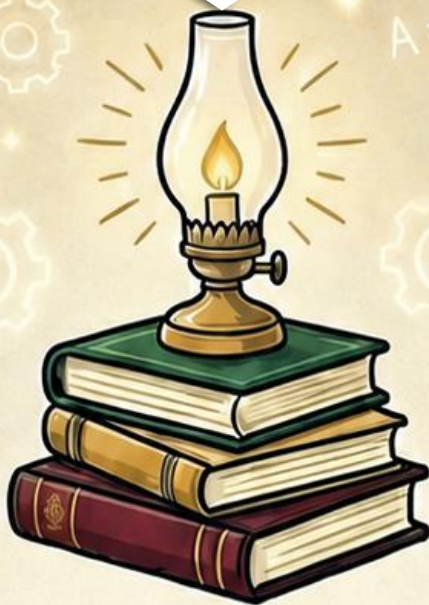




$$A = \frac{m}{(m^2 + c)^2}$$



NIOS PYQ's SOLUTIONS

$$\sqrt{h-x^2}$$

$$\sqrt{a} = bc^2$$

PREVIOUS YEARS' QUESTIONS & ANSWERS



APRIL 2026

Your Path to Success

(SET – A)

SECTION – A

Q1. Salmonella typhi is a pathogen for:

- (A) Cholera
- (B) Tetanus
- (C) Typhoid
- (D) Tuberculosis

Answer: (C) Typhoid

Q2. Histology refers to the study of:

- (A) Cells
- (B) Organs
- (C) Tissues
- (D) Plants

Answer: (C) Tissues

Q3. The essential photosynthetic pigment is:

- (A) Chlorophyll A
- (B) Chlorophyll B
- (C) Xanthophyll
- (D) Carotenoids

Answer: (A) Chlorophyll A

Q4. The R.Q. (Respiratory Quotient) for Carbohydrates is:

- (A) 1
- (B) 1.2
- (C) 0.9
- (D) 0

Answer: (A) 1

Q5. A person recovered from measles in childhood does not get the disease again, this is due to:

- (A) Innate immunity
- (B) Active acquired immunity
- (C) Passive immunity
- (D) Non specific body defense

Answer: (B) Active acquired immunity

Q6. Use of an artificial pace maker helps the patient to:

- (A) Regulate body temperature
- (B) Regularise heart beat
- (C) Helps in respiration
- (D) Helps in recording heart beat

Answer: (B) Regularise heart beat

Q7. This  T.S. of stem is of _____ because vascular bundles are in _____ like arrangement.

- (A) dicot, ring
- (B) dicot, scattered



(C) monocot, ring

(D) monocot, scattered

Answer: (D) monocot, scattered

Q8. An unfertilised female gametophyte of an angiosperm has:

(A) 8 cells, 7 nuclei

(B) 7 cells, 7 nuclei

(C) 7 cells, 8 nuclei

(D) 8 cells, 8 nuclei

Answer: (C) 7 cells, 8 nuclei

Q9. The alleles that express in homozygous condition are:

(A) dominant, codominant

(B) dominant, recessive

(C) recessive, dominant

(D) incompletely dominant

Answer: (B) dominant, recessive

Q10. The correct order of layers of a young anther from outer to inner side is:

(A) endothecium, middle layer, epidermis, tapetum

(B) epidermis, endothecium, middle layer, tapetum

(C) tapetum, middle layer, endothecium, epidermis

(D) epidermis, tapetum, endothecium, middle layer

Answer: (B) epidermis, endothecium, middle layer, tapetum

Q11. Obese person may get:

(A) hypertension

(B) atherosclerosis

(C) heart attack

(D) all of these

Answer: (D) all of these

Q12. A transitional zone between two ecosystem is:

(A) ecotone

(B) biome

(C) wetland

(D) biosphere

Answer: (A) ecotone

Q13. A human population density in an area is 100 and after one year, it increases to 110. The factors responsible are:

(A) Immigration, Natality

(B) Immigration, Mortality

(C) Emigration, Natality

(D) Emigration, Mortality

Answer: (A) Immigration, Natality

Q14. *Saccharomyces cerevisiae* belongs to:

(A) algae

(B) fungi

(C) bacteria

(D) virus



Answer: (B) fungi

Q15. Large tanks used to carry out fermentation process are:

- (A) Stirrer (B) Bioreactor
(C) Autoclave (D) Motor

Answer: (B) Bioreactor

Q16. Skin serve as 1st line of defence because:

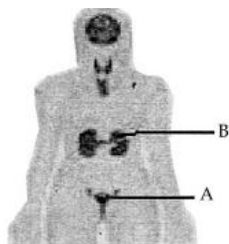
- (A) it prevents the entry of pathogens into the body (B) it is the outer tough layer
(C) it is the sense organ (D) none of the above

Answer: (A) it prevents the entry of pathogens into the body

SECTION – B

Q17. Fill in the blanks: In human, since mitochondria come into _____ from the egg, inheritance of mitochondrial DNA is said to be a case of _____ inheritance. **the zygote / offspring, maternal (cytoplasmic) inheritance**

Q18. Identify A and B in the diagram.



Answer:

- B = Thymus gland** (located in the upper chest, behind the sternum, near the neck region shown by the paired lobed structure)
- A = Thyroid gland** (located in the neck region, below the larynx shown by the lower marked structure)

Q19. DNA → (A) → mRNA → (B) → Protein. Name A and B.

Answer:

- A = Transcription** (process of forming mRNA from DNA template)
- B = Translation** (process of forming protein from mRNA template)

Q20. Match the following:

(A)	(B)
(1) Malvaceae	(A) <i>Hibiscus rosasinensis</i>
(2) Fabaceae	(B) <i>Pisum sativum</i>

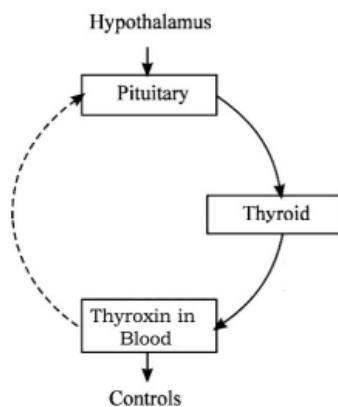


(C) *Oryza sativum*

Answer:

- (1) Malvaceae → (A) *Hibiscus rosasinensis*
- (2) Fabaceae → (B) *Pisum sativum*

Q21. What does solid line and broken line represents?



Answer:

- **Solid line** represents the stimulatory pathway i.e., the normal hormonal control sequence: Hypothalamus stimulates the Pituitary, which stimulates the Thyroid, which releases Thyroxine into the blood.
- **Broken (dashed) line** represents the negative feedback mechanism where increased levels of Thyroxine in the blood inhibit/suppress further secretion from the Pituitary gland, thus regulating and controlling hormone levels.

Q22. Write True or False.

- (a) The edible part of coconut is endocarp **False**
- (b) Apple is having fleshy thalamus **True**

Q23. By looking at the diagram answer the following questions.



(a) Name the technique.

Answer: The technique shown is Amniocentesis.

(b) What is its significance?

Answer: Amniocentesis involves withdrawal of amniotic fluid (which contains fetal cells) from the amniotic sac using a needle, for prenatal diagnosis. It is used to detect genetic and chromosomal



abnormalities (such as Down's syndrome), determine the sex of the fetus, and check for certain metabolic disorders before birth, allowing early medical intervention or genetic counselling.

Q24. Choose the two correct words to fill in the blank (nodules, nodes, nodulins):

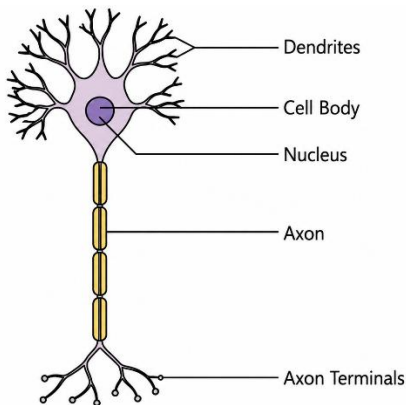
(a) In legumes, nitrogen fixation occurs in specialized bodies called _____. **Nodules**

(b) _____ is the special protein formed as a result of symbiosis in legumes. **Nodulins**

Q25. Complete the diagram to label these parts: Axon, Dendrites



Answer:



Q26. (a) Name the disorder in this child body. (b) What is the reason?

Answer:

(a) The disorder shown is Cretinism (a condition seen in children).
 (b) Reason: Cretinism is caused by hypothyroidism during infancy/childhood, i.e., deficiency of thyroid hormone (thyroxine) from birth or early childhood, often due to iodine deficiency or an underactive/underdeveloped thyroid gland. This leads to stunted physical growth, mental retardation, and characteristic features as seen in the image.



Q27. After organ transplantation, patient should administer with immunosuppressants, why?

Answer: After organ transplantation, the recipient's immune system recognizes the transplanted organ as "foreign" (non-self) because of differences in surface antigens (MHC/HLA molecules) between donor and recipient. This triggers an immune response leading to graft rejection, where the body's immune cells (like T-lymphocytes) attack and destroy the transplanted tissue.



Immunosuppressant drugs are administered to suppress/weaken this immune response, preventing the body from rejecting the new organ and allowing it to function properly within the recipient's body.

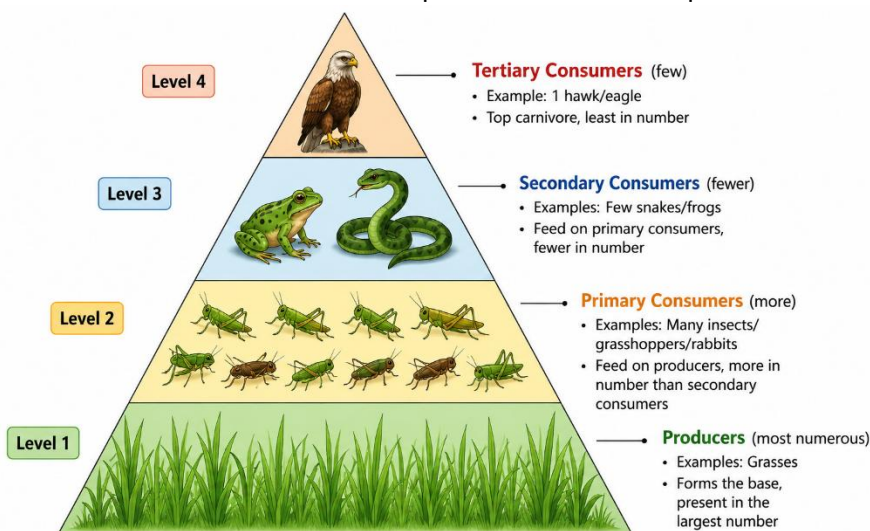
Q28. Fill in the blank with the appropriate word given in the bracket. The _____ of bird and bat are example of _____ organ. **wings, analogous**
(wings, beak, analogous, homologous)

SECTION – C

Q29. Construct a pyramid of number in a grassland with 4 trophic levels.

Answer:

A pyramid of numbers in a grassland ecosystem is typically upright, since the number of organisms decreases at each successive trophic level. With 4 trophic levels:



- **Trophic Level 1 (Producers):** Grasses present in the largest number
- **Trophic Level 2 (Primary Consumers):** Grasshoppers/insects/rabbits feed on grass, fewer in number than producers
- **Trophic Level 3 (Secondary Consumers):** Frogs/snakes feed on primary consumers, fewer in number
- **Trophic Level 4 (Tertiary Consumers):** Hawk/eagle top carnivore, least in number

This forms an upright pyramid, broad at the base (producers) and narrow at the top (top carnivores), since energy and biomass decrease at each successive level, supporting fewer organisms.

Q30. With reference to class Reptilia, Identify the two wrong statements.

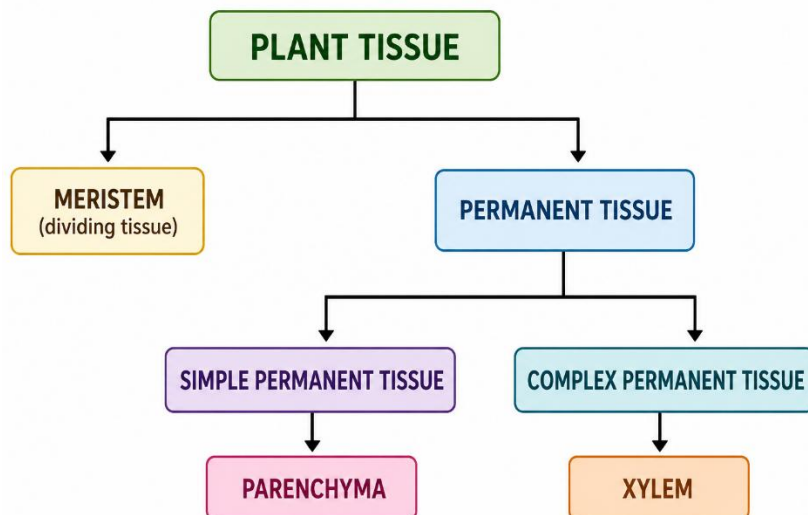
- (a) Body is covered by hairs
- (b) Has paired pentadactyl limbs with clawed digits
- (c) Respiration is by lungs
- (d) Heart is two chambered



Answer: The two wrong statements are (a) and (d).

Q31. Construct a flow chart using these words: Xylem, Complex permanent tissue, simple permanent tissue, plant tissue, meristem, parenchyma.

Answer:



Q32. Write any two biotic and two abiotic components of pond ecosystem.

Answer:

• **Biotic components:**

1. **Producers** – aquatic plants like Hydrilla, algae, lotus
2. **Consumers** – fish, frogs, insects, zooplankton (primary, secondary consumers) (Decomposers – bacteria and fungi can also be mentioned)

• **Abiotic components (any two):**

1. Water (the medium itself, along with its temperature, pH, dissolved oxygen)
2. Sunlight (essential for photosynthesis by aquatic producers) (Other abiotic factors: soil/silt at the bottom, dissolved minerals/nutrients)

OR

Explain the term commensalism with an example.

Answer: Commensalism is a type of symbiotic relationship between two different species in which one species is benefited while the other is neither harmed nor benefited.

Example: The relationship between an orchid (epiphyte) growing on a large tree. The orchid gets support/shelter and better access to sunlight by growing on the tree, while the tree is neither helped nor harmed by the orchid's presence.

Q33. Name the source to extract the following antibiotics. (a) Tetracyclin (b) Streptomycin



Answer:

(a) **Tetracyclin** is extracted from the bacterium *Streptomyces rimosus* (also *Streptomyces aureofaciens*).

(b) **Streptomycin** is extracted from the bacterium *Streptomyces griseus*.

OR

Write any two advantages of biogas.**Answer:**

1. Biogas is a clean and eco-friendly fuel it burns without producing smoke, soot, or harmful pollutants, unlike wood or coal.
2. The slurry left after biogas production is an excellent organic manure/fertilizer, rich in nitrogen and other nutrients, improving soil fertility. (Additional advantages: renewable source of energy, helps in proper disposal of animal waste/organic waste, reduces dependency on fossil fuels)

Q34. Write the function of the following carbohydrates.(a) Glucose (b) Cellulose**Answer:**

(a) **Glucose** is a simple sugar (monosaccharide) that serves as the primary and immediate source of energy for cells; it is broken down during respiration to release ATP.

(b) **Cellulose** is a structural polysaccharide that forms the cell wall of plant cells, providing rigidity, mechanical strength, and protection to plant cells. It is also an important component of dietary fiber/roughage in the human diet.

OR

Write any two functions of roughage.**Answer:**

1. Roughage (dietary fiber) adds bulk to the food and stimulates peristaltic movement of the intestine, helping in smooth movement of food through the digestive tract.
2. It prevents constipation by absorbing water and softening the stool, ensuring regular bowel movement, and also helps reduce the risk of colon-related disorders.

Q35. AUG has dual function, which are they?

Answer: The codon AUG has two functions:

1. It acts as the start/initiation codon, signaling the beginning of protein synthesis (translation) on the mRNA.
2. It also codes for the amino acid Methionine, which is incorporated at the start of every polypeptide chain in eukaryotes.



OR

Write anticodon of codon (i) AGU and (ii) UGC.

Answer: An anticodon is complementary and antiparallel to its corresponding codon.

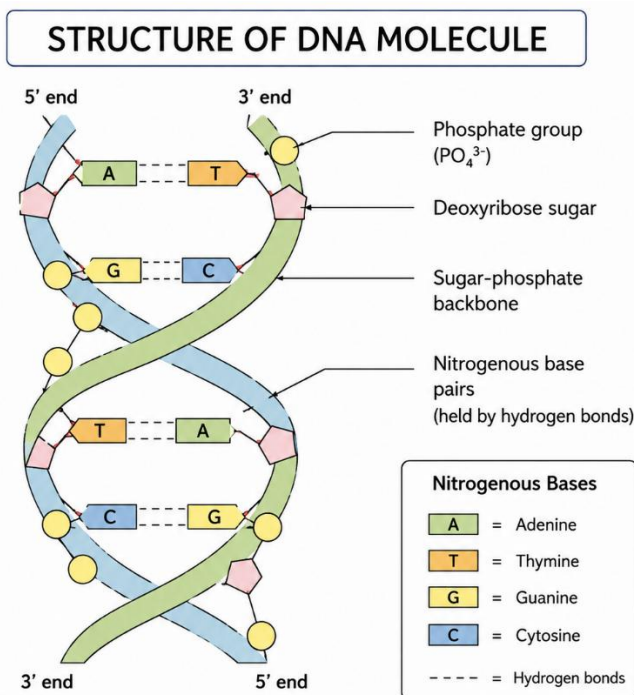
(i) Codon AGU (5'→3') → Anticodon = ACU (5'→3')

(ii) Codon UGC (5'→3') → Anticodon = GCA (5'→3')

(Calculated by pairing A↔U and G↔C in antiparallel/reverse direction, then reading the resulting anticodon in its own 5'→3' orientation.)

Q36. Draw the diagram to show the structure of DNA Molecule.

Answer: Since this is a text-based format, here is a labeled schematic representation of the DNA double helix structure:



(The two strands twist around each other to form a right-handed double helix)

Key structural features to label in your diagram:

- **Two polynucleotide strands** twisted into a right-handed double helix (Watson-Crick model)
- **Sugar-phosphate backbone** on the outside of each strand (deoxyribose sugar + phosphate groups joined by phosphodiester bonds)
- **Nitrogenous bases** (Adenine, Thymine, Guanine, Cytosine) projecting inward, paired by hydrogen bonds:
 - Adenine (A) pairs with Thymine (T) by 2 hydrogen bonds
 - Guanine (G) pairs with Cytosine (C) by 3 hydrogen bonds
- The two strands run antiparallel to each other (one strand runs 5'→3', the other 3'→5')



Q37. What is PEM? Give the two reasons for PEM.

Answer: **PEM (Protein Energy Malnutrition)** is a form of malnutrition caused by inadequate intake of proteins and calories (energy), commonly seen in infants and young children, leading to conditions like Kwashiorkor and Marasmus.

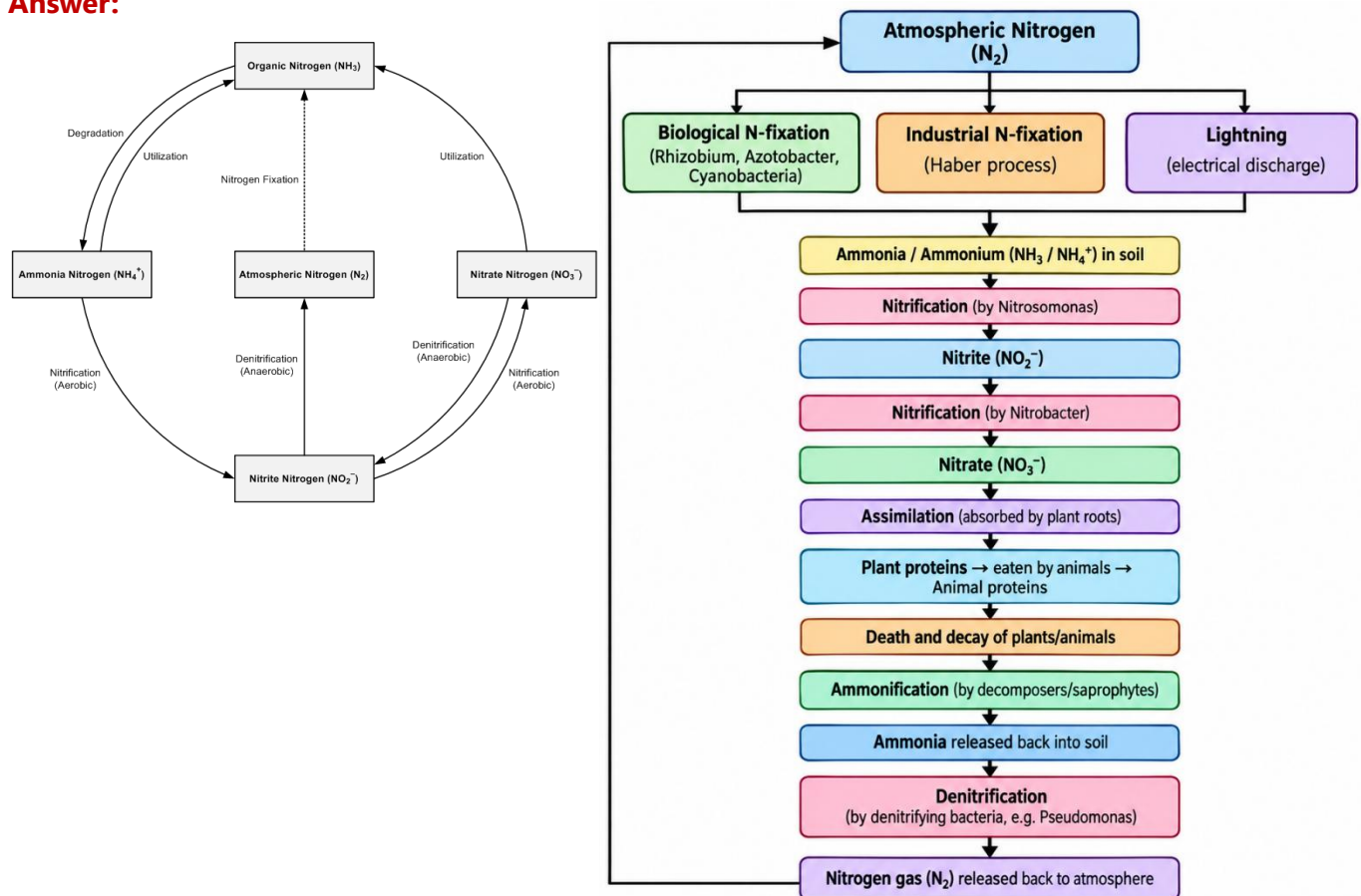
Two reasons for PEM:

1. Insufficient dietary intake of protein-rich and calorie-rich food due to poverty, poor availability of nutritious food, or improper weaning practices in infants.
2. Improper absorption/utilization of nutrients due to frequent infections, diarrhea, or digestive disorders, which prevent the body from properly absorbing the proteins and calories consumed.

SECTION – D

Q38. Write the schematic representation of nitrogen cycle.

Answer:



Explanation: The nitrogen cycle is the continuous process by which nitrogen moves from the atmosphere into the soil, into living organisms, and back into the atmosphere through the sequential steps of nitrogen fixation → nitrification → assimilation → ammonification → denitrification.

Q39. Name the three subunits of nucleotide.



Answer: A nucleotide is made up of three subunits:

1. **Pentose sugar** (deoxyribose in DNA, ribose in RNA)
2. **Nitrogenous base** (Adenine, Guanine, Cytosine, Thymine/Uracil)
3. **Phosphate group**

OR

Write any three differences between DNA and RNA.

Answer:

Feature	DNA	RNA
Sugar	Contains deoxyribose sugar	Contains ribose sugar
Strands	Double-stranded helical structure	Usually single-stranded
Nitrogenous bases	Contains Thymine (along with A, G, C)	Contains Uracil in place of Thymine (along with A, G, C)

(Additional difference if needed: DNA is the hereditary material and is stable/long-lasting, while RNA is mainly involved in protein synthesis and is comparatively short-lived.)

Q40. Give reason:(a) Testes are extra abdominal. (b) In aphids, we can see only females. (c) A mother should feed her new born baby just after the birth.

Answer:

(a) Testes are extra abdominal (located in the scrotum outside the abdominal cavity) because sperm production (spermatogenesis) requires a temperature 2-3°C lower than normal body temperature. If the testes remained inside the abdomen (at normal body temperature), the higher temperature would inhibit proper sperm formation. The scrotal sac, being outside the body, maintains the lower temperature necessary for healthy sperm production.

(b) In aphids, we can see only females because aphids reproduce by parthenogenesis, a type of asexual reproduction in which females produce offspring (also females) from unfertilized eggs, without the need for a male or fertilization. This is why generations of only females are commonly observed in aphid populations.

(c) A mother should feed her newborn baby just after birth because the first milk secreted by the mother, called colostrum, is rich in antibodies (especially Immunoglobulin A) and essential nutrients. Feeding the baby immediately after birth provides the newborn with passive immunity, protecting it from infections and diseases during the early vulnerable period of life, when the baby's own immune system is not yet fully developed.



OR

What is colostrum? Why it is essential for newly born baby?

Answer: Colostrum is the thick, yellowish first milk secreted by the mother's mammary glands during the first few days after childbirth, before regular breast milk production begins.

Why it is essential:

1. It is rich in antibodies (immunoglobulins, especially IgA), which provide the newborn with passive immunity against various infections and diseases, since the baby's own immune system is still immature.
2. It is highly nutritious, containing proteins, vitamins, and minerals in concentrated form, and also has a mild laxative effect that helps in passing the baby's first stool (meconium), clearing the digestive tract.

Q41. What is placenta? Give any two of its functions.

Answer: The placenta is a temporary, disc-shaped vascular structure that develops in the uterus during pregnancy, connecting the developing fetus to the mother's uterine wall via the umbilical cord.

Any two functions:

1. **Exchange of nutrients, oxygen, and waste products** between the mother's blood and the fetus's blood supplying oxygen and nutrients to the fetus and removing carbon dioxide and metabolic waste from the fetal blood.
2. **Hormone secretion** the placenta secretes hormones such as human chorionic gonadotropin (hCG), progesterone, and estrogen, which help maintain pregnancy and support fetal development. (Additional function: acts as a selective barrier, preventing many harmful substances and pathogens from directly reaching the fetus.)

Q42. What is Photophosphorylation? Write the differences between cyclic and non-cyclic photophosphorylation.

Answer: **Photophosphorylation** is the process occurring during the light reaction of photosynthesis, in which ATP is synthesized from ADP and inorganic phosphate using light energy absorbed by chlorophyll, in the thylakoid membranes of the chloroplast.

Differences between Cyclic and Non-cyclic Photophosphorylation:

Feature	Cyclic Photophosphorylation	Non-cyclic Photophosphorylation
Photosystems involved	Only PS I (Photosystem I) is involved	Both PS I and PS II are involved



Electron flow	Electrons released from PS I return back to PS I itself (cyclic path)	Electrons flow from PS II to PS I in a linear/one-way path (non-cyclic)
Products	Only ATP is produced (no NADPH, no O ₂ released)	Both ATP and NADPH are produced, along with release of O ₂
Water splitting (photolysis)	Does not occur	Occurs in PS II, releasing oxygen

OR

Name the Scientists who discovered C₃ cycle in plants. Write any four differences between C₃ plants and C₄ plants.

Answer: The C₃ cycle (Calvin cycle) was discovered by scientists Melvin Calvin, Andrew Benson, and James Bassham (commonly credited as the Calvin-Benson cycle; Melvin Calvin received the Nobel Prize for this discovery).

Four differences between C₃ plants and C₄ plants:

Feature	C ₃ Plants	C ₄ Plants
First stable product of photosynthesis	A 3-carbon compound — 3-phosphoglyceric acid (PGA) is formed	A 4-carbon compound — Oxaloacetic acid (OAA) is formed
Leaf anatomy	Do not show Kranz anatomy (bundle sheath cells lack chloroplasts or have poorly developed ones)	Show Kranz anatomy (bundle sheath cells are large, contain numerous chloroplasts, arranged around vascular bundles)
CO ₂ fixation enzyme	CO ₂ is fixed by the enzyme RuBisCO only	CO ₂ is fixed first by PEP carboxylase (in mesophyll cells), then by RuBisCO (in bundle sheath cells)
Photorespiration	Show significant photorespiration, reducing photosynthetic efficiency	Photorespiration is minimal or absent, making C ₄ plants more efficient, especially in hot/dry climates

(Examples: C₃ plants wheat, rice, spinach; C₄ plants maize, sugarcane, sorghum)



Q43. Identify the modified plant part in the following. (1) Rhizome of ginger (2) Carrot (3) Spines of opuntia (4) Thorns of citrus (5) Phylloclade of opuntia

Answer:

1. **Rhizome of ginger** – Modified underground stem (rhizome), which grows horizontally and stores food.
2. **Carrot** – Modified tap root, swollen and modified for storage of food.
3. **Spines of opuntia** – Modified leaves, converted into sharp spines to reduce water loss (transpiration) and protect the plant from herbivores.
4. **Thorns of citrus** – Modified stem (axillary bud modified into a hard, pointed structure), serving as a protective structure against grazing animals.
5. **Phylloclade of opuntia** – Modified stem (flattened, green, fleshy stem that performs photosynthesis in place of leaves, as an adaptation to arid conditions).

OR

Identify adventitious root modification in the following: (1) Rhizophora (2) Cuscuta (3) Banyan (4) Sugarcane (5) Money plant

Answer:

1. **Rhizophora – Pneumatophores:** (breathing roots) vertical roots that grow upward out of the waterlogged soil/mud to obtain oxygen for respiration (seen in mangrove plants).
2. **Cuscuta – Haustorial/parasitic roots:** modified roots that penetrate the host plant's tissue to absorb nutrients and water, as Cuscuta is a parasitic plant.
3. **Banyan – Prop roots:** thick, pillar-like adventitious roots that grow downward from the branches to the soil, providing additional mechanical support to the massive spreading canopy.
4. **Sugarcane – Stilt roots:** adventitious roots arising from the lower nodes of the stem that grow obliquely into the soil, providing extra support/anchorage to the plant against lodging (falling over).
5. **Money plant – Climbing roots:** adventitious roots that arise from the nodes of the stem and help the plant climb and cling onto a support (like a wall or another tree).





Thank you!



We hope you found this material helpful. We wish you the very best for your examination.



Strive for Excellence – Your Path to Success