to treat arthritis
(C) An antacid
(D) Used to treat emphysema Ans.—(D)

48. Hybridomas are employed for
(A) Production of somatic hybrids
(B) Killing cancer cells
(C) Synthesis of antibiotics
(D) Synthesis of monoclonal antibodies Ans.—(D)

49. Which of the following releases methane ?
(A) Rice fields (B) Cattle
(C) Termites (D) All of these Ans.—(A)

50. What is the function of copper–T ?
(A) Stops zygote formation
(B) Stops conception
(C) Stops fertilization
(D) Checks mutation Ans.—(C)

51. Genital warts spread by which of the following ?
(A) Hepatitis–A (B) Herpes Virus
(C) Trichomonas (D) Papilloma Virus
Ans.—(D)

52. DNA recombinant technology uses
(A) Cloning vector
(B) Restriction endonuclease and DNA ligase
(C) Gel Electrophoresis
(D) All of these Ans.—(D)

53. Genetically engineered bacteria are being employed for production of
(A) Progesterone (B) Insulin
(C) Estrogen (D) Thyroxine Ans.—(B)

54. Which vector can clone only a small fragment of DNA?
(A) Cosmid (B) BAC
(C) Plasmid (D) YAC Ans.—(C)

55. Which of the following restriction enzymes produces blunt ends ?
(A) Sal I (B) Eco RV
(C) Hind III (D) Xho I Ans.—(B)

56. Which of the following is not a method of in-situ conservation of biodiversity ?
(A) Botanical Garden (B) Bioshere Reserve
(C) Sacred Grove (D) Wildlife Sanctuary
Ans.—(A)

57. An example of quantitative trait in human is
(A) Hair colour (B) Skin colour
(C) Shape of nose (D) Colour of eyes
Ans.—(B)

58. Different forms of a gene are called
(A) Complementary genes (B) Allele
(C) Supplementary genes (D) Heterozygote Ans.—(B)

59. Which type of protein is found in silk thread ?
(A) Fibroin (B) Albumin
(C) Keratin (D) Fibrinogen Ans.—(A)

60. Shakti, Rattan and Protina are lysine rich varieties of
(A) Rice (B) Maize
(C) Wheat (D) Cotton Ans.—(B)

61. Penicillium produces
(A) Mitospores (B) Zoospores
(C) Meiospores (D) Both (A) and (B)
Ans.—(D)

62. Fertilization is internal in
(A) Star Fishes (B) Sharks
(C) Bony fishes (D) Amphibians Ans.—(B)

63. Main source of variation is
(A) Mitosis division (B) Mutation
(C) Meiosis division (D) Fertilization Ans.—(B)

64. Azolla forms symbiotic relationship with
(A) Azospirillum (B) Anabaena
(C) Rhizobium (D) Nostoc Ans.—(B)

65. Tapetal cells show
(A) Mitosis cell division
(B) Meiosis cell division
(C) Endomitosis cell division
(D) Endomitosis and Polyploidy Ans.—(D)

66. What is formed from megaspore mother cell ?
(A) Megasporangium (B) Chalaza
(C) Megaspore (D) Microspore Ans.—(C)

67. The oestrous cycle possessed by female animal is
(A) Monkey (B) Humans
(C) Both (A) and (B) (D) Cow Ans.—(D)

68. Acrosome of human sperm is formed from
(A) Nucleus (B) Lysosome
(C) Golgi body (D) Endoplasmic reticulum
Ans.—(C)

69. The placenta in humans is formed by
(A) Amnion (B) Allantois
(C) Chorion (D) Chorion and Ailantois
Ans.—(C)

70. In angiospermic plants male gamete is formed by the division of
(A) Vegetative cell (B) Microspore
(C) Generative cell (D) Microspore mother cell
Ans.—(C)

Section–B
Short Answer Type Questions

Question Nos. 1 to 20 are short Answer Type. Answer any 10 questions. Each question carries 2 marks.

10 × 2 = 20

1. Define co-dominance and incomplete dominance.

Ans.—**Co-dominance**—Co-dominance is that condition in which the F_1 generation resembles to both parents. Which share equally. A good examples is different types of red blood cells that determine ABO blood grouping in the human beings. ABO blood groups are controlled by the gene I having 3 alleles- I^A, I^B and i. The alleles I^A and I^B are co-dominant to each other, so producing AB antigen and finally AB blood group in a person.

Incomplete dominance—It is a condition in which a dominant allele does not completely mask the effects of a recessive allele.

2. Name any two chromosomal disorders in humans.

Ans.—Two chromosomal disorders in Humans are—(i) Down's syndrome (ii) Turner's syndrome.

3. Differentiate between the antibiotic and interferon.

Ans.—**Antibiotic** is medicine used to kill bacteria and to cure from infections. But Interferons are anti-viral protein to check growth of virus near by viral infected cells by formation of antiviral coat.

4. What do you understand by crossing over ?

Ans.—All genes present in a chromosome are found in linear arrangement and they are linked. The process by which recombination of linked genes occurs is called crossing over. It is an important event of Meiosis.

There is a great importance of crossing over in the evolution of new species of organisms. Due to this event there is exchange of Maternal & Paternal traits resulting into offsprings of high quality.

5. Write a note on practical adaptation in animals.

Ans.—Adaptation is the ability of individual to change in morpho-anatomical features of body a/c to change in environment. It plays very significant role in habit and habitat of organisms. Examples—Camels in deserts are well-adapted than Cows, Kangaroo rat of North America never drinks water & compensates metabolic activities by the use of internal facts.

6. What do you understand by sterilization? Name any two methods.

Ans.—Surgical method is the sterlisation in both Male and Female. It is called vasectomy in Male and Tubectomy in female. By this method there is blockage of transport of sperms & ovum, so no chance of fertilization. Hence, it is effective to control birth.

7. Name the different types of RNAs.

Ans.—RNA is a single stranded structure with a polynucleotide alongwith Ribose sugar and Uracil as nitrogenous base replacing Thymine. It is found in both Cytoplasm and Nucleus.

RNA is of 3 types—
(i) Messenger RNA (ii) Transfer RNA
(iii) Ribosomal RNA

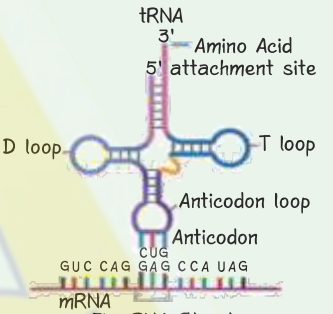


Fig. RNA Structure

(i) **Messenger RNA**—RNA after synthesized from DNA comes into cytoplasm and attaches with Ribosome. Since, it carries hereditary informations of DNA, so it is called messenger RNA.

(ii) **Transfer RNA**—It transfers various amino acids from cytoplasm to Ribosome during protein synthesis. It is about 10-15% of total RNA in a cell.

(iii) **Ribosomal RNA**—It is the most stable RNA lying attached with ribosome. It is about 80% of total RNA in a cell. This RNA out of three remains active for long time inside a cell.

8. Define the operon and name its constituent genes.

Ans.—Operon is the group of linked genes which takes part in Protein synthesis. It includes following genes—

(a) **Structural gene**—It takes part in protein synthesis.

(b) **Operator gene**—It binds with activators to fix whether the structural gene will be functional or not.

(c) **Promotor gene**—It is the site for binding RNA-polymerase.

(d) **Regulator gene**—It is responsible for production of invaders.

9. Define stamen and pistil with the help of labelled diagram.

Ans.—(a) **Stamen**—It is the pollen producing part of a flower. It consistss of a filament with anther.

(b) **Pistil** is the ovule producing part of a flower. It consists of stigma, style and ovary.

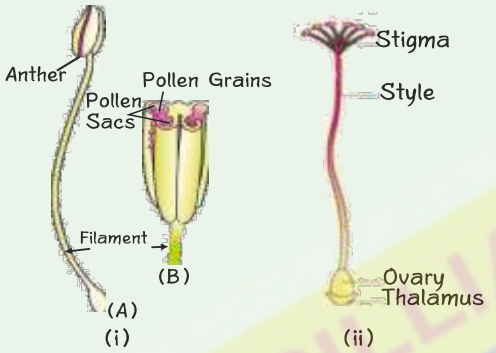


Fig. : (i) (A) A Typical Stamen
(B) Three dimensional cut section of an anther
(ii) A typical pistel

10. Write the scientific names of four sugar producing plants.

Ans.—(i) Saccharum barberi
(ii) Saccharum officinarum
(iii) Variety coc671
(iv) HM658

11. Define the following :
(a) Cloning site (b) Micro-injection

Ans.—(a) **Cloning site**—It is the one or more recongnition sites on cloning vector for the binding of alien DNA with the help of restriction enzyme.

(b) Micro-injection—In this method foreign DNA is directly injected into the nucleus of animal cell or plant cell by using micro-needles. It is used in oocytes, eggs and embryo. Jeffey S. Chamberlain et.al. (1993) have cured mice that inherited a neuromuscular disease which is like muscular dystrophy of humans.

12. Explain binary fission and multiple fission with the help of examples.

Ans.—

Binary fission	Multiple fission
1. It forms two daughter individuals.	1. It produces a number of daughter individuals.
2. The nucleus of the parent body divides only once.	2. The nucleus of the parent body divides repeatedly.
3. In binary fission, no residue is left.	3. In multiple fission, a residue is left behind.
4. It occurs during favourable condition.	4. It can take place under favourable conditions. (e.g. plasmodium) as well as unfavourable conditions (e.g. Amoeba).
5. It makes the organism immortal. e.g. Bacteria, Paramoecium, Amoeba	5. Immortality is absent in multiple fission e.g. Amoeba, Plasmodium etc.

13. What do you understand by Food-chain ?

Ans.—Sequence of trophic levels through which food travels while passing from producers to ultimate consumers is called Food chain. In food chain the phenomenon of eat and be eaten operates, i.e. an organism which is predator at one trophic level becomes prey for organisms of high trophic level. Food chains are of 3 types—

(a) Grazing food chain : It is a common food chain where producers are eaten by herbivores, herbivores by carnivores and the latter by higher order carnivores.

(b) Parasitic food chain : It terminated at the level of parasites, e.g. Grass → Cattle → Pneumococcus.

(c) Detritus food chain : It proceeds from dead bodies and organic remains. The major components of food chain are scavengers and decomposers.

e.g. Detritus → Earthworm → Sparrow → Falcon.

14. Name the pathogen of the following diseases:
(a) Amoebiasis (b) Malaria
(c) Pneumonia (d) Ascariasis

Ans.—

Diseases	Name of Pathogens
(a) Amoebiasis	Entamoeba histolytica
(b) Malaria	Plasmodium vivax
(c) Pneumonia	Streptococcus pneumoniae
(d) Ascariasis	Ascaris Lumbricoiden

15. What do you understand by Gene pool ?

Ans.—The aggregate of all the genes and their alleles present in an interbreeding population is known as gene pool.

16. Distinguish between the divergent and convergent evolution.

Ans.—Divergent evolution involves species with a common ancestors which change to become different over time, where as convergent evolution involves unrelated species that develop similar functions over time.

Forelimb of Man, Birds & Horse are example of Divergent evolution. While wings of birds and wings of insects are example of convergent evolution.

17. Define buds and bulbils with the help of suitable examples.

Ans.—Buds are asexual reproductive structures on body of such individual e.g. Hydra.

While bulbils are vegetative propagules in angiosperms, capable of giving rise to new offspring. e.g. Bulbil of Agave.

18. What is restriction enzyme? Name any two of them.

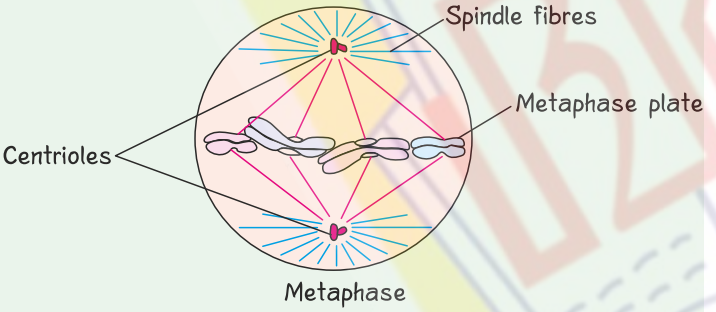
Ans.—Restriction endonuclease is an enzyme which cuts or splits DNA segment at some particular site. This enzyme is obtained from microbes. It's nomenclature is also done on the basis of type of species of microbes, e.g. E.Co.RI. is an Restriction enzyme which is obtained from E.ColiI. This eyzyme is used in DNA Recombinant Technique.

19. Show the following with the help of well-labelled diagram/sketch only:

(a) Metaphase stage of Mitosis cell division

(b) Binary fission in Bacterial cell.

Ans.—(a) Metaphase stage of Mitosis cell division—



(b) Binary fission in Bacterial cell—

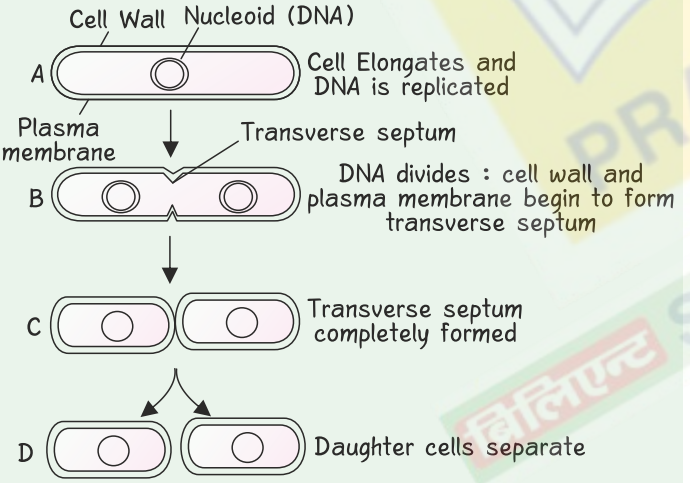


Fig : Binary fission in bacterial cell

20. What is pest resistant plant? Explain in brief with the help of example. 1+1=2

Ans.—Many nematodes live in plants and animal including human beings. A nematode / meloideyne incognitia infects the roots of tobacco plants and causes a great reduction in yield. A noval strategy was adopted to prevent this infection that was based on the process of RNA interference (RNAi.). RNAi takes place in all eukaryotic organisms as a method of cellular defense. This method involves silencing of a specific mRNA due to a complementary dsRNA molecule which binds to and prevents translation of mRNA (silencing).

Long Answer Type Questions

Question Nos. 21 to 26 are Long Answer Type Questions. Answer any 3 questions. Each question carries 5 marks. Give your answer in about 120 words.

3 × 5 = 15

21. What do you mean by biofertilizer ? How do biofertilizers increase soil fertility ?

Ans.—Biofertilisers are organisms who enhance nutrients in soil so that production of crop may increase. Such microbes include Bacteria, Blue-green algae & Mycorrhizal fungi.

Various biofertilisers are described as below—

I. Free-living Nitrogen-Fixing Bacteria—They live freely in soil and take part in Nitrogen-fixation; eg. Azobacter.

II. Free-living Nitrogen Fixing Cyanobacteria—e.g. Anabaena & Nostoc.

III. Symbiotic Nitrogen-Fixing bacteria—e.g. Rhizobium.

IV. Symbiotic Nitrogen-Fixing Cyanobacteria—eg. Azolla.

V. Mycorrhiza—It is a special type of association in between plants of root nodules and fungus. In this type of symbiotic association fungi of soil attached with roots of plants providing nutrients.

Significance/Role of Biofertilisers—

* It enriches soil-texture.
* It removes from ill-effect of pollution.
* It fulfills deficiency of Nitrogen in soil.

22. What is pest management? What do you understand by integrated pest management ? 1+4=5

Ans.—Pest management is the strategy to control weeds, insects, fungi, viruses and bacteria. Few important principles of pest management are :

* Integration
* Public awareness.
* Best Practice

Pest management is also called integrated pest management. There are 4 groups of pest management methods—cultural, mechanical, biological and chemical. The overall goal of IPM is to reduce the enviromental and health risks of pesticides within social and economic constrains.

23. Describe the following :

(a) DNA structure proposed by Watson and Crick

(b) Meselson and Stahl experiment.

Ans.—(a) DNA structure proposed by Watson and Crick— Watson and Crick demonstrate successfully the structure of DNA molecule, so called Watson and Crick model of DNA. According to them DNA molecule is a double helical structure having following main features :—

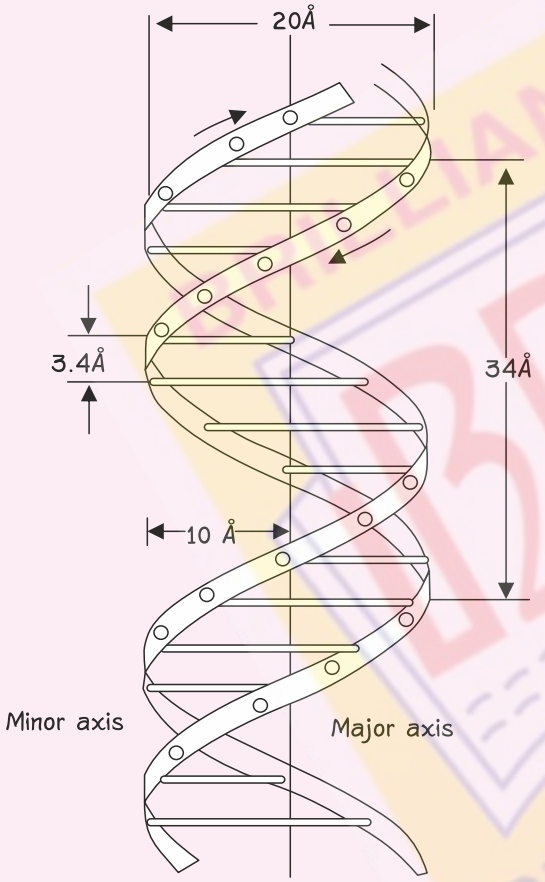


Fig : DNA structure

(i) DNA molecule has 2 complementary polynucleotide chains which are spirally arranged around a common axis antiparallely.

(ii) In each strand phosphate and Deoxyribose sugar are alternately arranged. Such phosphate and sugar are the main support of strand.

(iii) Towards inner side of each strand Nitrogenous base purine and pyrimidine are attached with Deoxyribose sugar.

(iv) DNA helix in right handed form.

(v) Purine base of one strand attaches with pyrimidine base of other strand by Hydrogen bond.

(vi) A complete spiral or turn of each strand has 34°A having 10 nucleotides, thus the distance between each pair is of 3.4A°.

(vii) The distance between both strands is 20A° (i.e. thickness/diameter of 2 strands).

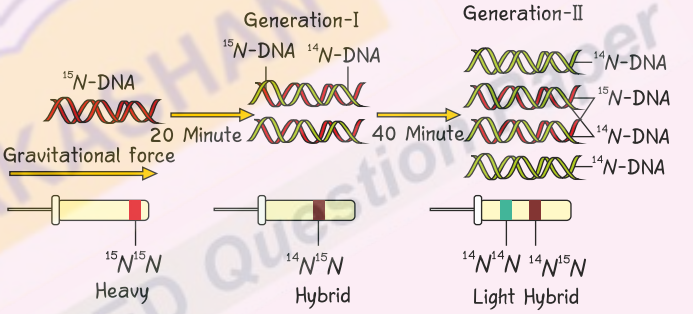
(b) Meselson and Stahl experiment— Semi-conservative method is the most accepted method for replication of DNA. It was given by Messelson and stahl. It explains that the two strands would separate and act as a template for the synthesis of new complementary strands. After the completion of replication, each DNA molecule would have one parental and one newly synthesized strand.

It is now proven that DNA replicates semiconservatively. It was shown first in Escherichia coli and subsequently in higher organisms, such as plants and human cells. Messelson and stahl performed the following experiment—

(i) They grew E. coli in a medium of $^{15}NH_4Cl$ (15 N is the heavy isotope of Nitrogen) as the only nitrogen source for many generations.

(ii) Then they transferred the cells into a medium with normal $^{14}NH_4Cl$ and took samples at various definite time intervals as the cells multiplied, and extracted the DNA that remained as double stranded helices.

(iii) Thus, the DNA was extracted from the culture one generation after transfer from ^{15}N to ^{14}N medium and composed of equal amount of this hybrid DNA and of light DNA.



Separation of DNA by Centrifugation

Fig. : Messelson & Stahl's Experiment

24. Describe the lytic cycle of Bacteriophage.

Ans.—It is the reproductive cycle of Bacteriophage when it is attached with the host cell through tail fibres. The tip of tail produces a hole in bacterial cell wall by means of enzyme lysozyme. Then the tail sheath injects viral genome into host cell. The viral DNA viral genome into host cell. The viral DNA transcribes some early mRNAs to form some enzymes over th host ribosomes. Parent viral DNA works as a template and replicates repeatedly with the help of bacterial nucleotides.

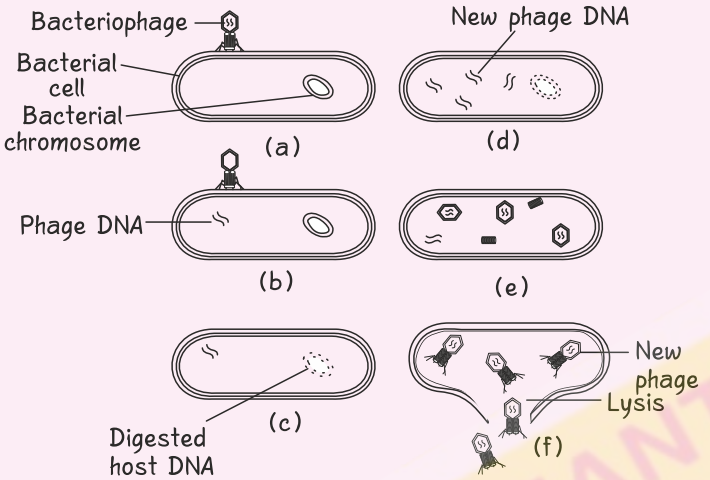


Fig : Lytic Cycle of Bacteriophage

25. What is an artificial ecosystem ? Describe an agro-ecosystem.

Ans.—Agroecosystem is man-made temporary ecosystem by which there in knowledge of global natural ecosystem and components providing shape to them. It is temporarily prepared by farmers to obtain crops but it is complete itself. In this ecosystem there is use of maximum fertilizers, insecticides & chemicals to obtain more crop production. By this way human beings make a change in environment for self benefit. However, there is production of grains, pulses and food for cattle.

Role of man in Ecosystem—There is a great role of man in ecosystem. If we consider man in context of food chain in an ecosystem, then we will find men as the primary and secondary consumer.

26. Write-short notes on the following :

(a) How are genetically modified crops useful?

(b) Human growth hormone.

Ans.—**(a)** Plants, bacteria, fungi and animals whose genes have been altered by manipulation are called Genetically Modified Organisms (= GMO). GM plants have been useful in many ways. Genetic modification has; made crops more tolerants to abiotic stresses. It has reduced reliance on chemical pesticides. It has enhanced nutritional value of food.

(b) Human growth hormone—Growth hormone is a protein based peptide hormone. This hormone promotes growth cell division & regeneration in Human beings and other animals. In humans its secreation takes place from Pituitary gland. Deficiency of this hormone leads to Dwarfism in Man.