SUBJECTIVE MOCK TEST | BIOLOGY | SOLUTION

CLASS – XII | SET – 1

SECTION-A

1.(C)
2.(C)
3.(A)
4.(D)
5.(B)
6.(B)
7.(C)
8.(B)
9.(B)
10.(A)
11.(A)
12.(D)
13.(A)
14.(C)
15.(B)
16.(C)

SECTION-B

17. Transgenic plants are genetically modified plants that have foreign genes inserted into their genome to exhibit desired traits such as pest resistance or improved nutritional quality.

Examples:

Bt cotton: Contains a gene from *Bacillus thuringiensis* for pest resistance.

Golden rice: Contains genes for increased production of vitamin A.

18.
1. RNA polymerase binds to the promoter region.
2. DNA unwinds, exposing the template strand.
3. RNA polymerase adds complementary RNA nucleotides.
4. Transcription terminates when a stop sequence is reached.

19. (A) *Papaver*: The ovary is syncarpous (carpels are fused).

(B) *Michelia*: The ovary is apocarpous (carpels are free).

20. Spermatogonia b: Interstitial cells c : Spermatozoad : Sertoli cells ii a: The spermatogonia or male germ cells undergo meiotic divisions leading to sperm formation. D: Sertolicells provide nutrition to the germ cells.

21. Yes, human excreta can be used instead of cow dung slurry to produce biogas, as both contain organic matter that can be decomposed anaerobically by methanogenic bacteria to produce biogas (methane). However, human excreta is not commonly used due to the risk of disease transmission, and it requires additional treatment to ensure safety and hygiene.

OR

Bottled fruit juices are clearer because they undergo filtration and pasteurization processes. These steps remove pulp, suspended particles, and microorganisms, making the juice clear and increasing its shelf life. Homemade juices often contain more pulp and other solid particles, making them appear cloudy.

SECTION-C

22. (i) The repressor molecule gets inactivated when an inducer molecule binds to it, causing a conformational change that prevents it from binding to the operator site, allowing transcription to occur.

(ii) The transcription of lac mRNA stops when the repressor binds to the operator region in the absence of the inducer.

(iii) The enzyme transcribed by the gene Z is β-galactosidase, which breaks down lactose.

23. This is an example of incomplete dominance, where neither red nor yellow is completely dominant. The red flowered plant contributes an allele for red color, and the yellow flowered plant contributes an allele for yellow color. In the F1 generation, the heterozygous plants exhibit an intermediate phenotype, producing orange flowers.

24. There are three types of age pyramids:

1. Expansive pyramid: This type shows a broad base and indicates a high birth rate and a growing population. It is characteristic of developing countries.
2. Stationary pyramid: This type has a nearly equal distribution of individuals across age groups, indicating low birth and death rates, typically seen in developed countries.
3. Contractive pyramid: This pyramid has a narrow base and shows a declining population with lower birth rates, common in countries with an aging population.

25. (a) Recombinant DNA Technology is the process of artificially manipulating an organism's genetic material to introduce, remove, or modify specific genes. It involves the isolation, modification, and reintroduction of DNA fragments into a host organism to produce desired traits.

(b) Application and Processes:

Applications:

Gene therapy: Treating genetic disorders by inserting healthy genes into the cells of a patient.

Production of insulin, vaccines, and other pharmaceutical products.

Agricultural improvements: Creating genetically modified crops with resistance to pests or enhanced nutritional content.

Processes:

1. Isolation of desired gene: Extracting the gene from the organism’s DNA.
2. Cutting and pasting DNA: Using restriction enzymes and ligase to insert the desired gene into a vector.
3. Transformation: Introducing the recombinant DNA into a host organism (bacteria, plants, or animals).
4. Selection and screening: Identifying successful recombinants and ensuring the correct expression of the inserted gene.

26. Conservation of biodiversity/wildlife refers to the protection, preservation, management, and restoration of biological diversity, including species, habitats, and ecosystems. It aims to prevent the extinction of species, protect their natural habitats, and maintain ecological balance.

Objectives of biodiversity conservation:

1. Preserve species and habitats: Protect endangered species and their habitats from destruction.
2. Maintain ecosystem stability: Ensure the functioning of ecosystems by maintaining species diversity and interactions.
3. Promote sustainable use of resources: Encourage practices that allow for the sustainable use of natural resources without depleting them.
4. Prevent biodiversity loss: Halt the loss of biodiversity due to human activities like deforestation, pollution, and poaching.

OR

The rivet popper hypothesis, proposed by Robert Paine, suggests that the loss of species in an ecosystem leads to a reduction in its functionality. It compares an ecosystem to an airplane, where each species is like a rivet in the plane. Removing a rivet (species) weakens the plane (ecosystem), but the loss of a few rivets may not affect its function significantly. However, losing too many rivets can cause the plane to collapse, which means that the loss of certain species can significantly disrupt the ecosystem.

27. **Convergent Evolution:** This occurs when unrelated species develop similar traits due to adapting to similar environmental conditions.

Example: The wings of bats, birds, and insects evolved independently but serve the same function for flight.

Divergent Evolution: This occurs when two or more related species become increasingly different over time, often due to different environmental pressures.

Example: The evolution of different beak shapes in Darwin's finches on the Galápagos Islands, where each species adapted to different food sources

28. The basic principle of vaccination is to stimulate the body's immune system to recognize and fight specific pathogens (bacteria, viruses) without causing the disease. This is achieved by introducing a weakened, inactivated, or subunit form of the pathogen, which triggers an immune response. The immune system then produces antibodies and memory cells, which provide long-term immunity.

Vaccines prevent microbial infections by "teaching" the immune system to recognize and combat the pathogen if it is encountered in the future, thus preventing infection.

Organism for Hepatitis B vaccine:

The hepatitis B vaccine is produced using the Saccharomyces cerevisiae (yeast) organism. The gene encoding the hepatitis B surface antigen is inserted into the yeast, which then produces the antigen to stimulate immunity.

SECTION-D

29. (i) Implantation occurs in the uterine wall (endometrium).

(ii) The trophoblast develops during the blastocyst stage of embryonic development

(iii) Zygote

Cleavage (2, 4, 8, 16-cell stages)

Morula

Blastula

Blastocyst (which gets implanted).

OR

If implantation fails, the embryo will not be able to establish a connection with the maternal blood supply, leading to its death and failure to develop into a fetus. This results in a miscarriage or early pregnancy loss.

30. (i) Autoimmune diseases are called degenerative diseases because they involve the immune system attacking and progressively damaging the body's own cells, tissues, and organs, leading to degeneration or loss of function over time.

(ii) One autoimmune disease that affects body muscles is Myasthenia Gravis.

(ii) T-lymphocytes provide cell-mediated immunity, which is responsible for attacking and destroying infected cells, cancer cells, and foreign pathogens inside the body.

OR

B cells are responsible for producing antibodies (immunoglobulins), which are proteins that specifically bind to and neutralize pathogens like bacteria, viruses, and toxins. When a B cell encounters an antigen (foreign substance), it can differentiate into plasma cells that secrete large amounts of antibodies into the bloodstream. These antibodies help identify and neutralize the pathogen, forming the basis of the humoral immune response.

Thus, the humoral immune system is primarily driven by B cells and their production of antibodies.

SECTION-E

31. (a) The stigma plays a crucial role in pollen-pistil interactions in the process of fertilization in plants. It is the part of the female reproductive organ (pistil) that receives the pollen during pollination. The primary functions of the stigma in pollen-pistil interactions are:

1. Recognition of Pollen: The stigma produces a sticky or receptive surface that helps in the adhesion of pollen grains.
2. Species-Specific Interaction: The stigma has a role in ensuring that only compatible pollen grains (typically from the same species) can germinate. It recognizes and accepts pollen from the same species, preventing cross-species fertilization.
3. Facilitates Pollen Germination: Once the pollen grain adheres to the stigma, it germinates and forms a pollen tube that grows down the style toward the ovary, where fertilization occurs.

(b) After pollination, where a pollen grain lands on the stigma, the following post-pollination events lead to double fertilization in angiosperms:

1. Pollen Grain Germination: The two-celled pollen grain germinates on the stigma. The pollen grain consists of a tube cell and a generative cell.
2. Pollen Tube Growth: The tube cell forms the pollen tube, which grows down the style toward the ovary. The generative cell divides to form two male gametes (sperm cells) within the pollen tube.
3. Pollen Tube Entry into Ovule: The pollen tube enters the ovule through an opening called the micropyle.
4. Fertilization – First Sperm Cell: One sperm cell fuses with the egg cell to form the zygote, which will develop into the embryo.
5. Fertilization – Second Sperm Cell: The other sperm cell fuses with two polar nuclei in the central cell of the ovule, forming a triploid endosperm. The endosperm will develop into the tissue that nourishes the developing embryo.
6. Formation of Seed and Fruit: The fertilized ovule becomes the seed, and the surrounding ovary develops into the fruit.

This process of double fertilization ensures that both the embryo and the endosperm (for nourishment) are formed simultaneously, a unique feature of angiosperms.

OR

(A) 1. Pollination: The process begins when a pollen grain lands on the stigma of a flower. The pollen grain consists of two cells — the tube cell and the generative cell.

2. Pollen Germination: The pollen grain germinates on the stigma, and the tube cell forms a pollen tube that grows down through the style toward the ovary.

3. Formation of Sperm Cells: The generative cell divides by mitosis to produce two sperm cells.

4. Pollen Tube Growth: The pollen tube grows through the style and enters the ovule through an opening called the micropyle.

5. Fertilization – First Sperm Cell (Fusion with Egg): One sperm cell fuses with the egg cell, which is haploid (n). This fusion forms a diploid zygote (2n), which will develop into the embryo.

6. Fertilization – Second Sperm Cell (Fusion with Polar Nuclei): The second sperm cell fuses with the two polar nuclei in the central cell of the ovule. This forms a triploid (3n) endosperm that will provide nourishment to the developing embryo.

7. End Products of Double Fertilization:

The zygote (2n) develops into the embryo.

The endosperm (3n) develops into the tissue that will nourish the embryo as it grows inside the seed.

Role of Synergids:

The synergids are two cells located near the egg cell within the embryo sac. They help guide the pollen tube toward the egg cell. The synergids secrete chemicals that attract the growing pollen tube, and when the pollen tube reaches the egg cell, the synergids degenerate, helping facilitate the entry of sperm cells into the egg cell and the polar nuclei.

(B) The development of the endosperm precedes that of the embryo because the endosperm provides the necessary nourishment for the developing embryo. After fertilization, the endosperm (formed by the fusion of one sperm cell with the two polar nuclei) acts as a source of food for the embryo during its early stages of development. Without a developed endosperm, the embryo would not have the resources it needs to grow and mature within the seed.

This sequence ensures that the embryo has access to a ready supply of nutrients for proper growth once it starts developing.

32. (i) The technique that is an important tool in forensic science is DNA Fingerprinting (also called DNA profiling).

DNA Fingerprinting:

DNA fingerprinting is a method used to identify individuals based on the unique patterns of their DNA. It involves analyzing specific regions of DNA that are highly variable between individuals. These regions are amplified and compared to generate a DNA profile. The key steps involved in DNA fingerprinting are:

1. Extraction of DNA: DNA is extracted from a biological sample (blood, hair, skin, etc.).
2. Amplification of DNA regions: Specific regions of the DNA, which are highly polymorphic, are amplified using the Polymerase Chain Reaction (PCR).
3. Separation of DNA fragments: The amplified DNA fragments are separated by size using a technique called gel electrophoresis.
4. Comparison of patterns: The resulting DNA patterns (bands) are compared. Individuals have unique patterns, so these can be used to match a suspect to a crime scene or confirm paternity, among other uses.

Applications in Forensic Science:

Criminal investigations: Identifying suspects based on biological evidence (blood, hair, semen, etc.) found at a crime scene.

Paternity testing: Confirming biological relationships between individuals.

Identification of human remains: Matching DNA from a crime scene or a disaster to known individuals

(ii) Besides forensic applications, DNA fingerprinting has several other uses, including:

1. **Paternity Testing:**

   DNA fingerprinting is widely used to determine biological relationships, especially in cases of paternity disputes. It can be used to confirm or exclude a potential father by comparing the DNA of the child and the alleged father.

2. **Genetic Research and Medicine:**

   DNA fingerprinting is used in medical genetics to identify genetic disorders and to track the inheritance patterns of specific genes. It helps in genetic counseling, where individuals are tested for genetic diseases.

OR

A.Hershey and Chase conducted their famous experiments in 1952 to investigate the nature of the genetic material. Specifically, they wanted to determine whether DNA or protein was the genetic material transferred by viruses during infection. This was a crucial question at the time because it was not yet clear whether DNA or protein was responsible for transmitting genetic information.

The specific goal of their experiment was to track which part of the bacteriophage (a virus that infects bacteria) — either the DNA or the protein coat — enters the host bacterium and directs the production of new viruses. Their experiments helped confirm that DNA is the genetic material, not proteins.

(i) Hershey and Chase used two different radioactive isotopes to label the DNA and the protein of the bacteriophage (T2 bacteriophage) to track which component was transmitted to the bacterial cell during infection:

1. Radioactive Phosphorus-32 (P-32):

   Phosphorus is a key element in the backbone of DNA, so they used P-32 to label the DNA. This allowed them to track the DNA during the infection process.

2. Radioactive Sulfur-35 (S-35):

   Sulfur is found in proteins, particularly in the amino acids cysteine and methionine, but not in DNA. Hershey and Chase used S-35 to label the protein coat of the bacteriophage.

   By using these two different isotopes, they could easily distinguish whether the DNA or the protein coat was injected into the bacteria.

(ii) Hershey and Chase needed to agitate and spin their culture to separate the viral protein coat from the bacterial cell after the phages had infected the bacteria.

Agitation: This helped to detach the viral protein coats (which remained outside the bacteria) from the bacterial cells.

Spinning: They used centrifugation to separate the heavier bacterial cells (which would form a pellet) from the lighter viral coats (which remained in the supernatant or liquid). This step ensured that they could separate the viral components and the bacterial cells for further analysis.

(iii) Observations:

1. After the infection process, Hershey and Chase found that the phosphorus-labeled DNA from the phages entered the bacterial cells, while the sulfur-labeled protein coats remained outside the bacteria.
2. When they analyzed the bacterial cells, they found that the radioactivity of P-32 (DNA) was inside the bacterial cells, while the radioactivity of S-35 (protein) was found in the liquid surrounding the bacteria.

Conclusions:

1. The genetic material that entered the bacteria and directed the production of new phages was DNA and not protein.
2. This experiment provided strong evidence that DNA is the genetic material responsible for inheritance, a key finding in molecular biology.

33. (i) The restriction enzyme that can recognize this DNA sequence is EcoRI. EcoRI recognizes the palindromic sequence GAATTC and cuts between the G and A on both strands. The given sequence CAGAATTCTTA matches the recognition site of EcoRI.

(ii) When EcoRI cuts the DNA at the recognition site GAATTC, the sequcne after digestion would be:

5’ – CAG | AATTCTTA-3’ (on one strand)

3’ – GTC | TTAAGAAT-5’ (on the complementary strand)

The cuts are made between the G and A of the GAATTC sequence, resulting in sticky ends with a 5’ overhand of AATT.

(iii) The ends generated after digestion by EcoRI are called sticky ends because they have a single-stranded overhang of AATT (on one strand) and TTAA (on the complementary strand). These overhangs are "sticky" because they are complementary to each other, allowing the two fragments to anneal (bind) together easily if the complementary strands are brought into proximity. This property is crucial for recombinant DNA technology, where DNA fragments can be joined to other DNA fragments with matching sticky ends.

OR

(A) Polymerase chain reaction or PCR consists of the following three steps:

- Denaturation- The two DNA strands of template DNA separate from each other when heated to 92°C.
- Annealing- The primers anneal to the 3’ end of single strands of DNA.
- Extension- The primers are extended by DNA polymerase by the addition of nucleotides to form complete strands of DNA.

DNA polymerases are enzymes responsible for assembling nucleotides to created new DNA molecules. During DNA replication, the polymerase reads the existing DNA strands and semi-conservatively creates new complementary DNA strands.

(B) (i) Application of PCR in Biotechnology: PCR is used for DNA amplification and the amplified fragment if desired can be used to ligate with a vector for further cloning.

(ii) Application of PCR in Diagnostics: By using PCR diseases like phenylketonuria, muscular dystrophy, sickle cell anemia, AIDS, tuberculosis etc. can be diagnosed.

SUBJECTIVE MOCK TEST | BIOLOGY | SOLUTION

CLASS – XII | SET – 2

SECTION-A

1.(B) Wind pollinated plants bear light and non-sticky flowers and long and feathery stigma.

2.(A) The patient suffering from myocardial infarction is immediately given an injection of Streptokinase. Streptokinase is an enzyme secreted by several species of streptococci that can bind and activate plasminogen used as effective and inexpensive thrombolysis medication in some cases of myocardial infarction.

3.(C)

4.(A) If we provide deoxyribonuclease enzyme while isolating DNA from a cell the enzyme will cut the DNA in many fragments and we will not be able to isolate DNA molecule from the cell.

5.(A)

6.(A) The inner cell mass contains certain cells that contain cells called stem cells which have the potency to give rise to all the tissues and organs. Now a day's stem cells are preserved for future use.

7.(D)

8.(C)

9.(C)

10.(A)

11.(B)

12.(D)

13.(A)

14.(A) Genetic drift is a mechanism of evolution in which allele frequencies of a population change over generations due to chance(sampling error). Hardy–Weinberg principle does not explain how genetic drift operates speciation although it says that in the absence of genetic drift, allele and genotype frequencies in a population will remain constant from generation to generation.

15.(A)

16.(C) The human immunodeficiency virus (HIV) is a retrovirus, which, like many other viruses, stores its genetic information as RNA rather than as DNA.

SECTION-B

17. The major steps of fermentation are as follows:

(i) Sterilisation of the fermentors/bioreactor and nutrient medium in steam, under pressure.

(ii) Inoculation of a selected strain of the yeast.

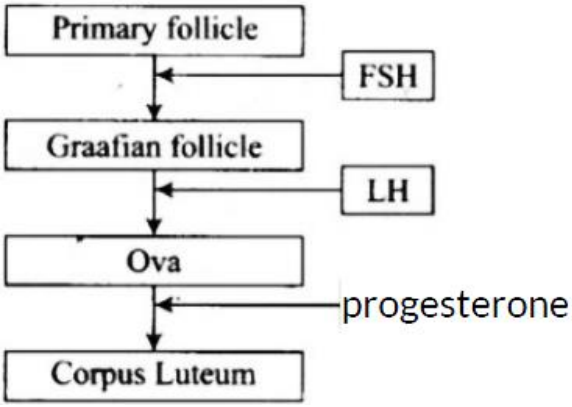
(iii) Recovery of the product.

18. A → Crustaceans, B → Insects, C → Mosses, D → Fungi

19. Simple stirred tank bioreactor.

It is used to produce large quantities of products where large volumes (100 - 1000) litres of culture can be processed.

20.



21. 'r' represents the intrinsic rate of natural increase.

Significance of calculating 'r' for any population- It is an important parameter for assessing the impacts of any biotic orabiotic factor on population growth.

OR

(a) Orchid Ophrys employs 'Sexual Deceit'to get pollinated by a species of bee one petal of flower resembles female of bee in size, colour and markings Male bee attracted and pseudocopulates the flower and gets dusted with pollens. When same bee 'pseudocopulates' with other flower, it transfers the pollens to it.

(b) If female bee pattern changes during evolution the flower needs to co-evolve to resemble the female bee to get pollinated.

SECTION-C

22. Anaerobic degradation is very important due to the following reasons:

(i) A major part of the organic part is digested.

(ii) There is little sink.

(iii) After the activity, the aerobic decomposers separate along with slow degrading organic matter as slime rich flora and floccules.

(iv) Flocs and floccules settle down. The clear supernatant water is allowed to pass into rivers and streams.

(v) Flocs and floccules, called activated sludge, is used to produce biogas and manure.

23. (i) 'a' is Trophoblast. It forms chorionic villi and foetal part of the placenta.

(ii) It gets differentiated into ectoderm and endoderm.

(iii) In the inner cell mass.

24. On crossing red and white flower only red colour flower appeared in the F1 generation. But the white colour flower again appears in the F2 generation which is raised out of the F1 individual Mendel reasoned that there is a factor of each and every character. Accordingly, there has to be one factor(R) for red flower and other one factor (r) for white flower. In case, an organism possesses only one copy of the gene then the possibility of reappearance of white flower in the F2 generation of the given cross is not there. Also, the ratio (3:1 of red and white) indicates that each organism must possess two copies of a particular gene.

25. (a) Species richness increased with increasing explored area up to a limit.

(b) S = Species richness

Z = Slope of the line /regression coefficient

A = Area

C = Y-intercept

26. Following are the three strategies that a bisexual chasmogamous flower can evolve to prevent self-pollination (autogamy):

(i) In many flowers, pollen release and stigma receptivity are not synchronized. Either the pollen is released much before the maturity of stigma or stigma matures much before the release of pollen.

(ii) In some flowers, anthers and stigma are placed at different places so that pollen grains from the same flower cannot reach the stigma.

(iii) Some flowers follow self-incompatibility between pollen and stigma. This is a genetically mediated process that prevents autogamy in these flowers.

OR

Endosperm is a nutritive tissue that supplies food material to the growing embryo. Endosperm is developed from the triploid primary endosperm nucleus (PEN).

In the angiosperms, there are three methods of endosperm development

(i) Nuclear type. In this method primary endosperm nucleus divides repeatedly without wall formation to produce a large number of free nuclei.

(ii) Cellular type. Every division of the primary endosperm nucleus is followed by cytokinesis.

(iii) Helobial type. This type is intermediate between cellular and nuclear type. The division of PEN is followed by wall formation, which result in the formation of micropylar and chalazal chambers. Now free nuclear divisions occur in both the chambers.

27. About 90 % of the energy consumed by an organism at a particular trophic level is dissipated in the form of heat energy. This leaves just 10 % for the organism at the next trophic level. By the time, energy moves from producers to topmost consumers; the available energy is a minuscule portion of the energy which was originally converted by the producer. Due to this, energy flow is unidirectional through various trophic levels and is non-cyclic.

28. (i) The copper-releasing IUDs are Cu-T, Cu-7, and multiload-375.

(ii) Copper-T (Cu-T) is an Intra Uterine Device (IUD) that is inserted by experts and it serves as an effective contraceptive m the following ways.

(a) Increases phagocytosis of sperms within the uterus.

(b) Copper ions released by Cu-T suppress the motility of sperms and their fertilising ability.

SECTION-D

29. (i) gene-regulatory gene.

It codes for the repressor protein of the operon, which is synthesised constitutively.

The repressor has the affinity for the operator gene. It binds to the operator and prevents the RNA polymerase from transcribing the structural genes.

When repressor binds to the operator, the operon is switched off and transcription is stopped. So, it is called negative regulation.

(ii) Lactose is an inducer molecule.

(iii) Gene 'z' codes for β-galactosidase, which is responsible for the hydrolysis of lactose into galactose and glucose.

'y' gene codes for permease. It increases the permeability of the cell to lactose.

OR

'y' gene codes for permease. It increases the permeability of the cell to lactose.

30. (i) • Species A • The leaf area damaged by species - A in Bt-corn is the least.

(ii) Species-B

(iii) Not to grow Bt variety as seeds are expensive and of not much benefit (productivity wise)/advise to grow Bt corn with its proper justification.

OR

Cry IAb

SECTION-E

31. (a) This principle states that allele frequencies in a population are stable and constant from generation to generation. In the expression p and q represent the frequency of allele A and allele a. The frequency of AA in a population is p2, of aa is q2 and of Aa is 2pQ. Hence p2 + 2pq + q2 = 1, where p2 represents the frequency of the homozygous dominant genotype (AA), 2pq represents the frequency of the homozygous genotype (Aa) and q2 represents the frequency of homozygous recessive genotype (aa). Sum total of all the allelic frequencies is 1.

(b) The factors which can disturb the genetic equilibrium are -

(i) Genetic drift (ii) Mutation

OR

(i) Adaptive radiation

(ii) It is an example of convergent evolution. Despite the temporal and geographical separation, marsupials in Australia and placental mammals in North America have produced varieties of species living in similar habitat with similar ways of living.

(iii) Darwin Finches.

32. Adenosine Deaminase (ADA) Deficiency is a genetic disorder that results in the impairment of the immune system. There are three main approaches used in its treatment:

(i) Enzyme Replacement Therapy (ERT): This approach involves regular infusion of ADA enzyme into the patient's blood stream. The exogenous ADA enzyme helps to break down toxic metabolites and restore immune function. ERT requires life long administration and can improve immune system function in ADA-deficient individuals. Hematopoietic Stem Cell Transplantation (HSCT): HSCT involves replacing the patient's bone marrow cells with healthy donor cells that carry the correct ADA gene.

(ii) Bone marrow transplant

(iii) Gene Therapy: Gene therapy aims to introduce a functional ADA gene into the patient's cells using viral vectors or other delivery methods. The corrected gene helps the patient's cells produce ADA enzyme, leading to improved immune function. Gene therapy holds promise as a potentially curative treatment, but further research and clinical trials are ongoing to ensure its safety and long-term effectiveness.

OR

Pest-resistant plants: Several nematodes parasitize a wide variety of plants and animals.

(i) A nematode Meloidogyne incognita infects the roots of tobacco plants and reduces the yield.

(ii) A process of RNA interference prevents this infestation. It is a method of cellular defence which takes place in all eukaryotic organisms. It involves silencing of a specific mRNA due to the complementary ds-RNA molecule that binds to and prevents β 5 / 5 translation of mRNA (silencing).

(iii) The source of this complementary RNA could be from infection by viruses having RNA genome or mobile genetic elements(transposons) that replicate via an RNA intermediate.

(iv) Using Agrobacterium vectors, nematode-specific genes were introduced into the host plant.

(v) The introduction of DNA produced both sense and antisense RNA in the host cells.

(vi) These two RNAs being complementary to each other formed a ds-RNA that initiated RNA/ and thus silenced the specific mRNA of the nematode.

(vii) As a result, the parasite could not survive in a transgenic host expressing specific interfering RNA.

(viii) The transgenic plant, therefore, got itself protected from the parasite.

33. (i) Contact inhibition - Cancer cells appears to have lost the property of contact inhibition as a result they continue to divide to form mass of cells(tumor).

(ii) When proto-oncogenes are activated under certain conditions it could lead to oncogenic transformation of the cells. Therefore all normal cell have proto-oncogenes.

(iii) X-rays/UV rays/Nicotine/Caffeine/T/Oncogenic viruses

Damage DNA which causes neoplastic transformation

(iv)

Benign tumors	Malignant tumors
Remain confined to their original location	Not remain confined to their original location/Show property of metastasis
Cause little damage	Damage surrounding tissue and starve normal cells by competing for vital nutrients

OR

(a) *Plasmodium falciparum* causes malignant malaria in humans.

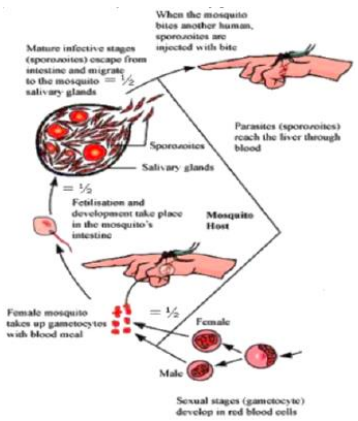
(b) The events in the life cycle of Plasmodium which take place in the female Anopheles are as follows:

(i) Gametocytes / Male and Female gametes - enter female Anopheles mosquito

(ii) Fertilisation and development in the female mosquito gut/stomach.

(iii) Sporozoites are transported to the salivary gland.

(iv)



(c) When Plasmodium gains the entry in the human body then following events are taking place inside the body-

(i) The parasite multiplies asexually in RBC

(ii) RBC rupture

(iii) Release toxic haemozoin

(iv) Chill and fever recurring every 3 - 4 days

(v) Parasites enter fresh RBC and repeat the cycle.