Zoology [21 Parts]

1. Human body Organ system

1. What are the organ system in human body?

   There are 10 organ system in human body. They are

   - Integumentary system
   - Circulatory system
   - Skeletal system
   - Nervous system
   - Digestive system
   - Respiratory system
   - Reproductive system
   - Urinary system
   - Muscular system
   - Endocrine system

2. What are integumentary system?

   Skin, nail and hair form parts of the integumentary system. Skin is exposed to changes in the environment, physical injuries and continuous attacks from micro-organisms. These functions are effectively monitored and carried out with the help of skin appendages like the hair on the head, body hair, nails, sweat glands and sebaceous glands.

3. What is skin?

   The skin is highly essential to protect internal organs and to prevent the entry of pathogens into the body.

4. How many layers are there in skin?

   The skin is like an envelope and its complex structure is divided into three layers of tissues: 1. Epidermis 2. Dermis 3. Hypodermis

5. What is epidermis?

   Epidermis is the upper layer of the skin. The outermost layer consists of flat, thin and scale - like dead cells. It is separated from the dermis by the basement membrane.

6. What is dermis?

The dermis is the middle layer. It is thick but elastic. The dermis consists of nerves, blood vessels, hair follicles, sweat glands and sebaceous glands (oil glands). Sweat glands separate sweat from the blood.

7. What is hypodermis?

   It is the innermost layer of the skin. It is thick and contains large amounts of adipose tissue. The adipose tissue stores fat and reserves energy. It provides the body with insulation.

8. What are the functions of skin?
   - The skin protects the internal organs of our body.
   - It prevents the entry of infectious agents.
   - It reduces water loss.
   - The skin regulates the body temperature.
   - The skin can prepare Vitamin D with the help of sunlight.
   - It helps us to feel touch, pain and temperature.
   - The skin acts as an excretory organ and excretes sweat.

9. What is muscular system?

   This system is made up of muscles that helps the body to move. Muscle tissue is made of bundles of cells and fibres that work in a simple way. They can contract and relax.

10. Which determine skin colour of human?

    The skin colour of humans is determined by the melanocytes of the basement membrane. The formation of melanocytes is determined by heredity.

11. Name the animals and their locomotory organs?
    - Amoeba Pseudopodia
    - Paramecium Cilia
    - Euglena Flagella
    - Earthworm Body setae
    - Star fish Tube feet
    - Fish Fins
    - Birds Wings
    - Bat Patagium

12. What is Skeletal Muscles?

The skeletal muscles are those that are controlled consciously. It includes bones of hands and legs, among others. The function of the skeletal muscle is to move parts of the body closer to the bone to which the muscle is attached.

13. What is Tendons?
14. These are connective tissue structures showing slight elasticity. They are like cords or straps, attached strongly to bones. The tensile strength of tendons is nearly that of steel.
15. What are fasica?

    Fascia is a sheet of connective tissue that forms a lining around skeletal muscles. The fascia may be superficial or deep. The superficial fascia is a layer of loose connective tissue found between the skin and the muscles.
16. What are the different sets of muscles on our body?

    There are five different sets of muscles in our body:
    - Muscles of the head.
    - Muscles of the neck.
    - Muscles of the trunk region
    - Muscles of the upper limb.
    - Muscles of the lower limb.
17. What is Facial Expressions?

    Facial expressions, such as looking, shocked or smiling are tiny voluntary movements made by more than 30 different muscles.

18. What is breathing?

    Four important thoracic muscles are associated with the process of breathing. The process of inspiration involves scalene and external intercostal muscles. The expiration is performed by the internal intercostal muscles and the transverse thoracis. The major breathing movement is due to the presence of diaphragm, a curved musculo fibrous sheath that separates the thoracic cavity from the abdominal cavity.
19. What is skeletal system?

    The skeletal system gives shape and form to our bodies. It supports and protects our bodies and helps to bring about movement, produce blood cells and store minerals. This system includes bones, cartilages and joints.

20. How are human skeletal system divided?

    The human skeletal system is divided into two parts:

    - The axial skeleton
    - The appendicular skeleton

21. What is Axial Skeleton?

    It is the upright axis of the body. Axial skeleton consists of the skull, the hyoid bones, the vertebral column and the thoracic cage.

22. What is skull?

    The human skull consists of 22 bones: 8 bones form the cranium and the remaining 14 are facial bones. The bones of thecranium are flat. They are connected by immovable joints. Cranium protects the brain. The skull also supports the organs of vision, hearing, smell and taste.

23. What is Phylum mollusca?

    Phylum mollusca is the animal group that does not have internal skeletal system.

24. What is Thoracic cage?

    The thoracic cage or rib cage is made up of ribs that are attached to a long flat bone in front of the chest called the sternum. The ribs are also connected behind the thoracic region of the vertebral column. This thoracic cage encloses a space called the thoracic cavity. There are 12 pairs of ribs

25. How many sets of vertebra are there in human?

    - Cervical vertebrae - 7
    - Thoracic vertebrae -12
    - Lumbar vertebrae - 5
    - Sacral vertebrae – 5
    - Coccygeal vertebrae – 4

26. What is Appendicular skeleton?

    The appendicular skeleton consists of the pectoral girdle and the upper limb (hand), the pelvic girdle and the lower limb (leg).

27. What is Upper limb or hand?

The hands are attached to the pectoral girdle. Each pectoral girdle has a pair of scapula or shoulder blade and a clavicle or collar bone.

28. What are the functions of bone?
    - Bones provide a framework for the attachment of muscles.
    - It helps to hold the weight of our body.
    - They support and protect the internal organs.
    - This system is useful for locomotion.
    - Bones act as a reservoir for calcium and fat.
    - The bone marrow is the site for the production of red blood corpuscles.
29. How many number of bones there in human body?

    In the human body, there are 206 bones, of which 80 are in the axial skeleton and 126 are in the appendicular skeleton. Among the bones of the axial skeleton, 28 bones are in the skull, 26 bones are in the vertebral column, 25 bones are in the thoracic cage and one remains as the hyoid bone.
30. How is digestive system divided?

    The digestive system can be divided into the alimentary canal and the associated glands.
31. How many teeth do human have?

    Adults have 32 teeth, 16 in each jaw which includes 4 incisors, 2 canines, 4 premolars and 6 molars. The last set of molar teeth grows after the age of 20.
32. How many salivary glands are their?

- Parotid glands - They are the largest of the three pairs of glands. They are found below the ears.
- Submaxillary gland - It is found below the jaw and irregular in shape.
- Sublingual gland - It is the smallest gland found at the base of the tongue

33. What do the saliva has?
    - Ptyalin(Amylase) - enzyme
    - Bicarbonate - salt
    - Mucus
    - Lysozyme – enzyme
34. What is Pharynx?

The pharynx is found below the nose and the mouth. It is about 11 cm in length. This region has 7 openings. They are: 2 internal nostrils, 2 eustachian tubes,mouth, larynx and oesophagus.

35. What is Oesophagus?

It is a musculo-membranous canal about 22 cm in length. It extends from the pharynx to the stomach. The inner lining has a mucus coat and it is lined by epithelium.

36. How is stomach divided?

It can be divided into 3 regions: the cardiac, the fundus and the pylorus. The stomach secretes gastric juice. The gastric juice contains the following: 1. Pepsin 2. Renin 3. Hydrochloric acid

37. What is the size of small intestine?

The small intestine is a 5 to 7 m long tube coiled like a hose.

38. What is Duodenum?

The duodenum is C-shaped and is around 22cms in length.

39. What is the weight of lungs?

The liver is the largest glandular organ in humans. It weighs about 1500 gms

40. What do exocrine gland secrete?

- Trypsin
- Chymotrypsin
- Carboxy peptidase
- Amylase
- Lipase

41. What do the intestinal juice contains?

- Sucrase
- Maltase
- Lactase
- Lipase

42. What is the length of Caecum?

Caecum is a large blind pouch and measures about 5 cm in length

43. What is the function of alimentary canal?

- Ingestion
- Digestion
- Absorption
- Assimilation
- Egestion

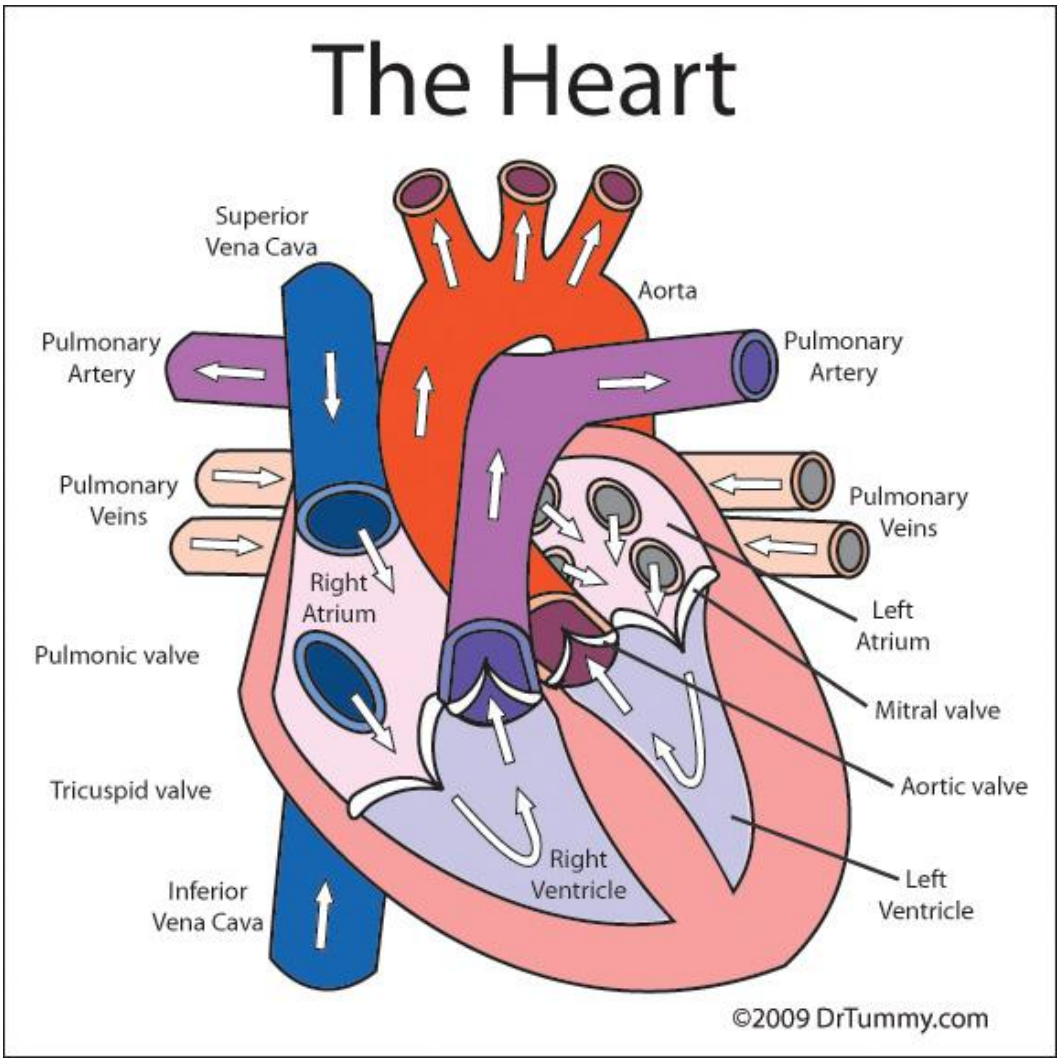
44. What is the weight of kidney?

The average adult kidney measures about 12 cm in length, 6 cm in width and 3 cm in thickness.

45. What are excretory organs?

Kidneys, lungs, liver and skin together function as excretory organs .

46. Mark parts in heart.



49. What are the important parts of heart?

- Right Atrium
  - Superior venacava
  - Inferior venacava
  - Coronary vein
- Right Ventricle Pulmonary artery (Deoxygenated blood)
- Left Atrium Pulmonary veins (Oxygenated blood)
- Left Ventricle Aorta

50. What are the valves in heart?

- Tricuspid Valve: Located inbetween right atrium and right ventricle.
- Bicuspid Valve(Mitral valve): Lies inbetween left atrium and left ventricle.
- Semilunar Valves: Present near the mouth of pulmonary artery and aorta.

51. What are arteries?

The blood vessels that carry blood away from the heart are called the arteries. Generally, the arteries carry oxygenated blood, the except the pulmonary artery.

52. What is blood?

The average human body contains about 4 to 5 litres of blood. Blood is a liquid connective tissue and it transports many substances through the body and helps to maintain homeostasis of nutrients, waste

and gases. Blood is made up of red blood cells, white blood cells, platelets and liquid plasma.

53. What are Blood Corpuscles?

Nearly 45% volume of blood contains corpuscles. The blood corpuscles are of three types:

- Erythrocytes or red blood corpuscles (RBC)
- Leucocytes or white blood corpuscles (WBC)
- Thrombocytes or blood platelets.

54. What is the level of RBC in human blood?

One cubic mm of blood contains 5 millions of RBC. They are produced in the bone marrow. The life span of RBC is 120 days.

55. What are Leucocytes?

They are colourless, irregular and nucleated cells. The WBCs are fewer in number when compared to RBCs and they are larger in size. One cubic mm of blood contains 8000 WBCs. There are 5 types of

WBC which are monocytes, lymphocytes, neutrophils, eosinophils and basophils. The lifespan of WBC is 4 weeks.

56. What are Thrombocytes (Blood Platelets?

These are small, non-nucleated and colourless structures floating in the plasma. In one cubic mm of blood, there are 2,00,000 to 4,00,000 thrombocytes.

57. What is Respiratory area?

The total surface of the alveoli will be around 80-100 square metres and is equal to the size of the tennis court.

58. What is carina?

The cartilagenous ridge found at the base of the trachea is called the carina. Foreign

objects reaching carina stimulate a powerful cough.

59. What do the male reproductive system includes?

The male reproductive system includes the primary sex organs and accessory organs. The primary sex organs are the testes and the accessory organs are seminal vesicles, prostrate glands, urethra

and penis.

60. What do the female reproductive system include?

The female reproductive system consists of ovaries and accessory organs such as fallopian tubes, uterus, cervix and vagina. The ovary produces an egg in every 28 days (menstrual cycle) apart from the female sex hormones, oestrogen and progesterone.

61. What are the phases of menstrual cycle?

1. The follicular phase(5th day –14th day)

2. The luteal phase or premenstrual phase (15th day – 28th day)

3. The menstrual phase (1st day – 5th day)

62. How can we classify the development of foetus?

The development of foetus can be studied as phases of three month period: The first, second and third trimesters.

First trimester

During this period, the proliferation of cells takes place and a single cell is transformed into a foetus gradually. Organogenesis takes place resulting in the formation of organs.

Second trimester

The foetus grows rapidly. The respiratory and circulatory systems become well developed and functional. The bones and muscles are well formed.

Third trimester

The length and weight of the foetus increases very rapidly and the development is completed.

63. How do child birth take place?

A few days before birth, the foetus turns head downwards in the uterus, just above the cervix.

At the onset of childbirth, the uterus begins to contract rhythmically under the influence of oxytocin hormone. These contractions become stronger and more frequent. This marks the onset of labour pain. With continued powerful contractions, the amnion ruptures and the amniotic fluid flows out through the vagina. Finally, the muscular contractions of the uterus and the abdomen expel the child through the dilated cervix and vagina. The umbilical cord that still connects the child to the placenta is tied and cut. A few minutes later, the placenta breaks away from the uterus and is expelled as 'after birth'.

64. How are test tube babies formed?

The test tube babies are formed by the technique of invitro fertilization in which fertilization and early development takes place in an artificial medium outside. Dr. Robert Edwards and Dr.Patrick Steptoe of UK were successful in producing the first test tube baby.

2. Structure and Functions of Human Body

1. What is Homeostasis?

Steady state in body functioning called Homeostasis.

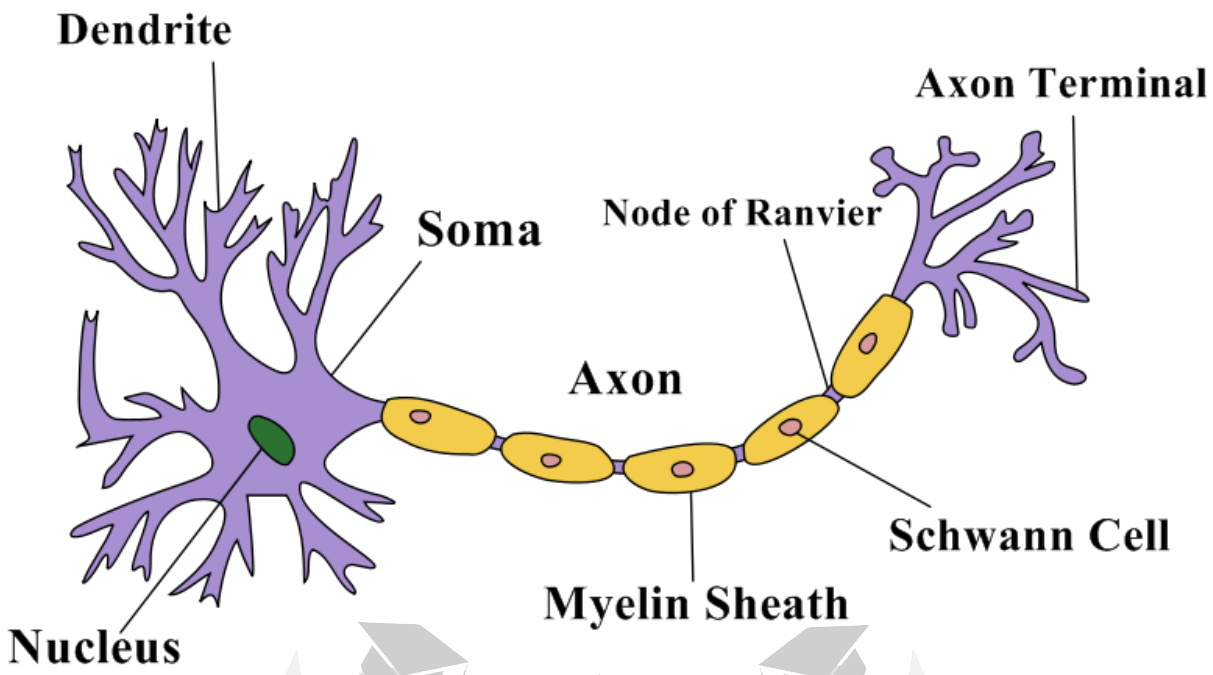
2. What is nervous system?

The nervous system provides an organized network of point-to-point connections for quicker coordination.

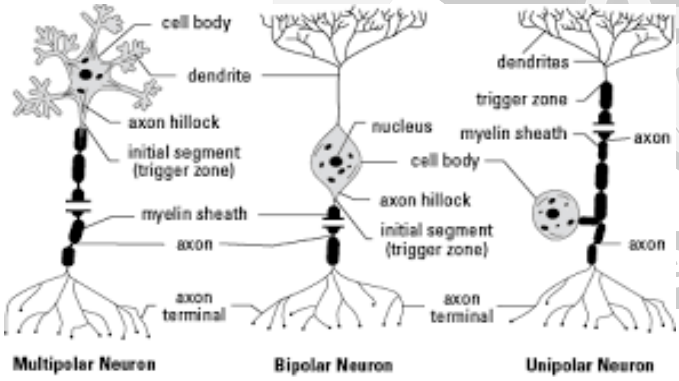
4. What is endocrine system?

The endocrine system provides chemical integration through hormones.

5. Label the parts in the structure of neuron?



6. What are the types of neuron?



7. What do the nervous system of human consist of?

i) Specialized cells called neurons or nerve cells which can detect, receive and transmit different kinds of stimuli.

ii) Neuroglial cells are the supporting cells of neurons.

iii) The nerve fibres are certain bundles of extended projections of nerve cells.

8. What is nerve cell?

Nerve cells or neurons are the structural and functional units of the nervous system. The Human Brain is made up of about 86 billion neurons and many more neuroglial cells (more than 86 billion). A nerve cell is a microscopic structure consisting of three major parts namely, cell body, dendrites and axon.

9. What are the types of nerve cell?

a) Myelinated or Medullated or White neurons: When the axon is enclosed by the white fatty myelin cover, it is called Myelinated or Medullated or White neurons. This forms the white matter of our brain.

b) Non- Myelinated or Non-Medullated or Grey neurons: This neuron is not enclosed by

the myelin sheath; so it appears grayish in colour. The axon is covered only by neurilemma and Schwann cells. This type of neuron is found in the grey matter of cerebrum.

c) Unipolar neurons: The developing embryonic nervous tissue contains unipolar neurons. A unipolar neuron has a nerve cell body with a single process or fibre, which acts both as axon and dendron.

d) Bipolar neurons:The sensory hair cells of the sense organs like rods and cones of retina are made up of bipolar neurons. Each bipolar neuron has a cell body and two processes at the ends, one acting as axon and the other acting as dendron.

e) Multipolar neuron: The cerebral cortex contains multipolar neurons. Each multipolar neuron has a cell body with many dendrites and an axon.

10. What is nerve impulse?

The conduction of stimuli by the nerve cells is called nerve impulse. The dendrites will receive the stimuli from the receptor (sense organ) and conduct the same as electrical impulse to the axon through the cyton.

11. What is Duramate?

The outermost cover lying below the skull and vertebral column is doubly thick and is called Duramater

12. What is Arachnoid membrane?

The middle covering is thin and vascularised and is called Arachnoid membrane.

13. What is piameter?

The innermost cover is a very thin delicate membrane and is closely applied on the outer surface of brain and spinal cord and it is called Piamater

14. What is brain?

The brain is the central information processing organ and acts as the command

and control system.

15. How is human brain divided?

The human brain as in the case of other vertebrates, is divided into three major

parts:

a) Forebrain

b) Midbrain

c) Hindbrain

16. How is human nerves system divided?

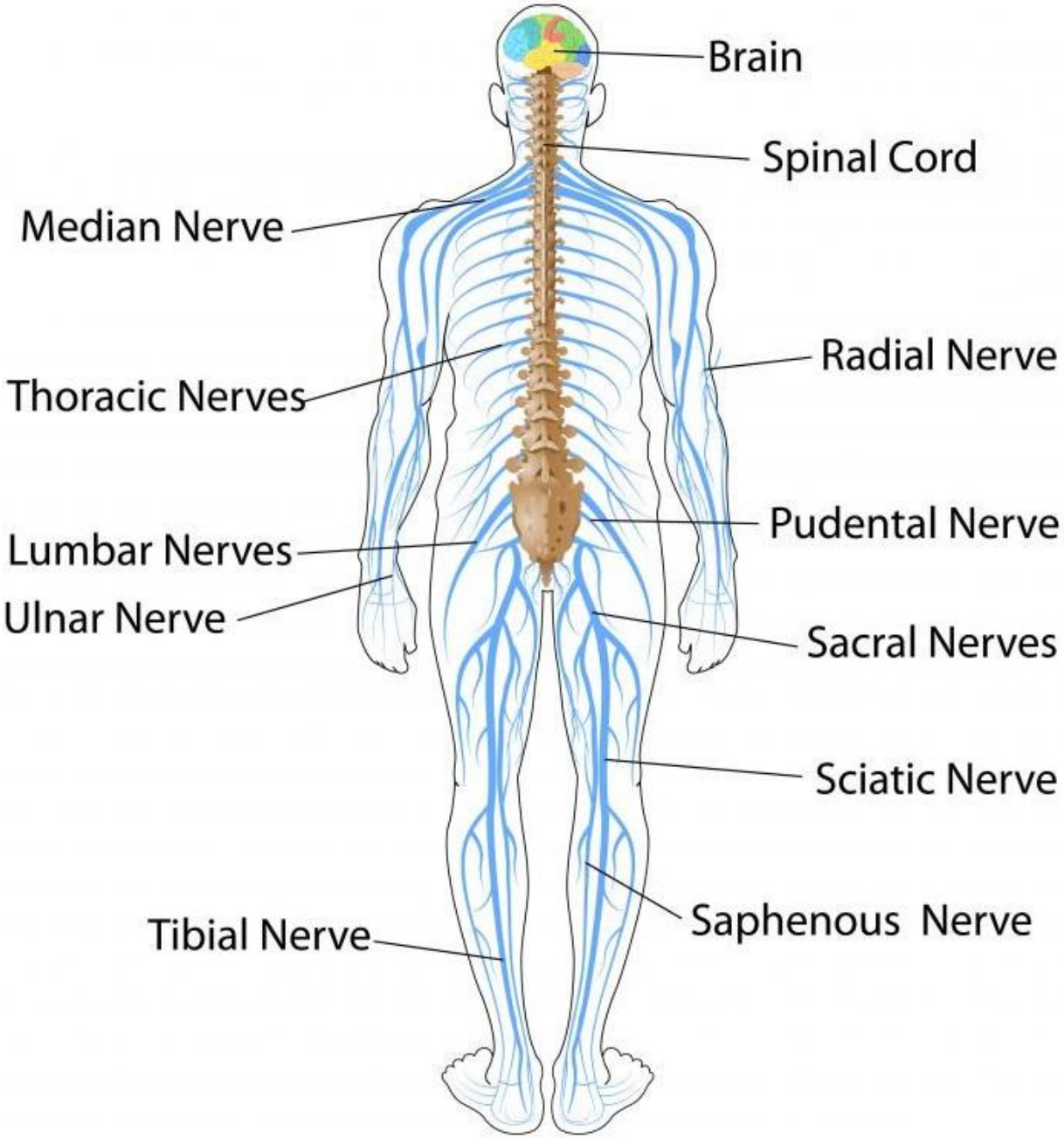
The human nervous system is divided into:

a) The Central Nervous System (CNS)

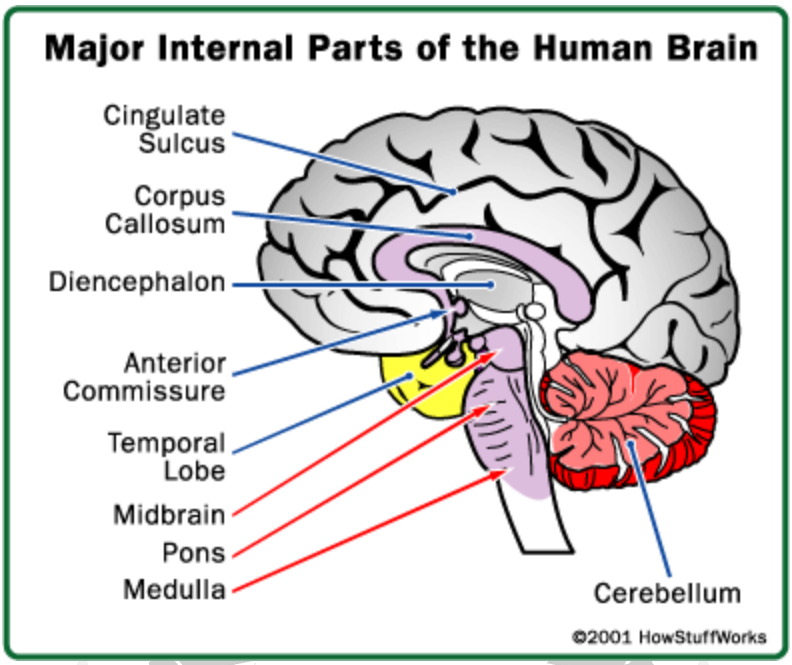
b) The Peripheral Nervous System (PNS)

c) The Autonomic Nervous System (ANS)

17. Label parts in human nervous system.



18. What are the major internal parts of human brain?



19. What is Hypothalamus?

It lies at the base of the thalamus. It controls body temperature, urge to eat and drink, the regulation of sexual behavior and expresses emotional reactions like excitement, anger, fear, pleasure and motivation.

20. What is Midbrain?

The midbrain is located between the thalamus and the hindbrain. A canal called cerebral aqueduct passes through the midbrain. The dorsal portion of the midbrain consists of four hemispherical bodies called corpora quadrigemina which controls and regulates various visual reflexes and optical orientation.

21. What are Pons?

It is the bridge of nerve fibres that connects the lobes of the cerebellum. It relays the information from the cerebrum to the cerebellum. It also contains the sleep and respiratory centers.

22. What is Medulla oblongata?

Medulla is the posterior most part of the brain where it merges with the spinal cord.

It acts as a coordination pathway for both ascending and descending nerve tracts.

Medulla is the centre for several reflexes involved in the regulation of heart beat, blood vessel contraction, breathing, etc.

23. What is spinal cord?

This is a tubular structure, a continuation of the brain lying in the neural canal of the vertebral column. The meninges – Piamater, Arachnoid membrane and the Duramater cover the spinal cord as in the case of the brain.

24. What are lumbar plexus?

The spinal cord has two enlargements – one in the neck region of the body called

cervical plexus and another in the lumbar region of the vertebral column called

lumbar plexus.

25. What is conus medullaris?

The spinal nerves arise from these enlargements. Below the lumbar enlargement, the spinal cord tapers to form a cone like region called the conus medullaris.

26.What is Filum terminale?

The tip of the spinal cord is filamentous and is called Filum terminale

27. What is PNS?

Peripheral Nervous System (PNS) The nerves arising from the brain and the spinal cord constitute the PNS.

28. What is endocrine system?

The chemical coordination of physiological processes to maintain the homeostasis is the work of the endocrine system. The endocrine system controls and coordinates the physical processes of

growth, reproduction and sustenance of life. The endocrine system consists of a number of endocrine glands and their hormones.

29. Name some endocrine system found in body?

Head – a) pituitary gland b) pineal gland

Neck – a) thyroid gland b) parathyroid gland

Thorax – thymus gland

Abdomen – a) pancreas – Islets of Langerhans b) adrenal glands – adrenal cortex and adrenal medulla c) gonads – testes in man and ovaries in woman

30. What is Pituitary Gland?

It is a tiny gland, the size of a pea, attached to the hypothalamus of the brain. The pituitary

gland regulates the endocrine glands and so it is called as the conductor of the Endocrine

Orchestra

31. How are pituitary glands divided?

Pituitary gland is divided into an anterior lobe called adenohypophysis and a posterior lobe called neurohypophysis.

32. What is thyroxine.?

The bilobed thyroid gland is located in the neck, one lobe on the either side of larynx, which secretes a hormone called thyroxine. Thyroxine is an iodinated protein, composed of tyrosine (amino acid) and iodine.

33. Name some thyroid disordered?

1) Hypothyroidism – less secretion of thyroxine causes many abnormalities like simple goitre, myxoedema and cretinism.

a) Simple goitre – It is due to the deficiency of iodine in our diet. Thyroid gland bulges as a swelling in the neck and it is called as goitre.

b) Myxoedema – It is caused in adults. The symptoms are: low metabolic rate, loss of mental and physical vigour, increase in weight, thickening of skin, lowered heart beat, mental dullness, etc.

c) Cretinism – This is caused in children and the symptoms are: stunted growth, retarded mental development, defective teeth, protrusion of tongue and loose skin.

2) Hyperthyroidism – The excess production of thyroxine causes exophthalmic goitre or Grave's disease. The symptoms are: high metabolic rate, high blood pressure, high irritability, profuse sweating, loss of weight, fatigue and protrusion of eyeballs.

34. What is Islets of Langerhans?

Pancreas plays a dual role both as an exocrine and an endocrine gland. The an endocrine portion is called Islets of Langerhans.

35. What is Insulin?

- It promotes the uptake of glucose by the cells for tissue oxidation.
- It favours conversion of glucose into glycogen and its storage in the liver and the muscles.
- It prevents the formation of glucose from protein and fat.

36. What is testosterone (androgen)?

Leydig cells constitute the endocrine part of the testes. It secretes male sex hormone called testosterone (androgen).

37. What is Oestrogen?

Oestrogen is responsible for growth of female reproductive organs and the appearance of secondary sexual characters in female, such as growth of pubic hair, soft voice, feminine body,etc.

38. What is Amitosis.?

A matured cell divides into two daughter cells. Unicellular animalcules like amoeba, undergo binary fission without any change in the chromatin reticulum. This type of cell division is called Amitosis.

39. What is Cytokinesis?

The cytoplasmic division takes place at right angles to the position of the nuclei ,resulting in the formation of four gametes.

40. What are the significance of meiosis?

1. Haploid sex cells are produced in order to maintain constancy in the number of

chromosomes of a species.

2. Crossing over results in variation of genetic traits in the offspring.

3. Variations form the raw material for evolution.

3. Reproduction in Plants

1. What is reproduction?

Reproduction is a special biological process, by which new individuals of the same species are produced. It is one of the biological processes like nutrition, respiration and excretion.

2. What is binary fission?

Unicellular organisms, like amoeba and bacteria, split into two equal halves and each half develops into new ones. This method is called binary fission.

3. What is Vegetative propagation?

It is the ability of plants to reproduce by bringing forth new plants from the existing vegetative structures without sexual reproduction.

4. How reproduction takes place in hydra?

In Hydra, a bud develops into an outgrowth due to repeated cell division at one specific site. These buds develop into tiny individuals and when fully matured, get detached from the parent body to become new independent individuals.

5. What are spores?

In lower group of plants, asexual reproduction takes place by means of spores. The spores are covered by thick walls that protect them until they come into contact with another moist surface and begin to grow.

6. What are Aplanospores?

In algae, the protoplast of the vegetative cells contract and produce ovoid bodies surrounded by a thin wall. These thin walled non-motile spores are called Aplanospores. New filaments are formed by the germination of these spores.

7. What are zoospores?

A zoospore is a motile asexual spore that uses a flagellum for locomotion. These spores are created by some algae, bacteria and fungi to propagate themselves.

8. What are akinetes?

In algae, the vegetative cells secrete thick additional wall layers. During adverse conditions, food materials are filled up in cells. These structures are called akinetes. During favourable conditions

they develop into new filaments.

9. What is Conidia?

Conidia are uninucleate, non-motile, asexual spores produced by the fungus like penicillium.

10. What is Sexual reproduction?

Sexual reproduction is the process in which two gametes (male and female) are

fused to produce offspring of their own kind.

11. What is the main whorls of flower?

The main whorls of a complete flower are:

1. Calyx (Composed of sepals)
2. Corolla (Composed of petals)
3. Androecium
4. Gynoecium

12. What is Gynoecium?

Gynoecium is the female part of the flower and is made of carpels. It has three parts : 1. Ovary 2. Style 3. Stigma

13. What is pollination?

The transfer of pollen grains from the anther to stigma of a flower is called pollination. Pollen grains are transferred mainly by wind, water, insects and animals. They are called pollinating agents.

14. What are types pollination?

Pollination is of two types. They are:

1. Self pollination

2. Cross pollination

15. What is self pollination?

Self pollination is also known as autogamy. The transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower of the same plant is known as self pollination.

16. What is Cross Pollination?

The transfer of pollen grains of a flower to the stigma of another flower of a different plant of the same species is called cross pollination or allogamy.

17. What are the types of cross pollination?

a) Pollination by animals (Zoophily)

b) Pollination by birds (Ornithophily)

c) Pollination by insects (Entamophily)

18. What is Entamophily?

Insects like butterflies and honey bees are attracted to the bright petals of the flowers. These flowers are large in size and have a sweet smell. Some of these flowers produce nectar. This is the most common of all types of pollination. This kind of pollination is called Entamophily.

19. What is Anemophily?

The flowers pollinated by wind are mostly small in size and do not have any attractive colour, smell and nectar. They produce a large number of pollen grains to make up for

the wastage of pollen in transit.

20. What is hydrophily?

Pollination by water is called hydrophily

21. What are the Process of fertilization?

The pollen tube enters into the embryo sac through micropyle. At this time, the pollen tube bursts open, gametes are released from the pollen tube and enter into the embryo sac. One of the gametes fuses with the egg and the other fuses with the secondary nucleus. The fusion of a male gamete with a female gamete (egg) is known as fertilization. The fertilized egg is known as zygote which develops into an embryo.

22. What is double fertilization?

The other male gamete fuses with the secondary nucleus. The secondary nucleus is diploid in nature.

23. What is fruit?

The fruit may be defined as a fertilized and ripened ovary. The ovary wall becomes the fruit wall (pericarp) and the ovule becomes the seed.

24. What are Simple fruits?

A simple fruit is developed from a single ovary with a monocarpellary or multicarpellary,

syncarpous gynoecium. Based on the nature of the pericarp, the simple fruits are classified into fleshy fruits and dry fruits.

25. What are Simple fleshy fruits?

In simple fleshy fruits, the pericarp is succulent and juicy when fully ripe. The fleshy fruits are indehiscent in nature. The pericarp is made up of three layers, namely epicarp, mesocarp and endocarp. There are mainly two types of fleshy fruits – Baccate and Drupaceous. Baccate is further classified into berry, hesperidium, pome and pepo.

26. What are Simple dry fruits?

These fruits have a dry pericarp. They are classified based on mode of dehiscense as dry dehiscent, dry indehiscent and schizocarpic fruits.

27. How reproduction takes places in Aggregate Fruit?

It is developed from a single flower with a multicarpellary, apocarpous, superior ovary. Each free carpel develops into a fruitlet. Hence, the aggregate fruit has a cluster of fruitlets attached to a common stalk e.g. Polyalthia

28. What is Composite or Multiple fruit?

Multiple or composite fruit is formed from all the flowers of whole inflorescence and gives a single fruit.

29. What are the types of multiple fruit?

There are two types of multiple fruits namely sorosis and syconus.

30. How are angiosperms divided?

1. Dicotyledons: Seeds with two cotyledons e.g. pea, bean and castor.

2. Monocotyledons: Seeds with one cotyledon e.g. maize, rice, wheat and onion

31. What is the Structure of a dicot seed?

The seed is bulky, oval and slightly indented on one side. On this side, there is a short longitudinal, whitish ridge called the raphae. At one end of the raphae, there is a minute opening known as germ pore or micropyle. If a water-soaked seed is pressed gently, a small drop of water along with air bubbles will come out through the micropyle. The embryo is enclosed by the seed coat. It consists of cotyledons attached to the primary axis which has a rudimentary root portion called the radicle and a rudimentary stem portion known as plumule. The tip of the radicle projects outside, and is nearer to the micropyle. The plumule is placed between the two cotyledons and consists of a shoot axis and a small bud having two tiny folded leaves.

32. What is the Structure of monocot seed?

In paddy, the so - called seed is actually a fruit. It is a simple indehiscent one – seeded fruit known as caryopsis. The seed coat is very thin. The fruit wall (pericarp) is thin and fused with the seed coat. The fruit is generally covered with yellowish bract and bracteoles which are commonly known as chaff. The embryo consists of a single cotyledon called scutellum and a

shoot axis. The lower part of the axis is the radicle, covered by a sheath called coleorhiza (root sheath). The upper part is known as plumule which is covered by a sheath called coleoptile. In a day or two, after the seed is placed in moist soil, the coleorhiza pierces the base of the seed. The radicle comes out next after splitting the coleorhiza. The radicle does not form the root system. Meanwhile, roots are formed from the lower most nodes of the stem. These roots are called adventitious roots. These adventitious roots form the fibrous root system of the matured plant.

33. What is Anemochory?

Anemochory is the wind dispersal of fruits and seeds. The wind blows them away and for this they have to be light, so that their buoyancy may enable them to float on air over long distances.

34. What is Autochory?

Autochory is an active mechanism of self dispersal of fruits and seeds. Fruits like balsam burst with a sudden jerk and disperse the seeds by wind through an explosive mechanism.

35. What is Hydrochory?

Hydrochory is a mechanism in which dispersal of fruits and seeds takes place by means of water. Fruits which are dispersed by water have outer coats that are modified to enable them to float. The mesocarp of coconut is fibrous and is easily carried away by water currents.

36. What is Zoochory?

Zoochory is a mechanism in which dispersal of fruits and seeds is by animals. Some fruits are provided with hooks, spines, bristles, stiff hair, etc. on their outer coat. With the aid of these out growths, these fruits stick to the furry coats or skins of some animals and get carried from one place to another.

4. A Representative Study of Mammals

1. What are called as mammals?

Mammals are a divergent group of animals, occupying different biomes of the environment, successfully adapting to their habitats. Mammals are found almost in all habitats like oceans, freshwater bodies, hilly regions, forests, deserts, polar regions and swamps.

2. How are Mammals distinguished from other vertebrates?

Epidermal Hair and Milk producing glands

3. What do the Epidermal Hair of mammals change?

All mammals have hair. Even apparently hairless whales and dolphins possess hair in the embryonic stage and grow sensitive bristles on their snouts when they turn adults. Mammalian hair is a new form of skin structure- a derivative of the skin. Hair is an insulator against heat loss. The colour and pattern of mammal's skin usually matches its background. Hair is also a sensory structure, as the whiskers of cats and dogs are sensitive to touch. Hair also acts as a defensive mechanism for porcupine and hedgehogs. Their long, sharp, stiff hair called quills protect them from predators.

4. What are the featured of milk producing glands of mammals?

All female mammals possess functional mammary glands that secrete milk. Newborn

mammals born without teeth are suckled by their mothers. Milk producing glands are modified sweat glands.

5. What is Habitat?

Habitat is the place where an organism lives.

6. What are marine-mammals?

In marine-mammals like whales and dolphins the limbs are modified into flippers which are used as oars to swim in water. They also possess huge subcutaneous fat deposits to conserve heat. The jaws of the whales are modified into baleen plates to sieve the water and trap minute plank tonic organisms called krill, which is their food.

7. What are the features of camel?

The skin of the camel is doubly thick and contains water-storing osmotic cells to conserve water, as they live in deserts. They have thick bushy eyebrows covering the eyes to protect their eyes from sand storms. Their nostrils can be closed during desert storms to prevent the entry of sand particles.

8. What are the features of bats?

Bats are the only mammals that are capable of flight. The forelimbs of bat's are modified into a wing-like structure. The bats wing-patagium is a leathery membrane of skin and the muscle is stretched over the bones of the fingers. Bats prefer to hang upside down from

their legs, while resting. The nocturnal bat can fly without crashing into things and still capture insects by echo location. As a bat flies, it emits a rapid series of extremely high pitched clicking sounds. The sound waves bounce off objects or flying insects and the bat hears the echo.

9. Who is an intellectual social animal?

Man is an intellectual social animal. The fingers and toes are adapted for extremely deft movements in holding fine objects, in writing and handling delicate instruments.

10. What is body temperature of man?

The body temperature in man is maintained at 98.4o F to 98.6o F.

11. Who is William Harvey?

William Harvey 1578-1657 was an English physician. He was the first to give details about blood circulation, properties of blood and pumping of blood by the heart.

12. What is the circulatory system of man?

In man, the circulatory system is composed of :

- the heart
- the blood vessels namely arteries, veins and capillaries

- the blood
- the lymph

13. What is the feature of human heart?

The human heart is a hollow, fibromuscular organ. It is in the shape of an inverted cone. The heart is covered by a protective double layered membrane called pericardium filled with pericardial fluid. The heart is made up of a special type of muscle, called cardiac muscle. The partitions within the heart divide the heart into four chambers the auricles and the ventricles. The right half of the heart receives and pumps out deoxygenated blood and the left half of the heart receives and pumps out oxygenated blood.

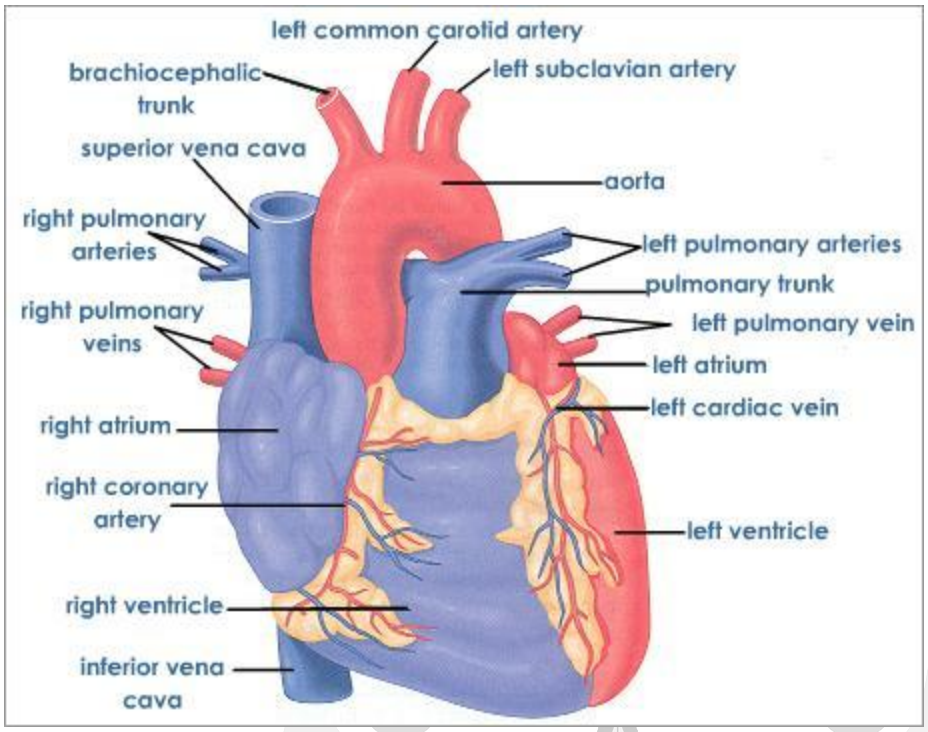
14. What is Auricles?

The auricles are the thin-walled upper chambers of the heart. They are divided into a right auricle and a left auricle, by a partition called inter-auricular septum. Auricles are the receiving chambers of blood. Into the right auricle, open the superior venacava and inferior venacava emptying the deoxygenated blood brought from different parts of the body. Into the left auricle open the four pulmonary veins emptying the oxygenated blood brought from the two lungs.

15. What are Ventricles?

The ventricles are the thick-walled lower chambers of the heart. A partition called inter-ventricular septum divides the ventricle into the right and the left ventricles. The ventricles pump the blood out from the heart.

16. Mark parts of human heart.



17. How does human heart functions?

The human heart works by contraction and relaxation of the cardiac muscles. The contraction phase is called systole and relaxation phase is called diastole. When the auricles are filled with blood, they are in relaxation phase (auricular diastole). By now, the ventricles will push the blood into the aorta and the pulmonary artery by their contraction (ventricular systole). When the auricles contract (auricular systole) the blood is pushed into the ventricles through the bicuspid and the tricuspid valves, leading to ventricular relaxation (ventricular diastole).

18. What is the heart beat of human?

The closure of the valves of the heart produce two different cardiac sounds- “lubb” and “dubb”. The human heart beats 72 times a minute when the body is at rest.

19. What are the types of blood vessels?

There are three distinct types of blood vessels namely, arteries, veins and capillaries.

20. What are the Arteries?

Arteries carry the blood from the heart to different parts of the body. They are the branches of aorta, supplying oxygenated blood to the various regions of the body (except pulmonary artery which carries deoxygenated blood). The aorta branches into arteries. Arteries branch into arterioles. Arterioles branch into fine tubes called meta arterioles. The meta arterioles end up in the tiny blood vessels called capillaries.

21. What are Capillaries?

Capillaries are tiny blood vessels that form a network, called capillary network around the tissues. They enable the passage of substances from the blood into the tissues.

22. What are Veins?

The veins carry the blood from different parts of the body to the heart. The capillaries

reunite to form venules, which carry the deoxygenated blood from the tissues. The small venules rejoin the big veins and open into the superior venacava and inferior venacava. Except for the pulmonary veins, all other veins carry deoxygenated blood.

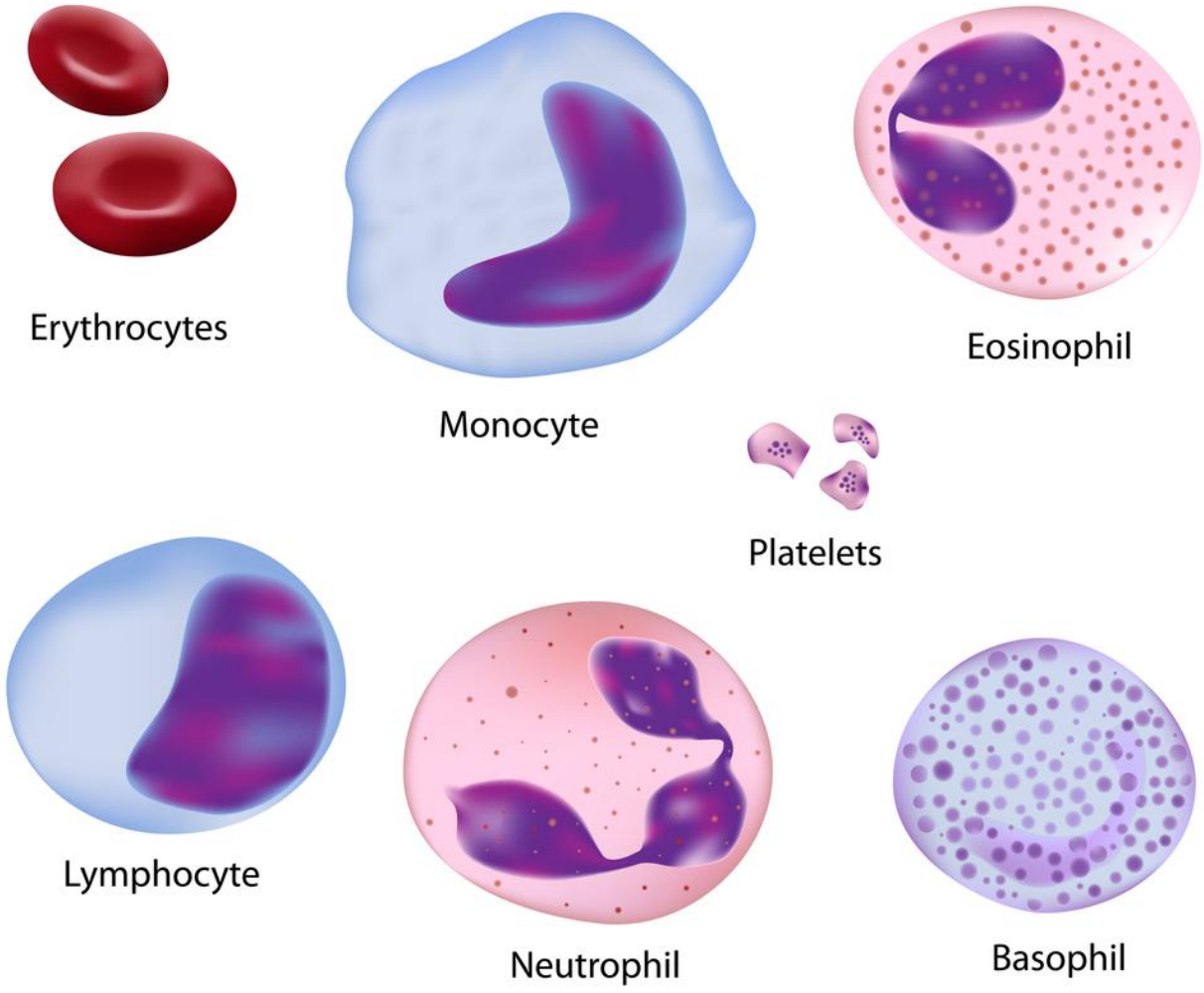
23. What is blood?

Blood is the red river of life – providing the internal environment to the body. Blood is the connective tissue, consisting of the fluid part called plasma and the solid components, the blood cells.

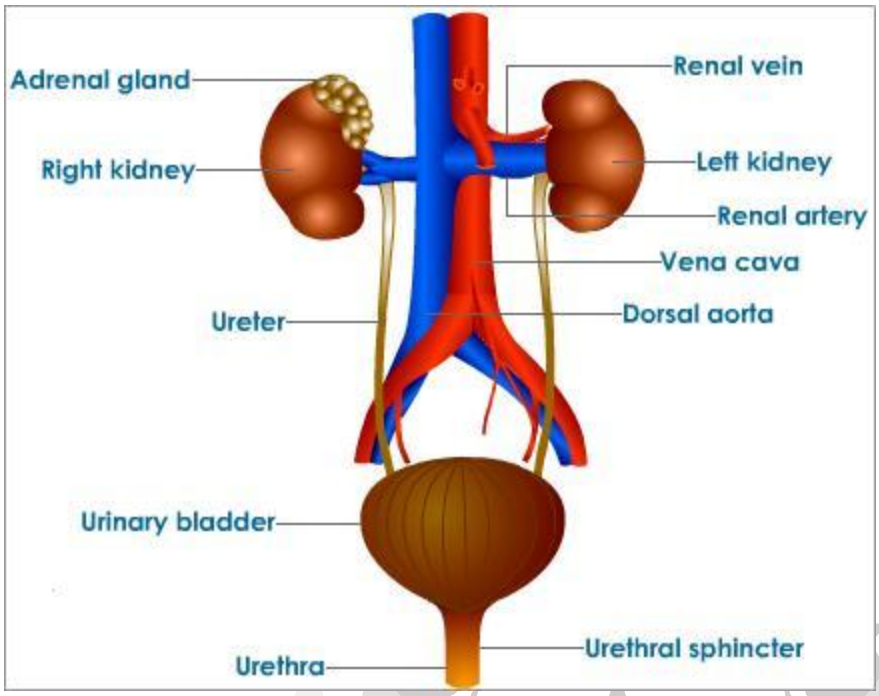
24. What are the types of blood cells?

There are three types of blood cells namely Red Blood Cells, White Blood Cells and Blood Platelets. They float freely in the plasma.

25. How do the blood cells look?



26. Excretory System of Man.



27. What is the external structure of human?

A pair of kidneys are present in the upper abdominal region, one on either side of the vertebral column attached to the dorsal body wall. A thin transparent membrane called 'capsule' covers the kidney. The kidneys are bean-shaped with outer convex surface and inner concavity. The depression in the concavity is called renal hilus, from which arises the muscular tube called the ureter. The two ureters open into the distensible muscular sacs called the urinary bladder, stores urine. From the urinary bladder arises the urethra through which, urine passes out of the body.

28. What is the internal structure of human?

The outer portion of the kidney is dark in colour and is called renal cortex. The inner pale region of the kidney is called renal medulla. Renal medulla contains conical masses called renal pyramids. On the renal pyramids are found the openings called renal papillae, which open into the inner space of the kidney called renal pelvis. From the renal pelvis arises the ureter. The kidneys are composed of millions of units called nephrons.

29. What is the Structure of a Nephron?

Nephrons are the structural and functional units of the kidney. Each kidney is composed of millions of nephrons. A nephron has two structural components namely, Malpighian capsule and Uriniferous tubules.

30. What is Malpighian Capsule?

This consists of a network of blood capillaries called glomerulus and a double walled cup called Bowman's Capsule. The glomerulus is a network of blood capillaries, formed by the branches of the wider afferent renal arteriole. From the glomerulus arises the narrow efferent renal arteriole, which branches over the rest of the nephron as network of capillaries. The Bowman's capsule accommodates the glomerulus.

31. What do the forelimbs of mammals consist?

The forelimbs of mammals consist of five parts namely upper arm, fore arm, wrist, palm and phalanges, but they are used differently in different animals.

32. What is behavior?

Behaviour is both an instinctive process (influenced by genes) and a learned experience (gained by experience).

33. What is imprinting?

Social attachment among animals is called imprinting.

34. What is filial imprinting?

The binding or attachment between the parents and the offspring is called filial imprinting.

35. What is cross fostering?

At times, we find the young one of a species raised by a parent of another species (e.g the chick of a cuckoo bird is fed by a crow in its nest). This behavioural pattern is called cross fostering.

36. What is the abstract of case study by Arun Venkatraman?

The behavioural patterns in different situations are investigated in the research projects taken up by leading universities in Tamilnadu. The abstract of case study by Arun Venkatraman, Asian Elephant Conservation Centre, Centre for Ecological Science, Indian Institute of Science – Bangalore on Dholes is given below. Asiatic wild dog "Chen Nai" – in Tamil, commonly called Dholes – Cuon alpines is an endangered species living in Mudumalai Wildlife Sanctuary at Nilgiris, Tamilnadu. The Dholes live in packs of 8-10 which consist of old females, males, females and pups. The pack members co-ordinate while attacking and killing a large prey such as an adult Sambar deer. There is a tendency to share the meat among the members of the pack. However, there prevails a squabbling among them to grab the choicest piece of meat. The young pups are allowed to take their share of meat first. The old males follow them. The other young ones and old females usually lag behind. The Dholes also exhibit a high degree of parental care by shifting their den frequently so that the pups are kept safe from predators such as leopards and hyenas.

5. Our Environment

1. Which constitute our environment?

Air, light, land, soil, water bodies, plants and animals around us constitute our environment

2. How is environment polluted?

Environment is polluted, due to industrial development, over population, modern life style and urbanization, which leads to undesirable and harmful effects.

3. What is wastes or effluents?

A lot of waste is accumulated owing to our busy life style. Things like plastic bags, papers, water bottles, aluminium foils, chocolate wrappers, peels of fruits and vegetables are thrown away after use. Unwanted substances formed during a process or substances which cannot be reused are called wastes or effluents.

4. Where is garbage situated?

Garbage are generated in places like houses, classrooms, industries and public places like streets, market and sea shore.

5. What are the Types of garbage?

Solid wastes which pollute environment are of two types, namely

- Bio degradable waste
- Non bio degradable waste

6. What is the bio degradable waste?

In nature, some wastes are gradually degraded by bacteria, fungi (micro-organisms) and earthworm. These are bio degradable waste. Leaves, agricultural wastes, animal wastes, vegetables, fruits and their peel, seed, nut are examples of bio degradable waste.

7. What are Non-biodegradable waste?

Waste substances that are not degraded by micro-organisms are non-biodegradable wastes. Eg: plastics, industrial effluents, metals.

8. What is land filling?

Landfilling is a method in which wastes are dumped into naturally occurring or man-made pits and covered with soil. Garbage buried inside landfills remain here for a long time as they decompose very slowly and become manure. These places can be converted into parks, gardens, etc.

9. What is Incineration?

The burning of solid waste in incinerator is called Incineration.

10. What is composting?

The process of degradation of organic wastes into manure by the action of microorganisms is called composting.

11. What is reusing?

Reusing means using a thing again and again, rather than using and throwing it after a single use. Instead of using plastic bags for shopping, using cloth bags is the best example for reusing.

12. What is recycling?

The process by which waste materials are used to make new products is called recycling. Using old clothes to make paper and melting some plastics to make floor mats, plastic boards and hose pipes are example of recycling.

13. What are the Benefits of garbage disposal?

- Pollution of air, water and land is reduced.
- Natural resources such as trees and metals are protected.
- Clean and hygienic surrounding is made.
- Unnecessary expenses are avoided.

14. What is vermicompost?

Vermicomposting is a type of composting where the organic wastes are degraded by using earthworms. The manure obtained by this process is called vermicompost.

15. What is 3R?

3R - reducing, reusing and recycling.

6. Eco System

1. What makes elephant to move out of forest?

Elephants live in forests. Forest is an ecosystem. Forests are the natural habitats of elephants. People have been cutting down trees and reducing forest cover for cultivation and other purposes. The elephants lose their habitations in the reduced forest area. So they are forced to come out of their forest homes (ecosystems) and move in the areas where people live.

2. What is eco system?

A community of living organisms with the physical environment of a definite geographical region form an eco system.

3. What are the components of eco system?

An eco-system consists of two main components. They are biotic (living) and abiotic (non-living) components.

4. What are the categories of biotic components?

The living components are broadly classified into three categories.

1. Producers: They are green plants that prepare their own food by the process of photosynthesis.

2. Consumers: We know that animals eat plants and they in turn are eaten by other animals. Hence the food produced by green plants is directly or indirectly consumed by all kind of animals, which are called consumers. eg. Goat.

3. Decomposers: They are organisms which feed upon dead matter to get energy and give back the nutrients to the soil. eg. bacteria and fungi.

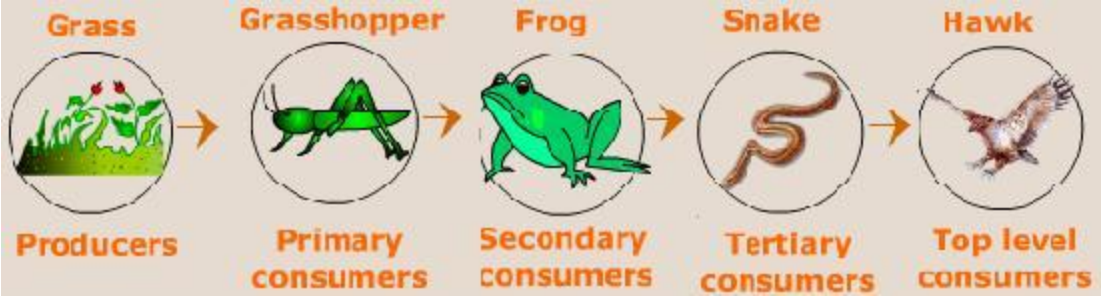
5. What do the abiotic components include?

This include the soil, water, air and climatic factors such as temperature, sunlight, humidity etc.

6. What is food chain?

The path of energy transfer from one organism to another in a single direction is called a food chain.

7. What is the food chain of grassland?



8. What is the food chain in forest?

9. What is the food chain in pond?

Phytoplankton-> Insect ->Small fish-> Large fish-> Man

10. What is trophic level?

In a food chain, each group of organisms occupies a particular position. The position of organisms in a food chain is called trophic level.

11. What are the various trophic level?

Trophic Level 1	Producer
Trophic Level 2	Primary Consumer
Trophic Level 3	Secondary Consumer
Trophic Level 4	Tertiary Consumer

12. What is food web?

A network of interlinked food chains is called a food web

13. What is flow of energy?

The sun is the ultimate source of energy for all living things. At first, the solar energy flows from the sun to the surface of the earth. Green plants trap the solar energy and convert it into chemical energy (food). The amount of energy decreases from one trophic level to another. The flow of energy is always in one direction only.

14. What is biome?

An ecosystem may be small or big. When small ecosystems are put together, they form a vast geographical area which supports a wide variety of flora and fauna. At the same time such a vast area has a different type of climate. Such a vast geographical area is called biome.

15. How are biome classified into many types?

Based on the types of flora and fauna, the biomes are classified into many types.

16. What Tropical Rain Forest?

They are found in South America, Africa and Indo Malaysia region near the equator. The weather is warm (20°C-25°C). Rainfall is plentiful, 190 cm per year. In India, they are found in Andaman and Nicobar Islands, Western ghats, Assam and West Bengal.

17. What is savannah?

They are found South Africa, Western Australia, North West India and Eastern Pakistan. They love a dry weather alternating with wet weather. The rainfall is about 25cm per year. Frequent fires occur during the dry season. In India, grassy plains are found in the Nilgiris, Khasi hills and Naga hills.

18. What are deserts?

They are found Africa, Arizona in America and Mexican desert in Mexico. The days are hot and nights are cold. The annual rainfall is less than 25 cm. In India, it is found in Rajasthan (The Thar Desert).

19. Where is Taiga found?

It is found Canada, Europe and Russia. They are also called Boreal Forests. The climate is of a short cool summer and a long winter with abundant snowfall. The annual rainfall is 20cm to 60 cm. Most of it is covered with snow and ice. It is found in Himachal Pradesh, Punjab and Kashmir in India.

20. Where is Tundra found?

It is found south of the ice covered poles in the Northern hemisphere. Though it receives 25 cm of rainfall, it has permanently frozen soil. The climate is extremely cold and windy. The temperature is less than 10oC. In India, it is found in the Himalayas.

21. What are the importance of forest?

- Forests are the sources for the formation of rivers.
- They increase the rainfall.
- They prevent soil erosion and floods.
- They become habitats to animals.
- They maintain the oxygen and carbon dioxide balance in nature.
- Forests are considered as God's first temples. They play an important role in our day-to-day life.

22. What is Vanamahotsav?

Vanamahotsav is an annual Indian tree planting festival celebrated in the month of July. It is to create an enthusiasm in the minds of people to conserve forests.

7. Water a Precious Resource

1. What is water percentage in Earth?

70% of our Earth is made of water but only 3% of it is fresh water

2. When is World Water Day celebrated?

March 22

3. What is the availability of water on Earth?

Water is a natural resource that is vital for both plants and animals. Water exists in abundance on our planet Earth. However, only a very small fraction of it is fit for human consumption.

4. Important days:

- World Wetland Day - Feb 2
- World Forest Day - March 21
- Earth Day - April 22
- World Environment Day- June 5
- Natural Resources Day - October 5
- Nature Conservation Day - Nov 25

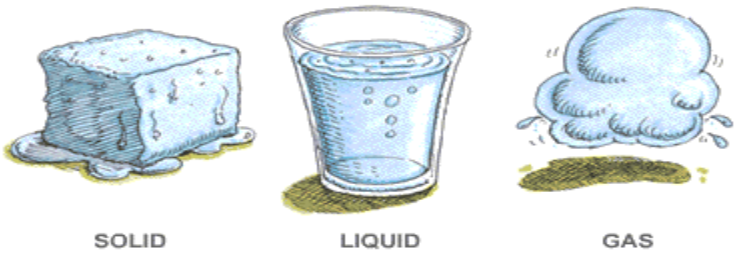
5. What is UN statement on water usage by a person per day?

The United Nations states that "the amount of water for drinking, washing, cooking and maintaining proper hygiene is a minimum of 50 litres per person per day".

6. What are the sources of water?

- Rain water
- Glaciers, ice and snow
- River water
- Sea and Ocean water
- Lake and Pond water

7. What are the forms of water?



8. What is solid form of water?

Ice is the solid form of water. It can be found in the atmosphere in the form of ice crystals, snow, ice pellets, hail and frost. It is also found in the polar regions and on high mountain peaks.

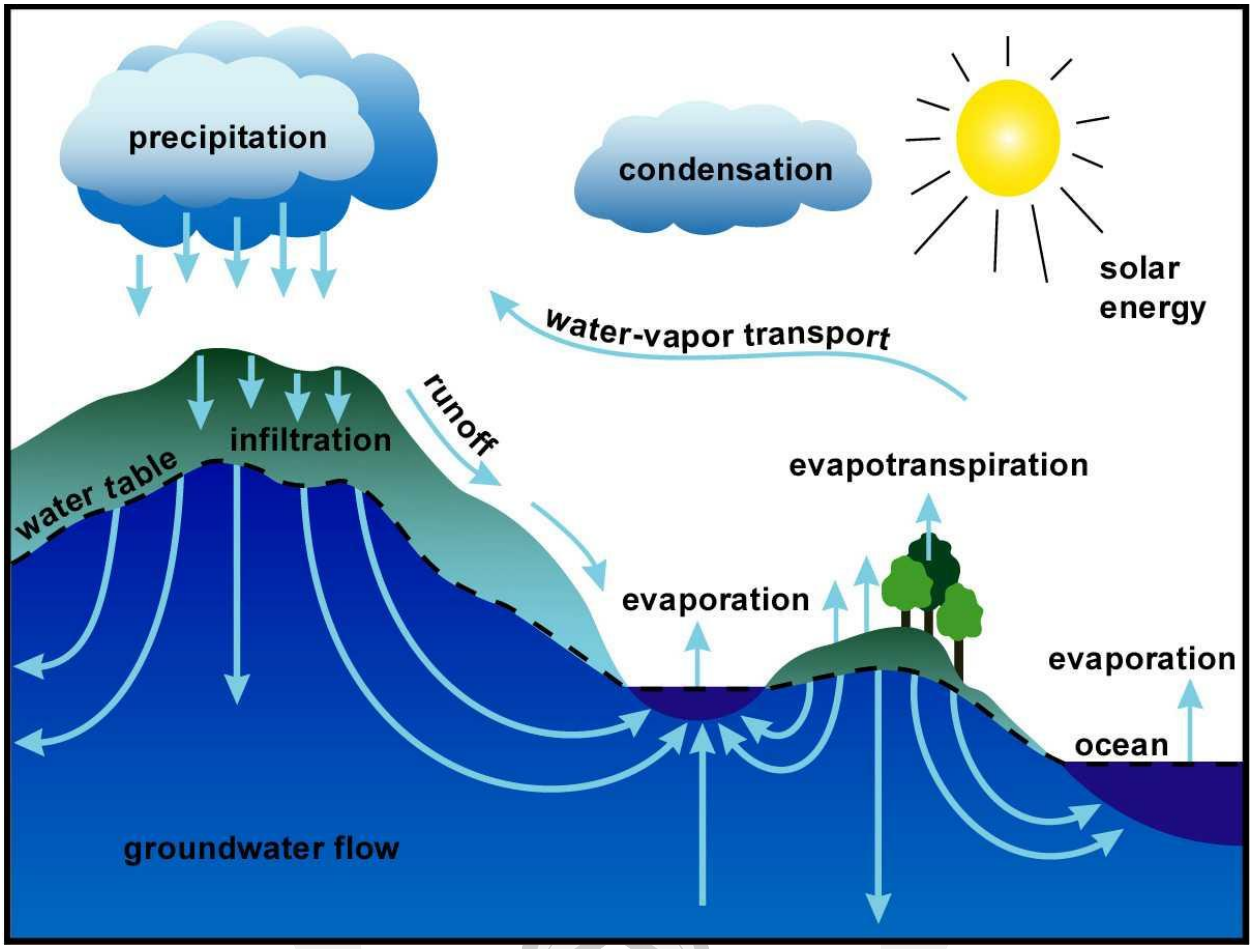
9. What is liquid form of water?

Rain and dew are in the form of water droplets. Also liquid water covers three quarters of the surface of the earth in the form of lakes, rivers and oceans.

10. What is gas form of water?

Water vapour is the gaseous form of water and exists as mist, fog, steam and clouds.

11. What is the water cycle?



12. What is water cycle?

The continuous circulation of water in nature is called water cycle. It is also called the hydrological cycle.

13. What is ground water?

Precipitation in the form of rain or snow provides fresh water to our earth. Most of the fresh water returns to the oceans through rivers. A small portion of rain water seeps into the soil and is stored as underground water. Underground water is also called an aquifer.

14. What is water table?

If we dig deeper and deeper, we would reach a level where all the space between the particles of soil and the gaps between rocks are filled with water. The upper limit of this layer is called the water table.

15. What is World Bank report on water?

A World Bank report says, "India is the largest user of groundwater in the world and its underground aquifers are being depleted at an alarming rate".

16. What cause depletion of water?

- Natural forces: Scanty rainfall and hot winds are natural forces that may deplete the water table.
- Human causes: Deforestation, increased population, rapid urbanization, overgrazing by cattle, excess tapping of ground water are human causes.
- Salt water intrusion: Many parts of the world are losing freshwater sources due to saltwater intrusion. Over use of underground freshwater reservoirs often allows salt water to intrude into aquifers and affect the water table.
- Commercialization of water resources: Some of the private companies suck a large quantity of water from rivers and underground aquifers.
- Sand grabbing from rivers: Some rivers are deeply affected by and rabbing. eg. Palar river

17. What is the water availability in India?

- India receives nearly 4 per cent of the global precipitation and ranks 133 in the world in terms of water availability per person per annum.
- The total renewable water resources of India is estimated at 1,897 sq km per annum.
- By 2025, it is predicted that large parts of India will join countries or regions having absolute water scarcity.

18. What are the factors contributing to the depletion of water table?

- Growing population has resulted in a growing demand for houses, offices, shops, roads etc.
- As a result, open areas like parks and playgrounds are used for construction of buildings. This reduces the seepage of water into the ground.
- Growing population has also resulted in an increase in the number of industries. Water is used in almost every stage of production of things that we use.
- As we already know India is an agricultural country and farmers have to depend on rains for irrigating their fields.
- However, erratic monsoons result in excess use of groundwater thereby decreasing the underground water.

19. What is rain water harvesting?

The activity of collecting rainwater directly or recharging it into the ground to improve ground water storage in the aquifer is called rain water harvesting.

20. What are the two main techniques of rainwater harvesting?

- Storage of rainwater on the surface for future use.
- Recharging the ground water.

21. What are the advantages of rainwater harvesting?

- Rainwater harvesting can reduce flooding in city streets.
- Sea water intrusion in coastal areas can be arrested.
- The ground water can be conserved.
- Rainwater Harvesting can reduce top soil loss.
- It can improve plant growth.

22. What is Icebergs?

Icebergs are pieces of glaciers that have drifted into the ocean and would otherwise melt and become saltwater. Icebergs are mostly white because the ice is full of tiny air bubbles.

23. What are the positive environmental impacts from the use of drinking water from icebergs?

- It decreases human dependency on traditional watersheds such as rivers and lakes, and therefore decreases human impact on these delicate and overstressed ecosystems.
- It helps to reduce rising sea levels, which have been caused by polar icecap melting. Since most of the glaciers were formed thousands of years ago from falling snow, and snow results from condensed water vapour in the atmosphere, the water from icebergs is quite pure. Icebergs are comprised of pure fresh water.

24. What are the common desalination processes?

1. Distillation 2. Reverse Osmosis

25. What is distillation?

The process in which both evaporation and condensation go side by side is called distillation

26. What is reverse osmosis?

The process of forcing water under pressure through a semi permeable membrane whose tiny pores allow water to pass but exclude most salts and minerals is called reverse osmosis.

27. Which is the largest desalination plant in India?

The Minjur Desalination Plant

28. What is distilled water?

Water obtained through distillation is called distilled water. This water is normally pure enough for use in school science lab and medical laboratories.

29. When did Mumbai experience the sweet sea water?

The 2006 Mumbai “sweet” seawater incident was a phenomenon during which the residents of Mumbai claimed that the water at Mahim Creek had suddenly turned “sweet”.

30. What is dead sea?

All oceans and seas have salty water. The saltiest of all is the Dead sea. It is called “dead” because the high salinity prevents any fish or other visible aquatic organisms to live in its water.

8. Air, Water and Soil Pollution

1. What are the important natural resources?

Air, water and land are the most important natural resources.

2. What is air pollution?

Air pollution is the outcome of any change in the composition of air, either by physical or chemical methods that cause harmful effects on health.

3. What are the sources of air pollution?

There are two sources namely,

- Natural sources
- Man-made (anthropogenic) sources.

4. What are the natural sources of air pollution?

Volcanic eruption, forest fire, sea salt sprays, biological decay, photochemical oxidation of terpenes, marshes, pollen grains, and spores are some natural sources. Radioactive minerals present in the earth’s crust are the sources of radioactivity in the atmosphere.

5. What are manmade air pollution?

Industrial emissions, vehicles, aeroplanes, power-stations, burning of fuels, etc.,are man-made sources. Air pollution is caused mainly due to burning of fuels to run vehicles and the smoke emanating from chimneys of factories and power stations.

6. What is the fact of air and pollution?

Air contains 20.9% Oxygen, 78% Nitrogen, 0.03% Carbon Dioxide, Neon, Krypton, Hydrogen and Water vapour in small quantities. Vehicles cause 50% of the air pollution in India.

7. What is green house effect?

Some of the infrared radiation from the earth passes through the atmosphere but most of it is absorbed and re-emitted in all directions by greenhouse gas molecules and clouds. This warms up the Earth's surface and the lower atmosphere.

8. What is acid rain?

Oxides of nitrogen, sulphur, and carbon produced by combustion of coal, petroleum, etc,. dissolve in atmospheric water vapour. They form their corresponding acids like nitric acid, sulphuric acid, etc., and reach the earth's surface as acid rain.

9. What are the effects of acid rain?

- It irritates the eyes and the skin of human beings.
- It inhibits germination and growth of seedlings.
- It affects the fertility of soil, destroys plant and aquatic life.
- It causes corrosion of many buildings, bridges, etc.,

10. What is global warming?

The increase in the concentration of greenhouse gases (CO2, methane) in the atmosphere allows radiations of short wavelength reflect back to earth. The consequent increase in the global mean temperature due to greenhouse gases is called global warming.

11. What is Ozone Depletion?

Ozone is a colourless gas, found in the upper atmosphere (stratosphere) and is highly beneficial. The Ozone layer is thinning due to the emission of pollutants into the atmosphere. Holes caused in the ozone layer allow the harmful UV rays to reach the earth.

12. How can we minimize the use of air pollution?

- Use of crude oil should be avoided and use of high quality fuels, unleaded petrol, bio-diesel and Compressed Natural Gas (CNG) should be recommended.
- Use of automobiles should be minimized. Industrial smoke must be filtered before releasing it into the atmosphere. Planting of more trees to get pure air (O2) and reduce the CO2 content in the environment.

13. What is air pollution?

Water is said to be polluted, when there are undesirable changes in the physical, chemical and biological conditions of water that make it unfit for human consumption

14. How are water polluted?

● Stagnant water becomes polluted day by day. It gives out a foul smell and mosquitoes breed there in large numbers causing malaria.

● Pond water get polluted due to human activities like bathing and washing clothes.

15. What is Sewage Treatment?

Cleaning of waste water is a process of removing pollutants before it enters a water body. This process of waste water treatment is commonly known as Sewage Treatment.

16. What is waste water treatment plant?

Treatment of waste water involves physical, chemical and biological

processes.

- At first, waste water is passed through bar screens.
- Large objects like sticks, cans and plastic packets are removed.
- The water is then passed through a grit chamber in which sand is removed.
- The water is then allowed to settle in a large tank.
- Solid materials settle at the bottom.

- Then the water is transferred to the next tank through a skimmer. This skimmer removes the floating solids like oil and grease.
- Next, air is pumped through water in an aeration tank to help aerobic bacteria to grow. The bacteria consume unwanted matters that still remain in water.
- The treated water has a very low level of organic material and suspended matter. It is discharged into a river.

17. What are 3 R?

- Reduce
- Recycle
- Reuse

18. Name some government acts for controlling pollution?

- Water (Prevention and control of pollution) Act, 1974.
- Air (Prevention and control of pollution) Act, 1981.
- Environment (Protection) Act, 1986

9. Diversity in Living Organism

1. What is cell?

Cell is the structural and functional unit of all living organisms

2. Who discovered cell?

Cell was discovered by Robert Hooke in 1665.

3. What are the two important cell theories?

Theodor Schwann and Matthias Jacob Schleiden postulated the cell theory in 1839. The two important postulates of the cell theory are:

- All living organisms are made up of cells.
- New cells are formed only from the pre-existing cells

4. Name the cells and shapes?

- Nerve cells — Star
- Flame cells — Tubular
- Gland cells — Cuboidal
- Squamous epithelium — Polygonal
- Columnar epithelium — Cylindrical
- Egg cells — Oval
- RBC — Round
- Fibrous Muscle cells — Elongated

5. List out the functions of the cells?

- Squamous epithelium — Protective & give shape
- Muscle cells — Contractile & Retractile
- Fat cells — Storing more fat droplets
- Nerve cells — Conduction of nerve impulses
- Bone cells — Rigidity
- Rods and cone cells — Vision & colour
- Ear cochlear cells — Conduction of sound waves
- Gland cells — Secretory

6. What is the structure of cell?

The cell organelles are present in the cytoplasmic matrix, which are the living structures of the cell. They have the properties of growth and multiplication at the time of necessity within the cell.

7. Name some cell organelle?

- Endoplasmic Reticulum
- Ribosome
- Golgi apparatus

- Lysosomes
- Mitochondria
- Centrioles

8. What is Endoplasmic Reticulum?

The electron microscopic study by Porter in 1945 revealed a network of membranous system with vacuoles in the endoplasm. This was named as endoplasmic reticulum by Porter in 1952. It is assumed that the endoplasmic reticulum originated by evagination of the nuclear membrane. Two types of endoplasmic reticulum have been observed. They are rough ER and smooth ER, based on the presence or absence of ribosome in the ER respectively.

9. What are the functions of Endoplasmic Reticulum?

1. The endoplasmic reticulum provides an ultra structural and skeletal framework to the cell.

2. The smooth endoplasmic reticulum helps in the synthesis of lipids and in the breaking down of glycogen.

3. During cell division, the endoplasmic reticulum membranes disappear and form a new nuclear envelope after each nuclear division.

10. What is ribosomes?

Many minute spherical structures known as ribosomes remain attached with the membrane of endoplasmic reticulum and form the (granular) rough endoplasmic reticulum. The ribosomes are produced in the nucleolus.

11. Who made the crystal structure?

Three researchers, who made the crystal structure of the ribosomes received the Nobel Prize for Chemistry in the year 2009 – Venkatraman Ramakrishnan, an Indian born U.S.A scientist, Thomas Steitz of U.S.A and Ada Yoath of Israel.

12. What are the three membranous components?

- Disc shaped group of flattened sacs or cisternae
- Small vesicles
- Large vacuoles

13. What is lysosomes?

Lysosomes are a kind of waste disposal system of the cell. Lysosomes originate either from the Golgi apparatus or directly from the endoplasmic reticulum. Each

lysosome is of a rounded structure. It is filled with dense material.

14. What is Mitochondria?

In the cytoplasm of most cells, large size filamentous, rounded or rodlike structure known as mitochondria may be seen. The mitochondria are bounded by two membranes made of proteins. The outer membrane forms a bag like structure around the inner membrane, which gives out many finger like folds on the lumen of the mitochondria. The folds of inner mitochondrial membrane are known as cristae.

15. What is Centrioles?

Centrioles were first described by Henneguy and Leuhossek in 1897. The centrioles are micro tubular structures, found in two shapes-rods and granules located near the nucleus of the animal cell.

16. What is nucleus?

The nucleus is a highly specialized cell organelle which controls all the activities in a cell. It is the brain of a cell.

17. What are four parts of nucleus?

- Nuclear Membrane
- Nucleoplasm
- Chromatin Reticulum

- Nucleolus

18. What is nucleoplasm?

The nucleoplasm is the protoplasmic substance of the nucleus. It is also known as nuclear sap.

19. What is tissue?

A group of cells having common origin, structure and function is referred to as tissue.

20. How are animal cells classified?

- Epithelial Tissues
- Vascular Tissues
- Connective tissues
- Nervous Tissue
- Muscular Tissue

21. How are epithelial tissues classified?

a. Squamous Epithelium

b. Columnar Epithelium

c. Cuboidal Epithelium

d. Ciliated Epithelium

e. Sensory Epithelium

f. Glandular Epithelium

g. Germinal Epithelium

22. What is epithelial tissue?

Epithelial tissues cover most organs and cavities within the body.

23. What is vascular tissue?

This is a liquid tissue adapted for the transportation of the nutritive materials, respiratory gases, excretory materials and others. It consists of 55% plasma and 45% blood cells.

24. What are the different types of blood?

- Red Blood Cells (Erythrocytes) : RBC
- White Blood Cells (Leucocytes) : WBC
- Blood Platelets (Thrombocytes)

25. What are the types of supportive system?

- Cartilage tissue
- Bone tissue
- Areolar tissue

26. What are the types of connective tissue?

- Adipose tissue
- Supportive tissue

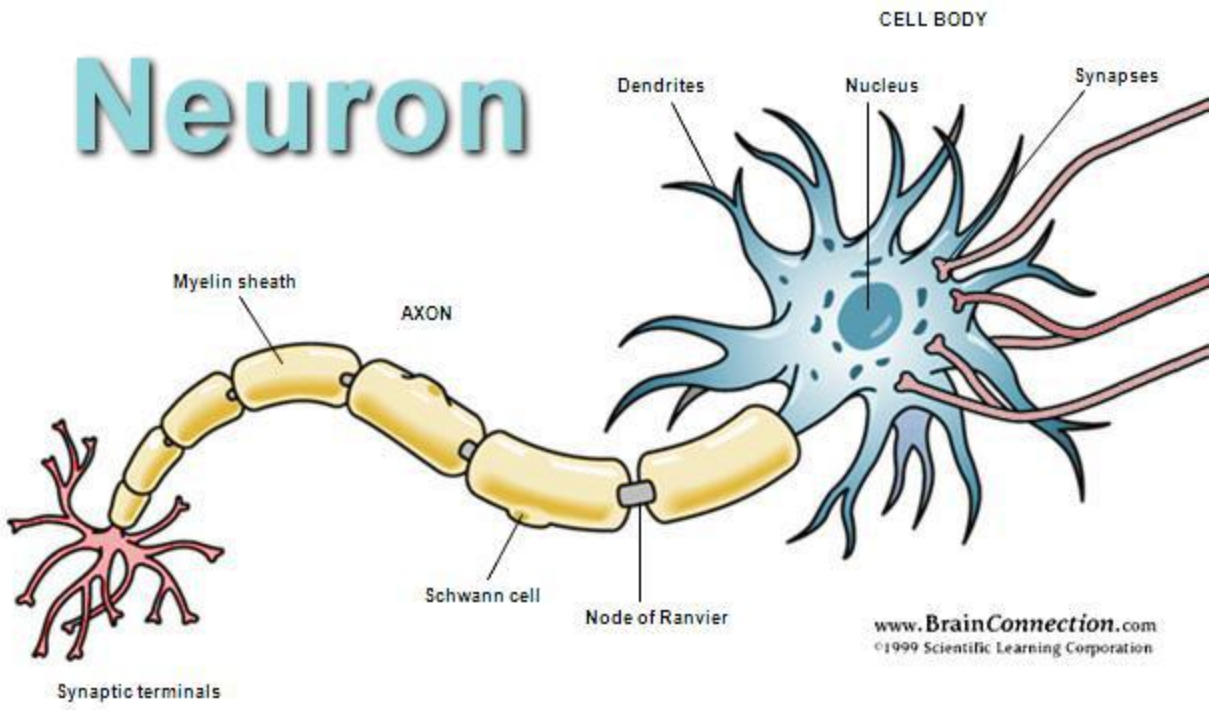
27. What is Nervous Tissue?

The nervous tissue is formed of nerve cells called neurons and nerve fibres. It has highly developed powers of irritability and conductivity. The brain, spinal cord and nerves are all composed of nervous tissues.

28. What is Contractile Proteins?

Muscular tissue consists of elongated cells, also called muscle fibres. This tissue is responsible for movement in our body. Muscular tissue contains proteins called Contractile Proteins.

29. Mark neuron with parts.



30. Which is the Photoreceptor?

The eye is called as photoreceptor. The sense organ eye is concerned with vision. The eye which is spherical in shape is kept in the orbit of the skull.

31. What are the coats of eye?

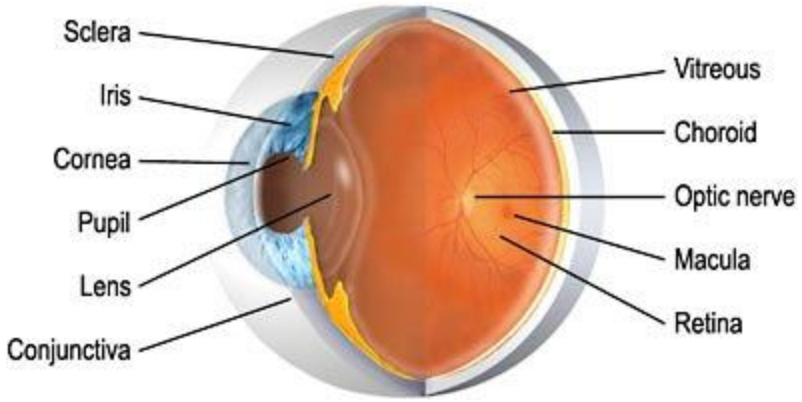
The eye is made up of three coats.

- the outer- Sclerotic coat
- the middle - Choroid coat
- the inner - Retina coat

32. What are the two types of receptor cells?

It contains two types of receptor cells - the rods and cones

33. Mark parts of eyes.



34. Give note on human kidney?

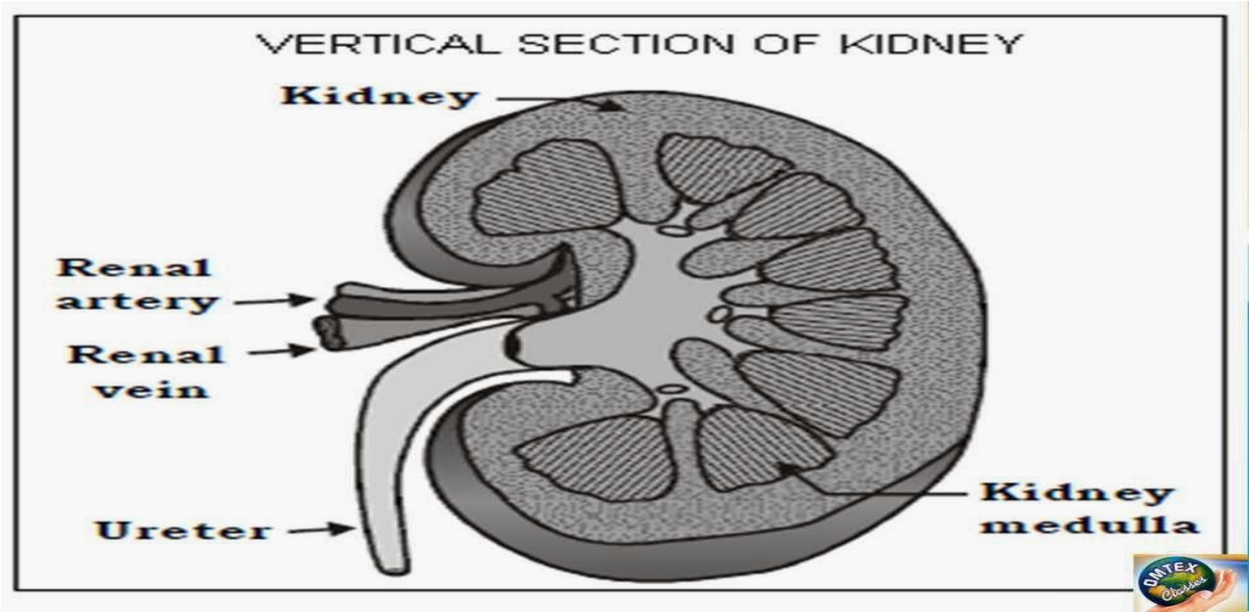
There is a pair of kidneys located inside the abdomen on either side of the vertebral column in the lumbar region and against the posterior abdominal wall. The right Vertical section of the kidney kidney is slightly on the lower side due to the presence of the liver. The outer surface is convex and the inner surface is concave. The concave side is called hilus. A vertical section of the kidney shows

an outer dark portion called the cortex and an inner pale region called medulla.

The medulla has a number of cone like structures called pyramids. The pelvis

projects in between the pyramids as cup like spaces called calyces.

35. Vertical section of the kidney.



36. Structure of Nephron

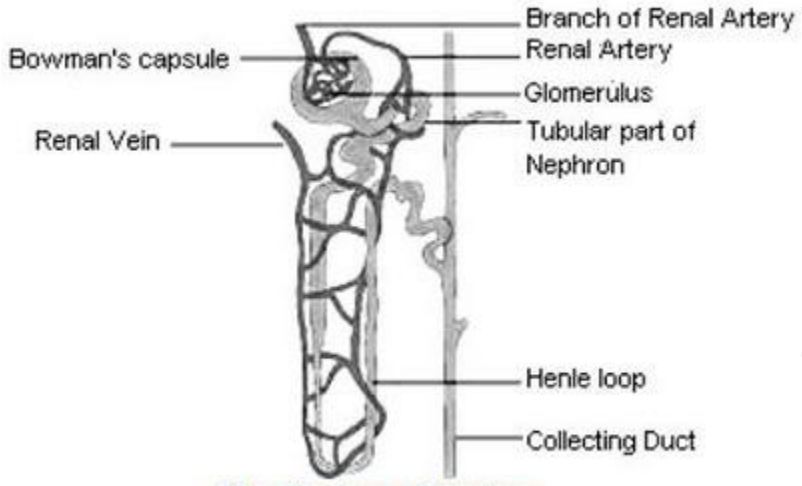


Fig : Stucture of Nephron

37. What is homeostasis?

Homeostasis is the maintenance of a constant internal environment of the body. It was first pointed out by the French physiologist Claude Bernard in 1857.

38. What is aerobic respiration and anaerobic respiration?

The biochemical process which occurs within cells is called cell respiration. If it uses oxygen, it is called as aerobic respiration. If the process takes place in the absence of oxygen, it is termed as anaerobic respiration.

39. What is metabolism?

The word metabolism has its root from the Greek word Metabole which means change. The sum total of the biochemical reactions involved in the release and utilization of energy or energy exchange within the organism is termed as metabolism.

40. What are the two process of metabolism?

Anabolism and catabolism.

41. What is anabolism?

The simple substances obtained from the food are converted into cellular substance. This process is called Anabolism. During this process energy is not released.

For example,

Glucose → Glycogen and other sugars

Amino acids → Enzymes, hormones, proteins

Fatty acids → Cholesterol and other steroids.

42. What is catabolism?

Organic substances which are obtained from the food are broken down to produce energy for the purpose of physiological functions of the cells. This process is called as catabolism.

10. Conservation of Plants and Animals

1. What is conservation?

Conservation can be defined in simple terms, as the management of resources in such a manner that largest number of people benefit for the longest possible time without harming the natural or ecological balance.

2. What is the need of conservation?

● Wildlife is an asset to be protected and preserved because of its aesthetic, ecological, educational, historical and scientific values.

● Wildlife is essential for ecological balance.

● Wildlife is a big boost to tourism.

● The innumerable plants could yield products of immense medicinal value.

● Wildlife is an important source of genetic material used in genetic engineering.

3. What are the types of forest?

- Desert (Dry forests) - Rajasthan, Southern parts of Punjab & Haryana
- Deciduous forests – Peninsular region
- Tropical Evergreen forests - Western Ghats, hilly areas in North Eastern India, The Sub Himalayan belt
- Hilly (mountainous) forests – The Himalayas, Southern India
- Tidal forest - Estuaries of Ganges & Mahanadi.

4. What is deforestation?

Selfish and anti-social elements have been destroying our natural wealth. Deforestation is one such dangerous act harming the ecological balance in the hilly areas.

5. What is afforestation?

Afforestation is aimed at two kinds of forestry programmes such as social forestry and agro forestry. In a locality, 'Tree lovers Club' can be started, and more people can be invited to join

these clubs'. Tree saplings can be planted on the road side. Sapling can be gifted to friends on special occasions and celebrations.

6. In India when was the Social Forestry Project started?

In India, the Social Forestry Project was started in 1976

7. What is agro forestry?

Planting of trees in and around agricultural boundaries and on marginal, private lands, in combination with agricultural crops is known as agro-forestry.

8. What is the result of deforestation?

Deforestation leads to soil erosion, irregular rainfall and global warming.

9. What is the flora and fauna of India?

India has a large variety of plants, about 45,000 species in number.

Of these

- Flowering plants - 15,000
- Algae - 1,676
- Lichens - 1,940
- Fungi - 12,480
- Gymnosperms-64
- Bryophytes - 2,843
- Pteridophytes - 1,012

India can be divided into eight distinct floristic regions. India has a great variety of fauna numbering 81,251 species, which represent 6.67 % of the world's fauna.

Of these,

- Insects - 60,000
- Mollusca - 5,000
- Mammals - 372
- Birds- 1,228
- Reptiles - 446
- Amphibians - 204
- Fishes - 2, 546

10. What is project tiger?

"Project Tiger" The population of tigers (Panthera tigris) reduced from 40,000 to 1827 in 1972. On 1st, April 1973, Project Tiger was launched by the Government of India, it resulted in the increase of population of tiger.

11. What is project elephant?

"Project Elephant" Elephant is our National heritage animal. The population of the Indian elephant- Elephas maximus, is threatened due to habitat destruction and poaching for ivory. An ambitious programme "Project Elephant" was launched by the Ministry of Environment and Forests, which focuses on solving the problems of humans and elephants competing for the same habitat.

12. What are called as Endangered Species?

Species that are less in number and are in considerable danger of becoming

extinct are termed as Endangered Species.

13. What is Operation Rhino?

"Operation Rhino" Number of Indian rhinos or one horned Rhinoceroses

(R.unicornis) are lost due to hunting and natural calamities. To protect the

Indian species, a centrally sponsored rehabilitation programme was undertaken in Dudhwa National Park.

14. What is Lion Sanctuary?

"Lion Sanctuary" In 1972, a five year plan was proposed by the Government of Gujarat, to protect this magnificent feline species in the Gir Sanctuary. Its National Park and ecological balance of the habitat are properly protected. This has resulted in an increase in lion population.

15. What is Crocodile Breeding Project?

Crocodile Breeding and Management Project was launched by the Government of India in 1975 for all the three endangered crocodile species namely, the fresh water crocodile (Crocodylus palustris), saltwater crocodile (Cricidylus porosus) and the rare gharial (Cravialis gangeticus).

16. What is IUCN?

The International Union for Conservation of Nature and Natural Resources (IUCN) maintains the Red Data Book. The Red Data Book contains a record of animals which are identified as endangered species or animals which are on the verge of extinction.

17. What is NGC?

NGC (National Green Corps) of the Ministry of Environment and Forests, Government of India.

- National Animal - Tiger
- National Bird - Peacock
- National Flower - Lotus
- National Fruit - Mango
- National Tree - Banyan tree
- National Heritage Animal- Elephant

18. What is migration?

All animals have an instinctive perception of the changes in temperature and just as people seek or spend their summer in cool places and their winter in warm places, all animals that can do so, shift their habitat in various seasons.

19. Give insite of Vedanthangal Bird Sanctuary?

The Vedanthangal Bird Sanctuary is one of the most spectacular breeding grounds in India. This Sanctuary has been protected by the local people for over 250 years. Vedanthangal is a home for migratory birds such as pintail, garganey, grey wagtail, blue-winged tail, common sandpiper and other birds.

20. Who is called as bird man?

Dr.Salim Ali

21. What are Sanctuaries?

Sanctuaries are places where the animals are well protected from any danger. Hunting or capturing is highly prohibited there. In our country there are about 500 sanctuaries. One of the most important missions of sanctuaries, beyond caring for the animals is educating the people. The individuals should be educated about the importance of animals so that the animals can be protected, and a good ecological balance can be maintained.

22. What is Bio-diversity Loss?

Loss of bio-diversity occurs when either the habitat essential for the survival of a species is destroyed or a particular species is destroyed. The former is more common. The latter reason is encountered when particular species are exploited for economical gain and hunted for sports or food.

23. What are the main objectives of bio-diversity?

● To preserve the continuity of food chain.

● The genetic diversity of plants and animals is preserved.

● It provides immediate benefits to the society such as recreation and tourism.

● It ensures the sustainable utilization of life supporting systems on earth.

24. Name sanctuaries with animals preserved.

- Mundanthurai and Kalakkadu Sanctuary-Tirunelveli Lion- tailed monkey, Tiger
- Srivilliputtur sanctuary - Virudhunagar Grizzled squirrel, Barking Deer
- Vedanthangal sanctuary - Kancheepuram Cormorants, Grey Heron
- Mudhumalai sanctuary - The Nilgiris Elephants, Gaur, Langur
- Viralimalai sanctuary - Tiruchirappalli Wild Peacocks
- Kodikkarai sanctuary - Nagapattinam Chital, Wild Bear

25. What are national park?

National Park is an area dedicated to protect the environment, the natural objects and the wild life there in. Many National Parks were initially wild life sanctuaries. There are about 89 National Parks in India.

26. What is the current bio diversity?

Currently bio-diversity is estimated to range from 10 to 100 million species, of which only 1.4 million have been formally catalogued. There are 12 mega diversity centres in the world. India is one among them. Diversity among the living organisms is known as Biodiversity. The bio-diversity of the earth is unimaginable.

27. What is green peace?

Green Peace – a group devoted to environmental protection was responsible for the ban on whaling.

11. Bio Geo Chemical Cycle

1. What is bio-geo chemical cycle?

The cyclic flow of elements or compounds between the non-living environment (soil, rock, air, water) and the living organisms is known as bio-geo chemical cycle.

2. What is abiotic components?

The abiotic or non-living components of the environment are air, water, soil, light and temperature

3. What is biotic components?

The biotic or living components of the environment include all living organisms including human beings.

4. What is eco system?

The ecosystem (Environmental system) includes these two essential components.

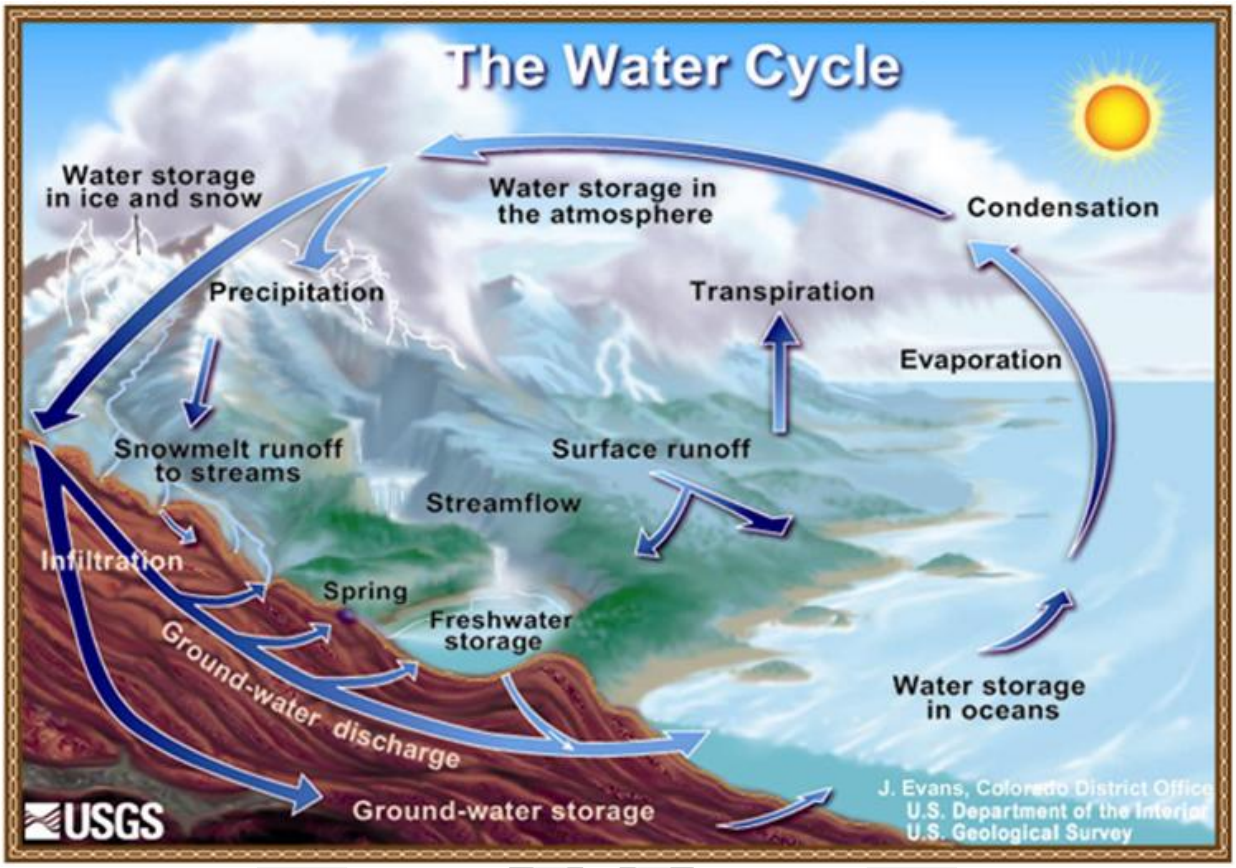
5. What is ecology?

The branch of Biology which deals with the interrelationships between organisms and their environment is called Ecology.

6. Which forms the food chain?

The energy trapped by green plants or autotrophs is relayed through a series of heterotrophic organisms or consumers. This forms the food chain.

7. What is the process of water cycle?



8. What is nitrogen cycle?

Living organisms require nitrogen to create proteins and nucleic acids in their body. The atmosphere consists of almost 78% of nitrogen, but plants and animals can use it only if it is in the form of ammonia, amino acid or nitrates. The process by which these forms get inter converted by physical and biological processes is called the Nitrogen Cycle.

9. What are the process involved in nitrogen cycle?

- Nitrogen fixation
- Nitrogen assimilation
- Ammonification
- Nitrification and
- Denitrification

10. What is Nitrogen assimilation?

The nitrates absorbed by plants are utilized for making organic matter such as proteins and nucleic acids. Plant proteins and other nitrogenous compounds consumed by animals are converted into animal proteins.

11. What is Ammonification?

Animal proteins are excreted in the form of urea, uric acid or ammonia. When plants and animals die, their proteins are broken down to release ammonia by the action of bacteria and fungi. This process of ammonia formation is called ammonification.

12. What is Nitrification?

During this process, ammonia is converted into nitrites and nitrates by soil bacteria such as Nitrobacter and Nitrosomonas, which are then absorbed by plants through their roots.

13. What is Denitrification?

Free living soil bacteria such as Pseudomonas reduce nitrate ions of soil into gaseous nitrogen which returns to the atmosphere.

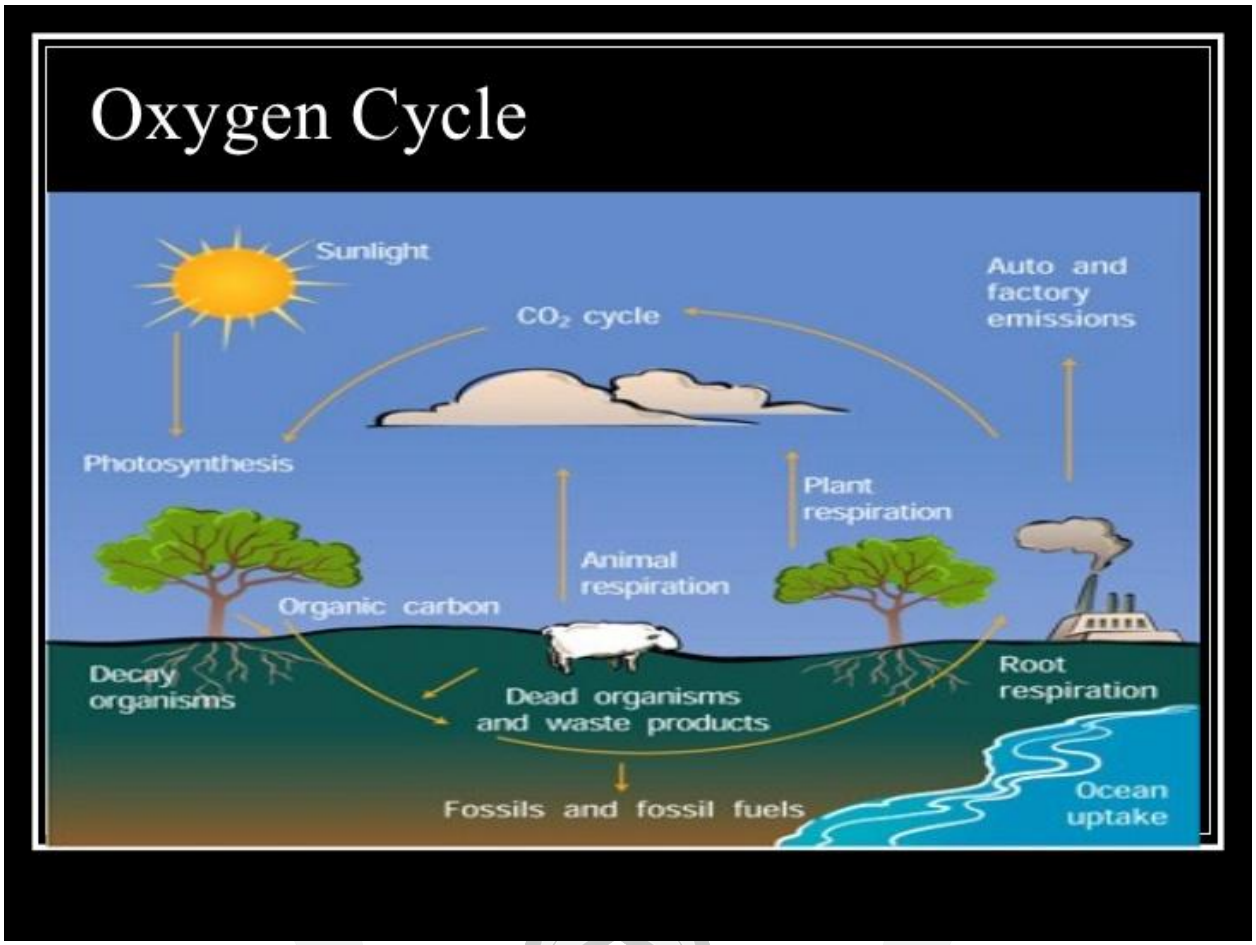
14. What is carbon cycle?

All living organisms are made up of compounds that contain carbon. The three main sources of carbon are: i) CO2 in the air and CO2 dissolved in oceans ii) Carbonate rock in the earth's crust iii) Fossil fuels like coal and petroleum. The element carbon moves from the atmospheric reservoir to the producers, to the consumers and then to the decomposers.

15. What is oxygen cycle?

For respiration, oxygen exists as part of water. Oxygen forms about 20% of air in the atmosphere. It enters the living world through respiration. It oxidizes food materials and produces energy. The carbon dioxide that is released in the process is utilized by the plants to produce food materials through photosynthesis and oxygen is libarated back into the atmosphere.

Process of oxygen cycle



12. Pollution and Ozone Depletion

1. What is pollution?

Pollution is an undesirable change in the physical, chemical and biological characteristics of our land, air or water caused by excessive accumulation of pollutants.

2. What are the kinds of pollution?

Pollution is of four major types, namely air pollution, water pollution, land pollution and noise pollution. In terms of origin, it may be natural or anthropogenic (manmade).

3. What is air pollution?

Degradation of air quality and natural atmospheric condition constitutes air pollution. The air pollutant may be a gas or particulate matter.

4. Name some air pollutants and their effects?

- Particulate matter : Exhaust gas from vehicles and smoke from industries contain small suspended particles such as soot, dust, pesticides and biological agents such as spores, pollen and dust mites. It causes respiratory ailments such as asthma, emphysema and chronic bronchitis.
- Carbon-monoxide : It is a product of incomplete combustion of fossil fuels in automobiles. It is highly poisonous to animals and humans. When inhaled, carbon monoxide reduces the oxygen carrying capacity of blood.
- Hydrocarbons : Hydrocarbons such as methane are evolved from soil microbes (methanogens) in flooded rice fields and swamps. They are also generated during the burning of coal and petroleum products.
- Sulphur dioxide : It is released from oil refineries and ore smelters which use sulphur-containing fuels. The sulphur dioxide that is released into the air dissolves in rain water and forms an acid causing acid rain. This acid rain has harmful effects on plants and animals.
- It causes chlorosis (loss of chlorophyll) and necrosis (localised death of tissues) in plants. It also has a corrosive effect on limestone and mortar structures.
- Nitrogen oxides : These are also caused from the emissions of vehicles. These gases cause a reddish-brown haze (brown air) in polluted air caused by traffic congestion which contributes to heart and lung problems. It also contributes to the formation of acid rain.

5. What is smog?

Smog is a mixture of smoke and fog. It is formed in the atmosphere under the influence of sunlight by the photochemical reactions of hydrocarbons, oxides of nitrogen and oxygen, resulting in the formation of PAN (peroxy acetyl nitrate).

6. What is acid rain?

Gases such as sulphur dioxide and nitrogen oxides are oxidized to form sulphuric and nitric acid along with water, and precipitate as acid rain. It damages building, plants and animals. It also makes the soil acidic.

7. Name some controls for air pollution?

- The particulates emitted by industries should be controlled by devices such as scrubbers, precipitators and filters.
- Use of unleaded or low sulphur fuel is to be encouraged.
- Shifting to non-conventional sources of energy (e.g solar energy, hydel energy, tidal energy, etc.) in order to reduce the dependance on conventional sources.
- Smoking in public places should be prohibited, because cigarette smoke contains carcinogens such as benzopyrene. It also affects nonsmokers. (ie. Passive smoker)
- Planting of trees along road sides and around industrial areas will reduce pollutants in the air. It will enrich the air with oxygen.

8. How is Black Lung disease caused?

It is common among coal miners due to the inhalation of carbon particulates which leads to lung cancer.

9. What is water pollution?

Water pollution is defined as the adding of unwanted substances or the change of physical and chemical characteristics of water in any way which makes it unfit for human consumption. It is caused by waste products from industries (effluents), domestic sewage, oil spillage, agricultural and industrial run-offs.

10. When was Bhopal Gas Tragedy happened?

BHOPAL GAS TRAGEDY (2nd & 3rd Dec 1984) refers to the industrial disaster which killed thousands of people and animals due to inhaling of methyl iso cyanate (MIC) gas which leaked out from a fertilizer factory owned by the Union Carbide Company. Many people who inhaled the gas still suffer from respiratory, immunological and neurological disorders, cardiac failure, birth defects, etc.

11. How does industrial waste cause water pollution?

Industrial effluents containing heavy metals and chemicals such as arsenic, cadmium, copper, chromium, mercury, zinc and nickel are directly released into water bodies such as lakes, ponds and rivers without proper treatment. These wastes contaminate the water bodies and make them unsuitable for human consumption. Industries also use water as a coolant for machinery and releases hot waste water into the water bodies causing thermal pollution which affect both plant and animal life.

12. What is MINAMATA DISEASE?

Mercury poisoning due to the consumption of fish captured from mercury contaminated Minamata Bay in Japan was detected in 1952. Mercury compound in waste water are converted by bacterial action into extremely toxic methyl mercury which can cause

numbness of limbs, lips and tongue. It can also cause deafness, blurring of vision and mental derangement.

13. What are the control for water pollution?

- Sewage treatment plants should be installed to treat sewage before releasing it into water bodies.
- Excessive use of pesticides, herbicides and fertilizers should be avoided.
- Biological control of insect pests and organic farming is to be followed in order to reduce the dependence on pesticides and inorganic fertilizers.
- Control pollution through legislation and strict enforcement.
- Create social awareness among people about water pollution and the need for pure water.

14. What is DDT?

Biological magnification of DDT (dichloro diphenyl trichloroethane) is seen in aquatic food chain. The concentration of DDT gradually increases at each trophic level. DDT inhibits calcium carbonate deposition in the oviducts of certain birds which result in the laying of thin-shelled eggs. These eggs can easily break during incubation and the developing embryos are destroyed.

15. What is oil spill?

An oil spill is a release of liquid petroleum hydrocarbons into the environment mainly due to human activities. It includes the release of crude oil from tankers, offshore platforms, drilling rigs and wells.

16. What are control and preventive measure for oil spill?

- Oil spills can be controlled by preventing the release of oil or hydrocarbons during transit, exploration or through accidents.
- Sea food should be thoroughly tested for contaminants before consumption.

17. What is called as bioremediation?

Oil spills may be cleared by using certain micro-organisms such as bacteria. This process of clearing oil spills by using bacteria is known as bioremediation.

18. Who is the creator of Pseudomonas putia?

Indian American scientist, Dr. Ananda Mohan Chakraborty.

19. What is Mumbai Oil Spill (August 2010)?

The spill occurred due to the collision of two oil tankers, MSV Chitra and MV Khalijia, off the coast of Mumbai. An estimated 400 tonnes of oil was spilled into the Arabian sea. The oil spill proved to cause extensive damage to the marine eco-system, as well as the sensitive mangrove plants.

20. What is soil pollution?

Soil pollution is the unfavourable alteration of soil by the addition or removal of substances which decrease soil productivity and groundwater quality.

21. What are the causes and effect of soil pollution?

- Industrial solid waste and sludge contain toxic organic and inorganic compounds as well as heavy metals. The radioactive waste from nuclear power plants and nuclear explosions

also contaminate the soil. Fly ash contains fine particulates which are released from thermal power plants. It settles on the ground and causes pollution.

- Domestic waste is rich in organic matter and undergoes decomposition. Hospital waste contains a variety of pathogens that can seriously affect human health.
- Agricultural chemicals such as pesticides, insecticides and inorganic fertilizers may pollute drinking water and can change the chemical properties of the soil adversely affecting the soil organisms.

22. What is radioactive pollution?

The emission of protons, electrons and electromagnetic radiations released by the disintegration of radioactive substances such as radium, thorium, uranium cause air, water and land pollution

23. What is REVERSE OSMOSIS?

It is the most efficient way of obtaining purified drinking water. During this process, pressure is applied on the solution which has more concentration. This reverses the natural direction

of water flow and osmosis from a high gradient to a low gradient. This process involves energy expenditure. The membranes used as a barrier for RO process have a dense layer which allow only the water to pass through and prevents the passage of solutes. Hence,

it is best suited for desalination of sea water (removal of salt).

24. What is the effects of radiation?

- Strontium-90 accumulates in bones causing bone cancer.
- Iodine-131 can damage bone marrow, spleen, lymph nodes and can cause leukemia (blood cancer).

25. What is noise pollution?

Noise may be defined as an unwanted and unpleasant sound that may have adverse effect on animals and humans. The unit of sound level is decibels (db). Noise level above 120 db is considered harmful to human beings.

26. What is Chernobyl Disaster?

Chernobyl Disaster (Ukraine) : The explosion at the Chernobyl nuclear power station was undoubtedly the world's worst nuclear disaster. Deadly radioactive material was released into the atmosphere and the inhabitants of Chernobyl were exposed to radioactivity which was a hundred times greater than at Hiroshima. Babies were born with infirmities and people suffered from serious diseases like thyroid cancer.

27. What are the sources of noise pollution?

The different sources associated with noise pollution are industrial machinery, road, rail and air transport, loudspeakers, construction equipments, household appliances and crackers.

28. What is changes occurred due to global warming?

- July 1998 was the hottest month the world over.
- In 1998 India had the hottest period in 50 years.
- 2012 was 9th warmest year on record.
- The nine warmest years have all occurred since 1998.
- There is a rapid melting of glaciers and a subsequent rise in sea level.

29. What is global warming?

It refers to an average increase in the temperature of the atmosphere or simply it is the warming of the earth.

30. What is green house effect?

The trapping of energy from the sun by greenhouse gases in the atmosphere leading to rise in earth's temperature is known as the greenhouse effect.

31. What is green house?

A greenhouse is a structure primarly of glass or plastic in which temperature and humidity can be controlled for the cultivation or growth of plants

32. Name some green house gases?

- Carbon-dioxide : It is the most abundant greenhouse gas released by burning of fossil fuels, deforestation, respiration of animals, decaying of organic matter. At present there is an increase of 31% of carbon dioxide.
- Methane: It is produced by the incomplete decomposition of organic compounds by methanogenic bacteria under anaerobic condition. It is also produced by the enteric fermentation in the cow and from flooded rice fields.
- Nitrous oxide: It is released by the burning of fossil fuels, industrial processes and agricultural practices like ploughing.
- Chloroflurocarbons: These are coolant gases used in refrigerators, aerosols and solvents.

33. Name some measures to reduce global warming?

- Use less heat and air-conditioning.
- Car pool, use bicycles and walk when you can.
- Buy energy efficient products (based on the □rating).
- Use CFL (Compact Fluorescent Light) bulbs.
- Reduce, reuse and recycle resources.
- Use less hot water.
- " Switch off" equipment when not in use.
- Plant trees.
- Encourage others to conserve energy.
- Do the energy auditing of household appliances.

34. Name some acts for controlling pollution?

Various laws and rules have been promulgated from time to time by the Government of India to control pollution. Some of them are:

- 1974 - Water (prevention, control of pollution) Act.
- 1980 - Forest Act.
- 1981 - Air (prevention, control of pollution) Act.

- 1986 - Environmental pollution Act.
- 1988 - Motor Vehicles Act

35. What is ozone depletion?

The ozone layer in the stratosphere is protective in function. It filters the harmful ultraviolet rays of the sun. The ozone in this layer is continuously broken down and reformed; these two processes perfectly balance each other. Due to human activity, this balance is upset

leading to the thinning of the ozone layer causing holes in the layer. The decrease in the amount of ozone in the stratosphere is called ozone depletion.

36. What is EL NINO EFFECT?

It causes erratic weather patterns which occur due to the interaction of unusually warm or cold sea surface temperatures in the eastern and central Pacific Ocean. It was once a rare cyclical weather condition which has become more frequent, persistent and intens.

37. What is C.P.R (C.P.Ramaswamy) Environmental Education Centre?

C.P.R (C.P.Ramaswamy) Environmental Education Centre Chennai: This centre promotes environmental awareness among the public. It gives guidance for creation and implementation of environmental laws, environmental impacts and environmental management studies. It promotes the use of renewable sources of energy.

38. What is MNS?

Madras Naturalists Society: It creates environmental consciousness through seminars, camps, video shows and visits to wild life sanctuaries and national parks. It conducts surveys regarding pollution and deforestation.

39. What is MSSRF?

MSSRF (M.S.Swaminathan Research Foundation): It is a non-profit research organisation and was established in 1998. It carries out research and development in six major areas such as bio-

diversity, bio-technology, food scarcity, coastal system research, information, education and communication.

40. Name the Physiology or Medicine Noble Price awardees?

The Nobel Prize in Physiology or Medicine 2015 was divided, one half jointly to William C. Campbell and Satoshi Omura "for their discoveries concerning a novel therapy against infections caused by roundworm parasites" and the other half to Youyou Tu "for her discoveries concerning a novel therapy against Malaria".

13. Conservation of Environment

1. What is environmental science?

Environmental science can be defined as the study of organisms in relation to their surroundings.

2. What is pollution?

Pollution: Any undesirable change in the physical, chemical or biological characteristics of air, land and water that affect human life adversely is called pollution.

3. What is pollutant?

Pollutant: A substance released into the environment due to natural or human activity which adversely affects the environment is called pollutant. e.g. sulphur-dioxide, carbon-monoxide, lead, mercury, etc.

4. What are the classifications of waste?

- Bio-degradable wastes
- Non bio-degradable wastes

5. What are the methods adopted for disposal of harmful waste?

- Landfills: There are permanent storage facilities in secured lands for military related liquid and radioactive waste materials. High level radioactive wastes are stored in deep

- underground storage.
- Deep Well Injection: This involves drilling a well into dry porous material below ground water. Hazardous waste liquids are pumped into the well. They soak into the porous material and remain isolated indefinitely.
- Incineration: The burning of materials is called incineration.

6. What is biomedical wastes?

Hazardous bio-medical wastes are usually disposed off by means of incineration. Human anatomical wastes, discarded medicines, toxic drugs, blood, pus, animal wastes, microbiological and bio-technological wastes etc. are called biomedical wastes.

7. What is solid waste management?

Management of non-hazardous wastes is called solid waste management.

8. What is recycling of waste?

The separation of materials such as rubber, glass, paper and scrap metal from the refuse and reprocessing them for reuse is termed as reclamation of waste or recycling.

9. What are the sources of water?

Water is a basic natural resource and a valuable asset to all nations. Human beings depend on water for all their needs such as bathing, washing, cooking, transportation and power generation. Water in India is of two kinds-salt water and fresh water. Fresh water is obtained from rain water, surface water and ground water. The main sources of water is rain and snow which form a part of the hydrological cycle.

10. Name some surface water in India?

India is blessed with a number of rivers, lakes, streams and ponds.

11. What is ground water?

Aquifers are underground reserves of fresh water. In the water table, water that percolates

into the ground through porous rocks is ground water. These porous rocks are saturated with water to a certain level. The ground water is important for plant growth. Man also taps this water through tubes and borewells. Scanty rainfall and unnecessary felling of trees affect the ground water level.

12. What are the steps in fresh water management?

- Seeding clouds: Seeding clouds with dry ice or potassium iodide particles sometimes can initiate rain, if water laden clouds and conditions that favour precipitation are present.
- Desalination: (Reverse osmosis) Desalination of ocean water is a technology that has a great potential for increasing the supply of fresh water. Desalination is more expensive than most other methods of obtaining fresh water. In desalination, the common methods of evaporation and re-condensation are involved.
- Dams, Reservoirs and Canals: Dams and storage reservoirs trap run-off water in them and transfer the water from areas of excess to areas of deficit using canals and underground pipes.
- Water Shed Management: The management of rain water and the resultant run-off is called water shed management. Water shed is an area characterized by construction of small dams to hold back water which will provide useful wildlife habitat and stock watering facilities.
- Rain Water Harvesting: Rain water harvesting essentially means collecting rain water from the roof of buildings or courtyards and storing underground for later use. The main idea in harvesting rain water is to check the run-off water. The rain water that falls on the roofs of buildings or in courtyards is collected through pipes and stored in under ground tanks of the buildings fitted with motor for drawing the water for use.
- The process of rain water harvesting is not only simple but also economically beneficial. It helps in meeting the increased demand for water, particularly in urban areas and prevent flooding of living areas.
- Wetland Conservation: It preserves natural water storage and acts as aquifer recharge zones.

- Domestic Conservation: As an individual, everyone can reduce the water loss by using a bucket of water than by taking a shower, using low-flow taps, using recycled water for lawns, home gardens, vehicle washing and using water conserving appliances.
- Industrial Conservation: Cooling water can be recharged and waste water can be treated and reused

13. What is wildlife?

All non-domesticated and non-cultivated biota found in natural habitat are termed 'wildlife'. It includes all the natural flora and fauna of a geographic region. Wildlife is an asset to be protected and preserved to our advantage and for the benefit of future generations. There are approximately 400 varieties of reptiles, 200 varieties of amphibians, 3000 varieties of fishes, 3000 species of birds, 20,000 species of flowering plants and 4100 species of mammals found in our country according to the latest census.

14. How many wildlife sanctuaries are there in India?

Wildlife sanctuaries were established in India in the pursuit of conserving wildlife, which was suffering due to ecological imbalance caused by human activities. There are 89 national parks, 500 wildlife sanctuaries, 27 tiger reserves, 200 zoological parks and 13 biosphere reserves in the country covering an area of 1.6 lakh sq.km.

15. What is eco system?

A community of organisms that interact with one another and exist in particular environment is called an eco-system.

16. What are the types of eco system?

The eco-system is of two types, namely aquatic and terrestrial.

17. Name major components of eco system?

There are four major components, namely:

- Abiotic factors

- Producers
- Consumers
- Decomposers.

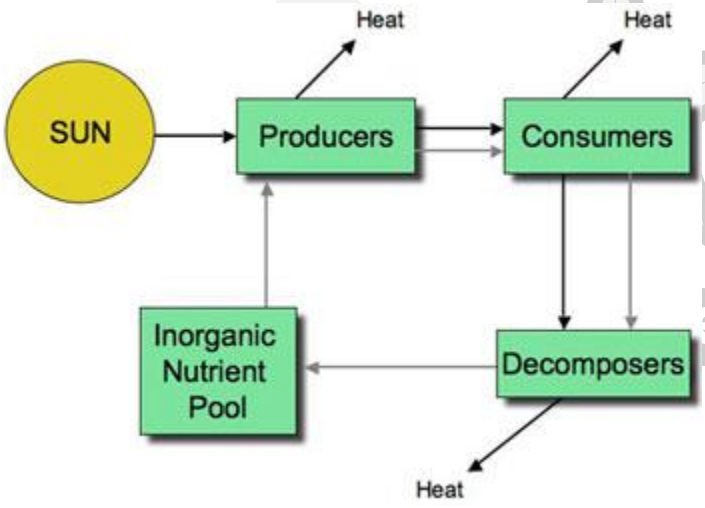
18. What are biotic factors?

Producers, consumers and decomposers are biotic factors.

19. What are abiotic factors?

The abiotic factors includes light, temperature, hydrogen ion concentration inorganic substances like CO2, H2, O2, N, PO4, CO3 and S and organic substances like carbohydrates, proteins and lipids.

20. Name the flow of energy system in ecosystem?



21. What is an eco system?

An ecosystem maintains the balance between the number of resources and the number of users or the balance between the predators and their prey

22. What is food web?

The food chains are interlinked to form food webs. So every component of the eco-system is connected with one another.

23. How is eco system maintained?

There are many factors which naturally maintain the harmony in an eco-system. Disturbing any one factor could have a drastic impact upon the living conditions of other organisms resulting in an imbalance. For example, removal of trees and vegetation would affect both land and water eco-systems, as there will be no food for organisms. Killing animals and polluting land, air and water also disturb the balance in nature. In order to maintain the eco-balance in an ecosystem, there should be recycling of nutrients, minerals, and water. Discreet use of natural resources will help to maintain the eco-balance. Thus eco-balance or ecological balance is the maintenance of balance between living components and the resources of an ecosystem, so that it remains a stable environment community for the better functioning of the organisms.

24. What is coal?

Coal is a compost primarily of carbon along with variable quantities of other elements chiefly sulphur, hydrogen, oxygen and nitrogen. Coal is a fossil fuel and is the largest source of energy for the generation of electricity worldwide, as well as one of the largest worldwide sources of CO_2 emission. Gross CO_2 emission from coal usage is high and more than that from petroleum and about double the amount from natural gas.

25. What are environmental effects of coal burning?

- Generation of waste products which contain mercury, uranium, thorium, arsenic and other heavy metals, which are harmful to human health and environment.
- Sulphur particles present in the coal causes acid rain.
- Interference with ground water and water table levels.
- Contamination of land and water bodies.
- Dust pollution.
- Release of CO_2, a green house gas, causing climate change and global warming.
- Coal is the largest contributor to the man-made increase of CO_2 in the air.

26. What is petroleum?

Petroleum or crude oil is a naturally occurring toxic, flammable liquid consisting of a complex mixture of hydrocarbons and other organic compounds that are found beneath the earth's surface.

27. Which is called as black gold?

Petroleum

28. What are the alternatives for petrol based vehicles?

1. Internal combustion engines (biofuel or combustion hydrogen)

2. Electricity (for e.g. all electric (or) hybrid vehicles), compressed air or fuel cells (hydrogen fuel cells).

3. Compressed natural gas used by natural gas vehicles.

29. What is green chemistry?

Green chemistry is the design of chemical products and the processes to reduce or eliminate the use and generation of hazardous substances.

30. What are the principles of green chemistry?

- It is better to reduce waste generation than to treat or clean up waste after it is generated.

- Wherever practically feasible, synthetic methodologies should be designed to use and generate substances that possess a little or no toxicity to humans and the environment.

- Chemical products should be designed to preserve efficacy of function while reducing toxicity.

31. What is green washing?

Green chemistry is not a panacea. We must be vigilant in making sure that what is called "Green Chemistry" really pushes towards a more sustainable world and not simply green washing.

32. What is global village?

A term that compares the world to a small village, where fast and modern communication allows news to reach quickly. The use of electronics for faster communication is a global village concept.

33. What is the global electronic village?

Global electronic village (GEV) is a term used to refer to a village without borders; it refers to connecting people around the world technologically through Information Communication Technologies (ICTS).

34. Who coined the term Global Electronic Village?

The term global village was coined by Marshall McLuhan.

14. Waste Water Management

1. What is the journey of water cycle?

A large quantity of water is present in an area of about 1400 million km3 in the entire globe. This water evaporates from moist surfaces, falls as rain or snow, passes through lakes and rivers, seeps into the ground water table and flows into the ocean, also gets fixed in glaciers and deposited over mountains. Plants absorb water from the soil, utilize it for its metabolic activities and release it into the atmosphere mainly through transpiration

2. What are the sources of water?

Water is widely distributed in nature and is found in various forms viz., solid, liquid and vapour. Rainfall brings the available primary source of water over the earth's surface. Oceans are the largest among all the water resources. Only a little quantity of water i.e. 2.4 percent of water is fresh and most of this fresh water is in glaciers or as ground water. Geologic layers containing water is known as aquifers from which water can be extracted. On some areas of the earth's crust, fresh water flows freely which is called as an artesian well or spring. Rivers carry a huge volume of water for discharge into the lakes and ponds.

Wetlands, swamps and marshes play a vital role in this journey of water.

3. What is sewage?

Sewage is generated from residential, institutional, commercial and industrial establishments and includes household solid and liquid waste from toilets, baths, showers, kitchens, sinks and so forth. The sewage is disposed through sewer lines.

4. What are the stages of sewage water treatment?

Conventional sewage treatment may involve three stages: 1.primary 2. secondary 3. Tertiary

5. What is primary sewage treatment?

Primary Treatment involves temporary holding of the sewage in a quiescent basin, where heavy solids get settled at the bottom while oil, grease and lighter solids float over the surface. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to secondary treatment.

6. What is secondary sewage treatment?

Secondary Treatment is used to remove the dissolved and the suspended biological matter. This process is typically performed by indigenous, water borne microorganisms in a managed habitat. Secondary treatment may require a separation process to remove the microorganisms from the treated water, prior to discharge for tertiary treatment.

7. What is tertiary sewage treatment?

Tertiary Treatment is defined as either chemical or treatment of filteration done after the primary and the secondary treatment.

8. What is Bioremediation?

Bioremediation is a technique which is used to clean up the environment using microorganisms. Nitrosomonas europaea can be used to treat sewage, freshwater, walls of buildings and the

surface of monuments especially in polluted areas, where there are high levels of nitrogen compounds.

9. What is waste water?

Waste water is often referred to as grey water. Any water that has been used in the households, with the exception of water in the toilet can be referred to as waste water.

This water could be reused for a multitude of purposes including,

- Watering yards and gardens
- Filtering septic systems
- Irrigating fields

10. What are the Benefits of household waste water recycling systems?

- Less fresh water usage
- Reduce stain in septic tanks
- Recharge ground water
- Encourage plant growth

11. How are Waterborne diseases caused?

Waterborne diseases are caused by the ingestion of water, contaminated by human or animal faeces or urine containing pathogenic bacteria or viruses. They include cholera, typhoid, amoebic and bacillary dysentery and other diarrhoeal diseases.

12. What are water-washed disease?

Water-washed Diseases are caused by poor personal hygiene and skin or eye contact with contaminated water. They include scabies, trachoma and flea, lice and tick-borne diseases.

13. What are water based diseases?

Water-based Diseases are caused by parasites found in intermediate organisms living in water. They include dracunculiasis, schistosomiasis and other helminthes.

14. What are water related diseases?

Water-related Diseases are caused by insect vectors which breed in water. They include dengue, filariasis, malaria, onchocerciasis, trypanosomiasis and yellow fever.

15. What are the Basic rules for sanitation in public places?

- There should be sufficient toilet facilities.
- The toilet facilities should be arranged in separate blocks for men and women.
- The men's toilet block should have urinals and toilet compartments. The women's block should have toilet compartments only.
- There must be a wash basin with clean water

16. What is energy management?

"Energy Management" is a term that has a number of meanings, but we are mainly concerned with the one that relates to saving energy at business, public-sector / government organizations and homes.

17. What is an energy audit?

An energy audit is an inspection, survey and analysis on energy flow for energy conservation in a building, process or system. It is done with a view to reduce the amount of energy input into the system without negatively affecting the output.

18. What is home energy audit?

Home energy audit is a service where the energy efficiency of a house is evaluated using professional equipment such as blower doors and infra-red cameras, with the aim to suggest effective ways to improve energy efficiency in heating and cooling the house.

19. What are renewable resources?

A natural resource is a renewable resource, if it is replaced by natural processes at a rate equal to or faster than its rate of consumption by humans. Solar radiation, hydrogen, wind and hydroelectricity are in no danger of a lack of long term availability.

20. What is solar energy?

Solar Energy is the energy harnessed directly from the sun. Along with nuclear energy, it is the most abundant source of energy on the earth.

21. What is hydrogen?

Hydrogen has been found to be the best choice among all the alternative fuel options.

It can be produced in virtually unlimited quantities with production technologies in hand. Hydrogen has the highest mass energy content. Its heat of combustion per unit weight is about 2.5 times that of hydro carbon fuel, 4.5 times that of ethanol and 6.0 times that of methanol. Its thermodynamic energy conversion efficiency (30-35 %) is greater than that of gasoline (20-25%).

22. What is wind energy?

Wind Power is derived from uneven heating of the Earth's surface from the sun and the warm core. Most modern wind power is generated in the form of electricity by converting the rotation of turbine blades into electrical current by means of an electrical generator. In wind mills, (a much older technology) wind energy is used to turn mechanical machinery to do physical work, like crushing grain or pumping water.

23. What is non-renewable energy?

A non-renewable resource is a natural resource which cannot be produced, grown, generated or used on a scale which can sustain its consumption rate. These resources often exist in a fixed amount, or are consumed much faster than nature can create them. Fossil fuels (such as coal, petroleum and natural gas) and nuclear power (uranium) are examples.

24. What is Fossil fuels?

Fossil fuels which are energy rich in combustible forms of carbon or compounds of carbon formed by the decomposition of biomass buried under the earth over million of years.

25. Which country is called as country of wind and why?

Denmark is called the country of "winds". More than 25% of their electricity needs are generated through a vast network of windmills. In terms of total output, Germany is the leader, while India is ranked 5th in harnessing wind energy for the production of electricity. It is estimated that nearly 45000MW of electrical power can be generated if India's wind potential is fully utilized. The largest wind energy farm has been established near Kanyakumari in Tamilnadu and it generates 380MW of electricity.

26. What is coal?

Coal is a black mineral of plant origin, which is chemically a complex mixture of elemental carbon, compounds of carbon containing hydrogen, oxygen, nitrogen and sulphur.

27. What is petroleum?

Petroleum is a dark, viscous, foul smelling liquid - a mixture of solid, liquid and gaseous hydro-carbons with traces of salt, rock particles and water.

28. What are natural gas?

The composition of natural gas is chiefly methane (> 90%) with traces of ethane and propane. It is found associated with other fossil fuels, in coal beds, as methane clathrates and it is created by methanogenic organisms in marshes, bogs, and land fills. It is an important fuel source, a major feedstock for fertilizers and a potent green house gas.

29. How is natural gas useful in power generation?

Natural Gas is a major source of electricity generation through the use of gas turbines and steam turbines. Most grid peaking power plants and some off – grid engine generators use natural gas.

30. What are the various liquid biofuels for transportation?

- Bioalcohol
- Green diesel
- Biodiesel
- Vegetable oil

- Bioethers
- Biogas

15. Food Habits

1. What are the food obtained from plants and animals?

The root, stem, leaf, flower, vegetable, fruit and seed of the plants are used as food. Different food items like milk, egg and meat are obtained from animals.

2. What are nutrients?

The constituents of the food which are essential for the body are called nutrients.

3. What are the types of nutrients?

- Carbohydrates - Provide energy
- Proteins - Help in growth
- Fats - Provide energy
- Vitamins - Help in physiological activities
- Minerals - Act as regulators in physiological activities
- Water - Transports food, regulates body temperature

4. Name the food and the water content.

- Water melon 99%
- Cucumber 95%
- Mushroom 92%
- Milk 87%
- Potato 75%
- Egg 73%
- A bread slice 25%

5. What is the Deficiency Diseases?

Diseases caused due to the deficiency of nutrients in food that we eat are called deficiency diseases.

6. What are balanced diet?

A food that contains all the nutrients in the right proportion is a balanced diet.

7. What are the types of nutrients?

- Autotrophic nutrition: Mode of nutrition in which an organism prepares its own food is called autotrophic nutrition. E.g.: Green plants, Euglena. They prepare their own food by photosynthesis.
- Heterotrophic nutrition: The mode of nutrition in which an organism depends on other organisms for food as they cannot prepare their own food is called heterotrophic nutrition.

8. What is photosynthesis?

Preparation of starch (sugar) by the plants with the help of sunlight, carbon-dioxide, water and chlorophyll is photosynthesis.

9. What are the Types of Heterotrophic nutrition?

- Parasitic nutrition: The mode of nutrition in which an organism depends on another living organism for its food and survival is called parasitic nutrition. The plant Cuscuta depends on other plants for food. It is an example for parasitic nutrition.
- Parasitic nutrition: The mode of nutrition in which an organism depends on another living organism for its food and survival is called parasitic nutrition. The plant Cuscuta depends on other plants for food. It is an example for parasitic nutrition.

10. What are the animals based on nutrition?

- Animals that feed only on plants are called herbivores. e.g. goat, cattle.
- Animals that feed on other animals are called carnivores. e.g. tiger.
- Animals that feed on both plants and animals are called omnivores. e.g. crow

11. What are vitamins and diseases based on them?

Vitamin/Mineral	Daily intake recommendation	What they affect	Where to find them
Vitamin A	700 mcg	Skin, bones, vision, hair	liver, carrot, sweet potato
Vitamin D	15 mcg	bones, immune system	Fatty fishes (catfish, salmon...) egg
Vitamin E	15 mg	skin, vision, hair	Wheat germ oil, sunflower seeds.
Vitamin K	60 mcg	bones, blood	spinach, kale, broccoli
Vitamin C	75 mg	immune system, skin, teeth, hair	Guavas, red pepper, broccoli
Choline	425 mg	Nervous system, brain	egg, beef, cauliflower
Thiamin (B1)	1-1.1 mg	energy, heart, muscles	egg, legumes, whole grains
Riboflavin (B2)	1.1 mg	body growth, energy, hair	Dairy, eggs, greens
Niacin (B3)	14 mg	digestive system, skin, energy	Dairy, eggs, fish
Pantothenic Acid	5 mg	skin, energy	Mushrooms, cauliflower, broccoli
Vitamin B6	1.3 - 1.7 mg	nerve, break down protein, hair	avocado, banana, legumes
Folic Acid/Folate	400 mcg	tissue growth, hair	dark greens, legumes, citrus fruits
Vitamin B12	2.4 mcg	metabolism, hair	eggs, soymilk, poultry
Biotin	no more than 30 mcg	hair, nail, skin	tomaotes, romaine lettuce, carrots

16. Human Body form and Function

1. What is the weight of our skin?

The skin is the heaviest organ of our body and it weighs about 7 kg.

2. How many organ system are there in our body?

There are about ten organ systems in our body.

3. What is The Integumentary System?

The Integumentary System includes the skin, hair, nails, sweat glands and oil glands.

4. What do the digestive system of human consists of?

The digestive system consists of mouth, food pipe, stomach, liver, intestines and the secretory glands.

5. What is the respiratory system of human consists of ?

Respiration is essential for the survival of living organisms. It is a process in which food is broken down into simpler forms with the help of oxygen and enzymes.

6. What is muscular system made of?

The Muscular System is made up of three types of muscles. They are skeletal muscles (striated muscle), smooth muscles (non-striated muscle) and cardiac muscles. Skeletal muscles are attached to the bones. Smooth muscles are found in the walls of blood vessels and in the lining of hollow organs such as stomach, intestines etc. Cardiac muscle is exclusively found in the heart.

7. What is skeletal system?

The Skeletal System includes bones and other tissues such as cartilages and ligaments in our body. The Skeletal System is made up of 206 bones.

8. What is circulatory system?

The Circulatory System transports substances from one part of the body to another. It is made up of the heart and the blood vessels. The heart is the pumping organ. It pumps the blood into the blood vessels, which carry the blood to all parts of the body and bring it back to the heart.

9. Which make blood to look red?

RBC contains red pigments called haemoglobin, which gives red colour to the blood.

10. What are nervous systems consist of?

The Nervous System is composed of the brain, the spinal cord and the nerves. The nervous system is divided into two types. They are the Central Nervous System (CNS) and the Peripheral Nervous System (PNS). There are five sense organs, which help us to know the outside world. They are eyes, nose, ears, tongue and skin. The CNS consists of the brain and the spinal cord. The PNS consists of the cranial nerves and the spinal nerves.

11. What is endocrine system?

A group of ductless glands in our body form a system called the Endocrine system. These glands secrete certain chemicals called hormones. These hormones are transported to the target organs through blood and regulate various functions of the body.

12. What do the excretory system consist of?

The Excretory System helps in the elimination of wastes from our body. It comprises a pair of kidneys, a pair of ureters, a urinary bladder and urethra. The blood is filtered and the waste is separated to form urine, which is expelled periodically.

13. What do the reproductive system made of?

The Reproductive System is mainly composed of testes in males and ovaries in females. The testes produce male gametes called sperms. The ovaries produce female gametes called eggs. This system helps in producing new individuals for the survival of human race.

14. What is health care?

Health Care is prevention of illness and treatment for illness.

15. What kind of medicine do rural people prefer?

Most of the rural people rely on two types of medicines. They are the Siddha and the Ayurveda systems of medicine.

16. What is sidha system?

Siddha vaidhya is an indigenous traditional system originated in Tamilnadu. It has references from age old literature such as 'Thirumandiram', 'Thirukkural' and 'Tholkappiam'. The Siddha is a traditional Tamil system of medicine which is also practiced in the neighbouring states of Kerala, Karnataka and Andhra pradesh. The Siddha Medical System was founded by a group of 18 spiritual people called Siddhars. The word 'Siddhar' is derived from "Siddhi" which means "Eternal Bliss". Agastiyar, being the first Siddhar, is called the Father of Siddha Medicine.

17. What is concept of sidhars?

The concept of the Siddhars is “FOOD IS MEDICINE, MEDICINE IS FOOD”.

18. Name some medicines used in Siddha?

Chooranam, Mathirai, Thailam, Legiyam, Rasayanam, Paspam, Chendooram

19. What is Ayurveda?

It is ‘System of healing using natural means’ (herbs). It which originated in India. ‘Ayurveda’ means the Science of Life (Ayur = Life, Veda = Science).

20. What is homeopathy medicine?

Homeopathy is a form of alternative medicine, first proposed by the German Physician Samuel Hahnemann, in 1796.

21. What is Unani medicine?

Unani Medicine is a form of traditional medicine based on the teachings of the Greek physician Hippocrates and the Roman physician Galen, and is developed into an elaborate medical system by the Arab and the Persian physicians.

22. What is healthy food habits?

- eating right amount of food and right type of food at regular intervals.
- drinking 3 to 5 litres of water per day.
- increasing intake of fibre rich foods like greens, leafy vegetables, whole grains and seasonal fruits.

23. Who is said to have diabetics?

The food that we eat is broken down into glucose. Glucose is a source of energy needed for all living beings. Insulin is a hormone secreted by pancreas to control glucose level. When the glucose level in blood exceeds the normal limit (80-120mg/dl), the person is said to be affected by Diabetes. Diabetes is not a disease but a disorder. It may lead to harmful conditions like

obesity, hypertension, heart ailments, etc., It is caused due to lack of physical activity, unhealthy food habits and lack of insulin.

24. Name some aerobic exercise?

- Jogging
- Playing basketball
- Playing football
- Swimming
- Cycling
- Brisk walking for a long distance
- Yoga and aerobic dancing

25. What are perishable foods?

There are certain food items which get spoiled soon at room temperature due to the excess of moisture content in them. Such food items are called **perishable food**. eg. fruits, vegetables, milk, meat etc

26. What are non-perishable foods?

There are certain food items which do not get spoiled at room temperature as they are dry in nature. Such food items are called as **non-perishable food**. eg. rice.

27. What is preservation of food?

The process of keeping the food for a long time without spoilage is called preservation of food.

28. What are common methods of preservation?

Some common methods of preserving food are: drying, freezing, heating, addition of salt or sugar.

29. What is drying?

This method involves the removal of water content from the food by drying. The harvested cereal grains are properly dried in the sun to reduce the moisture in them. This prevents the food from the attack of insects, fungi and bacteria.

30. What is heating?

Heating is a method of food preservation. It kills the microorganisms and denatures the enzymes present in the food. Hence food is stored safely.

eg. boiling of milk before it is stored or used.

31. What is freezing?

Frozen food like meat and fish at very low temperature prevents water activity in the food material. Thus the microbial growth and enzyme activity can be prevented.

32. What are fast foods?

Fast food is easy and convenient to be cooked within a short time. Its taste and flavour is also appreciated by everyone. Food, today is no more home cooked wholesome food but processed with multiple additives. Fast food, if eaten in large quantities on a regular basis can cause many ailments like obesity, diabetes, high blood pressure etc.. Fast food covers a wide range of products, like processed food, pre-prepared food like burgers, fries, vadai, samosa, bajjis etc

33. What are the negative effects of fast food?

1. Fast food item have a very high energy density. Food item with a high energy density confuse the brain's control system.

2. Continuous intake of fast food leads to weight gain and obesity. This is because fast food interferes with the normal appetite control systems.

3. The human appetite was designed for low energy density food and not for high energy density food.

4. Fast food may speed up the risk of clogged arteries, which may lead to heart attacks

17. Reaching the age of Adolescence

1. What is adolescence?

The word 'Adolescence' is derived from the Latin word 'adolescere' which means 'to grow'. The period of transition from childhood to adulthood is called adolescence.

2. What is WHO definition of adolescence?

The World Health Organization (WHO) defines adolescence as the period of life between 11 and 19 years of age.

3. What is puberty?

Puberty is the period in life when the body's reproductive system gets ready to work. Generally, boys attain puberty at the age of 14 to 15 years, while girls reach puberty at a comparatively lower age of 11 to 12 years.

4. What are the changes at puberty?

- Increase in Height: There is a sudden increase in the height of both boys and girls during puberty. The rate of growth in height varies from person to person. Some may grow rapidly at the start of puberty and then slow down, while as others may grow gradually. The height of an individual depends upon the genes which are inherited from parents.
- Change in Body Shape: The changes occurring in adolescent boys and girls are different. In girls hips become broader and the pelvic region widens. In boys, shoulders broaden and the body muscles grow more than that of the girls.
- Change in Voice: At puberty the voice box or the larynx begins to grow. The larynx in boys is larger than that in girls. The voice box in boys can be seen as the Adam's Apple, in their throat In boys, the voice becomes deep and harsh, where as girls have high pitched.
- Increased activity of Sweat and Sebaceous glands: The secretion of sweat and sebaceous glands (Oil glands) increases during puberty. This causes acne and pimples on the face of boys and girls at this time.

- Development of Sex Organs: The Reproductive Organs in boys and girls become fully functional at Puberty. In boys, the male sex organs like the testes and penis develop completely. The testes start producing sperms. In girls, the ovary enlarges and eggs begin to mature. Ovaries start releasing matured eggs.

5. Name some of the secondary sexual characters that develop in girls and boys?

Boys

- Facial hairs such as beard and moustaches develop.
- Hair develops under the armpit, under chest and in the pubic regions.
- Voice becomes deeper.
- Muscles develop, and shoulder becomes broad.
- Increase in weight.

Girls

- Development and enlargement of breasts.
- Hair develops under the armpit and in the pubic regions.
- Hips broaden and pelvic region widens
- Initiation of menstrual cycle.
- Deposition of fat around hips, these changes which occur at adolescence

6. What is gland?

The word gland means having some secretions.

7. What is pimple?

A small papule or pustule. Pimples are sebaceous glands that are infected by bacteria, become inflamed and filled with pus.

8. What are the two types of gland?

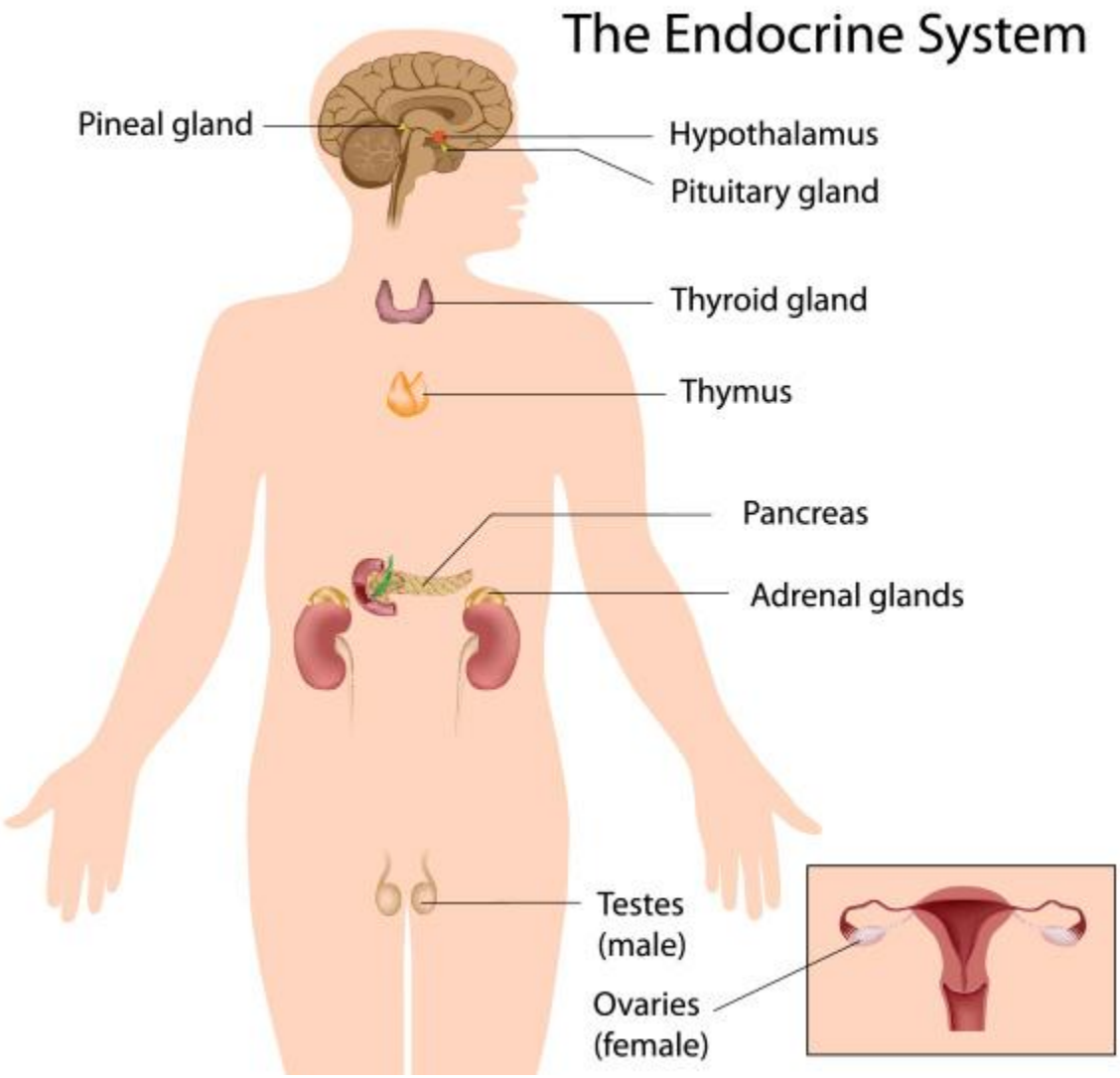
- Exocrine gland – gland with duct

- Endocrine gland – gland without duct.

9. What is exocrine gland?

The exocrine gland secretes enzymes which are important for digestion. The ductless or endocrine glands secrete hormones. They are special chemical substances that make wonders in our body.

10. Mark important endocrine glands.



10. What is pituitary gland?

It is located just below the brain. It is called as the master gland because it controls the functioning of all other endocrine glands. Your growth depends on the secretion of the pituitary gland. It secretes growth hormone. A person having less growth hormone remains very short (Dwarfism) ; on the other hand, a person having much growth hormone becomes very tall (Gigantism). In adults, excess secretion leads to a condition called acromegaly.

11. What is thyroid gland?

It is located in the throat region. It secretes a hormone called thyroxine. The function of thyroxine is to control the rate of Metabolism, growth and respiration.

The deficiency of thyroxine hormone in children is known as cretinism. It slows down growth and mental development. Sometimes the gland may enlarge causing a disease called Goitre.

12. What is pancreas?

Pancreas is located just below the stomach in the body. Pancreas is both exocrine and endocrine in nature. The endocrine part is called Islets of langerhans. It has alpha and beta cells, which secretes glucagon and insulin. Both control sugar metabolism in the body. Deficiency of insulin in the body causes a disease known as diabetes mellitus.

13. What are Adrenal gland?

These are also known as supra renal glands, as they are located just on the top of the kidneys. It secretes adrenalin hormone. This hormone is produced during stress or emergency situations. It regulates heart beat, breathing rate, blood pressure etc.

14. What are testes and ovaries?

Testes and ovaries secrete sex hormones. Testes produce testosterone and ovaries produce oestrogen hormones. These hormones are responsible for male and female secondary sexual characters.

15. What is reproductive organs in male?

In male, the testes produces the male sex hormone testosterone. This hormone helps in the development and maintenance of the primary and secondary sexual characters and functions of sperms. In female, the ovaries secrete estrogen and progesterone responsible for the primary and secondary sexual characters. Apart from testes and ovaries the Adrenal Cortex also secretes steroid hormones in both the sexes. These hormones are responsible for adolescent growth spurt.

16. What is Reproductive Phase?

The phase in an individual's life during which there is production of gametes is called Reproductive Phase. In females it is normally between 13 to 50 years, and in males, it is from the age of 13 to life long. The reproductive age may vary from person to person.

17. What are the various reproductive phases in the life of a female?

- Ovulation: Release of an ovum from the ovary - usually one egg is released every month.
- Menstruation or the period: This is the outward sign of the routine cycle of egg production and hormone change in a woman's body. It takes about 3 – 5 days.
- Pregnancy: When the egg gets fertilized by the sperm, the zygote is implanted in the uterus for further development this results in pregnancy.
- Menopause: The menopause marks the end of the reproductive phase of a woman's life, the chief outward sign is the cessation (stop) of the monthly flow of menstrual blood. The usual age is around 50.

18. What is sex chromosome?

Chromosomes are thread like structures present in the nucleus of the cell. All the cells contain 23 pairs of chromosomes, The last pair of chromosome is different in males and females. The last pair determines the sex, so it is called as sex chromosome.

19. What are the two types of sex chromosomes?

Sex chromosomes are of two types, These are named as X. and Y chromosomes. Usually a woman has two 'X' chromosomes (XX) and male has one 'X' and one Y chromosome (XY), in their cells. During gamete (reproductive cell) formation the number of chromosomes are reduced

into half. (46 chromosomes are reduced into 23). When a sperm containing 'X' chromosome fertilizes the egg, the zygote will have two 'X' (XX) chromosomes. The zygote will develop into a female child. Similarly, when a sperm containing 'Y' chromosome fertilizes the egg, the fertilized egg will have one 'X' chromosome and one 'Y' chromosome (XY), and it will develop into a male child.

20. What are some of the measures that girls and boys need to take to maintain personal hygiene?

● Take bath atleast once a day, paying special attention to underarms, groins and genitals.

● Change the underwear daily. The underclothes should be made of cotton.

21. What is Menstruation?

Menstruation in females is as natural as our regular physiological activities like breathing, drinking, eating, urinating and defecation etc., It is a cyclical process that is present in all the mammalian females.

22. What is the needed dietary consideration?

Minerals: Since there is an increase in skeletal mass and blood volume, the body needs calcium, phosphorous and iron.

Calcium: Calcium intake needs to be increased to prevent osteoporosis in later life. It is present in milk and milk products.

Iodine: It helps to prevent thyroid gland related diseases.

Iron: Lack of iron in the diet results in anemia. To make up for the loss, have a diet rich in iron. In boys, iron deficiency occurs due to muscle spurt if it is not adequately supplemented. In girls, iron deficiency occurs due to menstruation in addition to the spurt in muscular growth if it is not adequately supplemented.

23. What are the stages in the Prevention of sexual abuse?

- Primary Prevention

- Secondary Prevention
- Tertiary Prevention

24. What are primary prevention?

It involves preventing the abuse from happening in the first place. Avoid being alone in company of suspected person. Don't wear provocative dresses. Do not let allow anyone to hug, pet or kiss you. Take care of the way you sit. When you are going to school by auto, bus or by train keep distance from the other sex.

25. What are secondary prevention?

It includes early detection and reporting of perpetrators for the purpose of stopping the perpetrators and minimizing the negative effect on the child.

26. What are the warning signs for sexual abuse?

- A sudden dramatic change in behaviour or personality.
- Recurring nightmares.
- Regression to early behavior patterns such as bed wetting.
- Withdrawal from friends and family members.
- Imitating adult sexual behaviour.
- Hostile, aggressive behaviour.

27. What are the changes that happens because of drug usage?

- Rejection of old friends and the acquiring of new ones.
- Sudden lack of interest in hobbies or extracurricular activities.
- Staying away from home after school.
- Drop in grades and disinterest in school work.
- Less concern with personal appearance.

- Mood swings or extreme irritability.

28. What is sprouting?

Sprouts are a living, enzyme-rich food, natural and low in calories. Their vitamin A content will usually double, various B group vitamins will be 5 - 10 times higher, and vitamin C will increase by a similar order. Their protein content becomes easily digestible and rich new nutrients such as enzymes are created. They contain significant amounts of calcium, iron and zinc.

29. What is initiation?

Normally body cells grow and reproduce in an orderly way. In contrast cancerous cells multiply rapidly. This is due to damaged genetic material of the cell. This stage is known as initiation.

30. What is metastasis?

These cancerous cells create lots of problem in our metabolism and invade to the other areas through blood streams, where they cause secondary tumours. This stage is called metastasis

31. What is apoptosis?

Programmed cell death is called apoptosis

32. How is cancer classified?

There are five broad groups that are used to classify cancer.

- Carcinomas are characterized by cells that cover internal and external parts of the body such as lung, breast, and colon cancer.
- Sarcomas are characterized by cells that are located in bone, cartilage, fat, connective tissue, muscle, and other supportive tissues.
- Lymphomas are cancers that begin in the lymph nodes and immune system tissues.
- Leukaemia are cancers that begin in the bone marrow and often accumulate in the bloodstream.
- Adenomas are cancers that arise in the thyroid, the pituitary gland, the adrenal gland, and other glandular tissues.

18. Improvement in food resources

1. What is food?

Food is a source of energy for our body. It nourishes and protects us from diseases.

Plants and animals provide us with food.

2. What are the reasons for scarcity of food?

The problem of food scarcity can be overcome by:

- increasing the yield of crops.
- preventing cultivable lands from being used for other purposes.
- optimizing water resources for cultivation.
- improving the system of preservation and distribution of food materials.

3. What are crops?

Plants that are cultivated in farms and harvested for food are called crops

4. Name the crops grown for food?

- Crops grown for cereals: Rice, Wheat, Maize, Millet
- Crops grown for pulses : Pea, Greengram, Blackgram
- Crops grown for oilseeds: Groundnut, Sunflower, Mustard, Sesame
- Crops grown for animal fodder: Oats, Sudan grass, Elephant grass, Alfalfa.

5. What is need of improved varieties of crops?

Improved varieties or strains of crops are produced by selective breeding for various important characteristics such as disease resistance, response to fertilizers, product quality and higher yield.

6. What are common factors for crop improvement?

- Higher Yield To increase the productivity of the crop per acre.

- Improved Quality- Quality of crop products vary from crop to crop. e.g. baking quality in wheat, protein quality in pulses, oil quality in oil seeds.
- Biotic and abiotic resistance: Crop production is decreased due to biotic (diseases, insects and pests) and abiotic factors (heat, cold, salinity and drought). Resistance to these stress factors can improve crop production.
- Change in maturity pattern Shorter maturity period; Uniform maturity makes the harvesting process easy and reduces losses during harvesting.
- Wider Adaptability One variety can be grown under different climatic conditions in different areas. Developing varieties of wider adaptability helps in stabilizing crop production.
- Desirable agronomic characters Tallness and profuse branching are desirable characters for fodder crops. Dwarfness is desired in cereals. Developing varieties of desired agronomic characters give higher productivity.

7. How many elements are needed for plant?

Scientists have identified sixteen elements that are important for the growth and reproduction of plants. Nitrogen is needed for plants to prepare proteins, nucleic acids, chlorophyll and other important organic molecules. Deficiency of nitorgen causes chlorosis in plants. Phosphorus is needed for the process of converting light energy from the sun into chemical energy.

8. What are Macro-nutrients?

Elements which are essential in large quantities for the growth of plants are called Macro-nutrients. They are carbon, hydrogen, oxygen, nitrogen, phosphorous, sulphur, potassium, calcium, magnesium and iron.

9. What are micro nutrients?

Elements that are needed for the growth of plants in very small quantities are called Micro-nutrients. They are manganese, copper, molybdenum, zinc, boron and chlorine.

10. What is manure?

Manure is an organic substance prepared by the decomposition of plant and animal waste.

11. How are manure classified?

i) Compost & Vermi Compost: Vermicompost is manure prepared by using earthworms to speed up the process of decomposition of plant and animal waste.

ii) Green Manure : Green manure is prepared by using leguminous plants like sunhemp and soyabean. These are grown for a specific period of time and then ploughed back into the soil. Green plants add nutrients and organic matters like nitrogen and phosphorous to the soil.

12. What are the uses of manure?

- Manure enhances the water holding capacity of the soil.
- It increases the number of friendly microbes.
- It improves the soil texture

13. What are fertilizers?

Fertilizers are chemicals like nitrogen, phosphorous and potassium that are commercially produced in factories and used as plant nutrients.

14. Name some fertilizers with example.

- Nitrogenous Fertilizers - Urea, Ammonium Sulphate, Ammonium Nitrate
- Phosphatic Fertilizers - Single Super Phosphate, Triple Super Phosphate
- Potassic Fertilizers - Potassium Nitrate, Pottassium Chloride
- Complex Fertilizers - Nitrophosphate, Ammonium Phosphate, Diammonium Phosphate (DAP)

15. What is eutrophication?

The excessive richness of nutrients in water that causes dense growth of algae on the surface and causes death of other organisms living in the water is called eutrophication

16. What is the difference between manure and fertilizer?

TABLE: Differences between manure and fertilizers.

Manure	Fertilizers
1. Manure is a natural substance. It is obtained by the decomposition of animal waste and plant residue.	1. Fertilizer is a human-made substance. It is inorganic salt or an organic composition.
2. A manure contains small amount of essential plant nutrient.	2. Fertilizers are very rich in plant nutrients.
3. A manure adds a great amount of organic matter in the form of humus in the soil.	3. A fertilizer does not add any humus to the soil.
4. Manure is insoluble in water and thus the nutrients present in manure is absorbed slowly by plant.	4. Being soluble in water, a fertilizer is readily absorbed by the crop plants.
5. A manure is not nutrient specific and tends to remove the general deficiency from the soil.	5. A fertilizer is nutrient specific. It can specifically provide nutrient to the soil according to the crop need.
6. A manure is voluminous and bulky so it is inconvenient to store, transport, handle and apply to the crops.	6. A fertilizer is compact and concentrated so it is easy to store, transport and apply to the crop.
7. A manure is cheap and is prepared in rural homes or field.	7. A fertilizer is costly and is prepared in factories.

17. How are insect pests classified?

Based on the mode of attack, insect pests are classified into three types:

i) Chewing Insects: They cut and chew the root, stem and leaves of the plants. e.g. grasshoppers and caterpillars.

ii) Sucking Insects: They suck the cell sap from different parts of the plants. e.g. leaf hoppers and aphids.

iii) Borer Insects: They make holes and enter different parts and feed on plant tissues. e.g. sugarcane borer.

18. How are plant disease classified?

Based on the mode of transmission, plant diseases are classified into four types,

- Seed borne diseases-----They spread through seeds.-------e.g. Leaf spot of rice, Loose smut of wheat.
- Soil borne diseases -------They spread through the soil. ------They affect roots and stems in plants. e.g. Tikka disease of groundnut.
- Air borne diseases----These diseases are transmitted through air----. They attack all aerial parts of plants like leaves, flowers and fruits. e.g. Blast of rice, Rust of wheat .
- Water borne diseases-----The diseases which are transmitted through water are called water-borne diseases. e.g. Bacterial blight of rice.

19. What are pesticides?

Pesticides are toxic chemicals that destroy pests.

20. What are insecticides?

Insecticides: Chemical substances which are used to kill insects are called insecticides. e.g. DDT (Dichloro diphenyl trichloro ethane), Malathion.

21. What is fungicides?

Chemicals used to kill fungi are called fungicides. e.g. Bordeaux mixture.

22. What is weedicide?

Chemical substances which are used to kill weeds are called weedicides. e.g. 2, 4-D. (2, 4 - Dichloro phenoxy acetic acid)

23. What is rodenticides?

Chemicals used to kill rodents like rats, mice and squirrels are called rodenticides, e.g. Zinc Phosphate, Arsenic.

24. What are the factors responsible for damage in seeds?

During storage, grains and seeds are subjected to spoilage by various agencies. Factors responsible for such damages are:

- Biotic factors (insects, rodents like squirrel and rat, birds, fungi, mites and bacteria)
- Abiotic factors (moisture and temperature)

These factors cause,

- infestation of insects
- degradation in quality
- loss in weight
- poor germinability
- discolouration of product
- poor marketability.

25. What is hybridization?

Hybridization is the method of producing improved varieties by crossing the genes of two or more dissimilar and specially selected parent animals or plants. The parents with desirable qualities are selected and the best characters are brought together in a single variety.

26. What are the types of hybridization?

Hybridization can be:

- Intervarietal (cross between two different varieties)
- Interspecific (cross between two species of the same genus)
- Intergeneric (cross between different genera)

27. What are the characteristics that farmers look for when selecting parent crops?

- Resistance to diseases
- Tolerance to climatic conditions
- General appearance
- Size and configuration

- Productivity
- Good health
- Proper age of reproduction

28. What is inbreeding?

Breeding between closely related individuals within the same breed is known as inbreeding.

29. What is outbreeding?

It involves breeding of animals that are not closely related.

30. What are the process involved in outbreeding?

a) Outcrossing: It involves breeding from the crossing of animals of the same breed (without a common ancestor).

b) Cross breeding: In this method, superior males of one breed are mated with superior females of another breed. It involves the fusion of two different breeds in order to combine the desirable qualities of both.

c) Interspecific Hybridisation: In this method, male and female animals of two different species are mated. In some cases, the progeny may combine desirable features of both the parents. For example, mule is produced from a cross between female horse (mare) and male donkey. Mules are sturdier and harder than their parental species and are well suited for hard work in different terrains like mountainous regions. There are two methods of interspecific hybridisation.

31. What is animal husbandry?

The branch of agriculture which deals with the feeding, sheltering, nurturing and breeding of domestic animals such as cattle, pigs, horses and fowls is called animal husbandry.

32. What are the elements of animal husbandry?

- Proper feeding of animals.

- Provision of clean drinking water for animals.
- Proper shelter for animals.
- Prevention and cure of animal diseases.
- Proper breeding of animals.

33. What is white revolution?

Dr. V. Kurien is considered as the

Father of White Revolution. White Revolution refers to a time when there was tremendous increase in milk production with the use of new improved breeds of cattle. Dr. V.Kurien is the founder chairman of National Dairy Development Board (NDDB). This board designed and implemented the world's largest dairy development programme called OPERATION FLOOD.

34. What is poultry farming?

Poultry farming is defined as rearing and breeding of avian species for the purpose of egg and meat. Chicken occupy 90% of the total poultry.

35. What is white revolution?

The increase in egg production brought about the 'Silver Revolution' in the area of animal husbandry.

36. How are fowls classified?

The fowls are classified on the basis of their utility to man. They are: 1. meat type

2. egg type 3. dual type.

37. What is intensive farming?

Intensive farming involves growing birds in small cages that are just large enough for them to feed and lay eggs. Animal welfare activists discourage this method as this does not provide sufficient space for the bird to move or spread its wings.

38. What are poultry disease?

Poultry are often affected by diseases and attacked by predators like cats, dogs and foxes. Some of the common diseases found in Indian fowls are tick fever (Spirochaetosis), tuberculosis, fowl cholera, fowl pox and flu.

39. What are the types of pisciculture?

a. Extensive pisciculture: growing fish on natural feed.

b. Intensive pisciculture: Growing fish on artificial feed to maximize production.

c. Monoculture: Growing a single type of fish in a water body.

d. Polyculture: Growing one type of fish or more types of fishes with different feeding habits together in a waterbody.

e. Integrated pisciculture: Growing fish along with agricultural crops or other animals.

40. What is pisciculture?

The process of rearing and breeding of fishes in rivers, streams, ponds, irrigation canals and paddy fields is known as pisciculture.

41. What are the factors of pisciculture?

- Topography or location of pond.
- Water resources and quality of water.
- Quality of soil (Nutrients).
- Temperature of water.

42. What is Aquaculture?

Aquaculture is a business that involves the production and marketing of aquatic organisms, both plants and animals, under controlled conditions. Aquaculture includes culture of prawn, lobsters, fish, pearl oysters, mussels and crabs.

43. Facts of Indian fisheries

- Total fish production – 2rd position in the world.
- Marine fish production – 7th position in the world.
- Aquaculture production – 2nd position in the world.
- Fish industry contribution -Rs.53,000 crores as foreign exchange annually.

44. What is apiculture?

The scientific method of rearing honeybees for honey and wax is called 'Apiculture' or 'Bee keeping'

45. What are the varieties of honey bee?

a. Indigenous varieties

i. Apis indica (Common Indian honey bee)

ii. Apis dorsata (Rock bee)

iii. Apis florea (Little bee)

b. Exotic varieties

i. Apis mellifera (Italian bee)

ii. Apis adamsoni (South African bee)

46. How does honey bee communicates?

HONEY BEE COMMUNICATION (Dance forms): Round dance indicates that the source of nectar is within 100 mts. Waggle dance signifies a long distance. The dance patterns specify the direction of nectar with respect to the sun. In 1973, KARL VON FRISCH received the Nobel Prize for deciphering this dance language.

19. Immune System

1. What is health?

"Health is a state of physical, mental and social well-being of an individual and not merely absence of a disease or infirmity".

2. What are the dimensions of health?

- Physical dimension : A person who is free from disease, looks bright with his skin shining; enjoys normal metabolism; has lustrous hair and has no dark circles around his eyes.
- Mental dimension : Mentally healthy people know their capacities and do not overestimate or underestimate themselves. They can easily judge their shortcomings and weaknesses.
- Social dimension : An individual who is able to adjust in society, does not find fault with other. Such a person maintains good interpersonal relationship with family members and colleagues at workspot. He is free from interpersonal conflicts and will never quarrel with others

3. What are the causes of diseases?

Diseases are caused due to various factors such as pathogens, environmental factors, nutritional factors, genetic factors, metabolic factors, etc. Based on the causative agent, diseases are classified into two categories:

- Diseases that are not caused by organisms.
- Diseases that are caused by organisms

4. What is disease?

The word 'disease' means "without ease or not at ease" and is the opposite of health. The condition of malfunctioning of the organ system or systems is called disease.

5. What is the sugar level in normal body?

A healthy body maintains a constant blood sugar level, which is normally 80-120 mg/dl of blood under fasting conditions.

6. Name some disease caused by metabolic disorders?

Diabetes insipidus, coronary heart diseases, Renal failure, hypertension, obesity, lzheimer's disease, stroke affecting the functions of the brain, etc., are all caused due to metabolic disorders

7. How are genetic disorder caused?

The genetic disorders are caused due to defective or mutated genes.

8. Who established gem theory of disease?

Robert Koch and Louis Pasteur were the first to establish the Germ Theory of Diseases.

9. Name some genetic disorder?

Haemophilia, Sickle cell anaemia, Thalassemia, Down's syndrome, Colour blindness, Bubble boy syndrome, etc. are a few other genetic disorders.

10. What cause Nutritional Deficiency Diseases?

A diet which contains all essential nutrients in correct proportion, is indispensable for maintaining good health. Deficiency in certain food constituents causes various kinds of diseases. Protein deficiency causes Marasmus and Kwashiorkar. In Marasmus, the child loses weight and suffers severe diarrhoea and it will appear as though bones are covered by skin. In Kwashiorkar, the child develops an enlarged belly with face and feet swelling.

11. Name disease based on nutrition.

- Vitamin A - Nyctalopia - Night blindness
- Vitamin D- Rickets - Defective calcification of bones
- Vitamin E - Sterility - Inability to reproduce
- Vitamin K - Haemorrhage - Profuse loss of blood
- Vitamin B1 - Beri-Beri - Nervous disorder
- Vitamin B5 - Pellagra Dementia, - dermatitis, diarrhoea
- Vitamin B12 - Pernicious anaemia- Destruction of RBC
- Vitamin C - Scurvy - Bleeding gums and loosening of teeth

12. What is Parasitic Microorganism?

The causative organism of a large number of diseases in man, are microorganisms belonging to different groups. They are viruses, bacteria, fungi and protozoans.

13. What are virus and viral disease in man?

Viruses are living substances inside the host cell and behave as dead particles outside the host cell. The Viral body consists of a nucleic acid, DNA or RNA and a protein cover. All the known viruses are parasitic and some of them cause deadly diseases such as polio, rabies, hepatitis, meningitis, encephalitis (brain fever), etc.

14. What are bacteria and bacterial disease?

Bacteria are unicellular prokaryotes and some are parasitic and produce diseases.

Bacteria can enter the host body through the mouth, nostrils, cuts and bruises on the skin. They multiply rapidly, producing toxins in high concentration to affect health. Some bacterial diseases in man are Tuberculosis, Leprosy, Cholera, Typhoid, Diphtheria, Pertusis, Tetanus, Plague, Pneumonia, Syphilis, Gonorrhoea, etc.

15. What are fungi and fungal disease?

Fungi are non-green saprophytic or parasitic plants that subsist on dead and decaying organic matter or living organisms. Certain species of fungi are parasitic on man and cause Ringworm attacking the keratinized layer of skin, destroying it in circular patches. Dandruff and Athletes' foot are other fungal diseases that attack man.

16. What are protozoan and protozoan disease?

Protozoans are unicellular animalcules. Some parasitic protozoans in man cause diseases such as malaria, amoebic dysentery, sleeping sickness, etc.

17. What are infectious disease?

A disease caused by a parasitic organism and transmitted from one person to another by the transfer of the parasite is known as an infectious disease.

18. What are fomites?

Common cold are spread through contaminated objects like handkerchief, bedding, clothes, utensils, toilet articles, etc

19. What is bacteria?

Bacteria are prokaryotic organisms. Some of the bacteria are parasitic, causing diseases like Tuberculosis, Cholera, Typhoid, Dysentery etc. in man.

20. What is tuberculosis?

It is an airborne disease affecting the lungs and other parts of our body such as bones, joints, lymph glands, alimentary tract, liver, kidney, etc.

21. What is typhoid?

It is caused by A short rod-shaped bacterium with numerous flagella – Salmonella typhi causes typhoid

22. How is malaria caused?

A tiny protozoan – Plasmodium is responsible for causing malaria. Four different species of Plasmodium namely, P.vivax, P.malariae, P.falciparum and P.ovale exist in India and cause malaria. Of these, the malaria, caused by Plasmodium falciparum is malignant and fatal.

23. How is Amoebic dysentery caused?

Entamoeba histolytica – a protozoan parasite in the large intestine of man causes Amoebiasis

24. What is the life cycle of malaria?

The sexual stage of Plasmodium takes place in female Anopheles mosquito whereas the asexual stage occurs in man. When a female Anopheles mosquito bites an infected person, these parasites

enter the mosquito and undergo further development in the body of the mosquito. The parasites multiply within the body of the mosquito to form sporozoites that are stored in the salivary glands of the mosquito. When these mosquitoes bite a healthy person, the sporozoites (the infectious stage) are introduced into his body. They multiply within the liver cells first and enter the Red Blood Cells(RBC) of man, resulting in the rupture of RBC. This results in the release of toxic substance called haemozoin which is responsible for the chill and high fever, recurring every three to four day

25. Who is Sir. Ronald Ross?

Sir. Ronald Ross, a British – Indian physician was born in Almora, India. He had his school education and higher studies in medicine in England. Later he was posted at the Presidency General Hospital, Calcutta. Ross did a research study about malaria between 1882 and 1899. When he was working in Bangalore, he observed the connection between water as the breeding ground of mosquitoes and the spread of malaria. He discovered the presence of malarial parasites in the female Anopheles mosquito, when he was working on malaria at Secunderabad. He demonstrated that malaria is transmitted from an infected individual to a healthy person by the bite of mosquito. In 1902, he was awarded the Nobel Prize for his work on malaria

26. Which cause ringworm?

Three different genera of fungi namely, Epidermophyton, Microsporum and Trichophyton cause ringworm.

27. What is immunity?

Immunity is the body's defence against or the specific resistance exhibited towards infectious organisms.

28. What is antigens?

Infectious organisms that invade the body, the toxins produced by them and the foreign proteins that enter the body are called antigens.

29. What are the types of immunity?

- Natural or Innate Immunity
- Acquired or Specific Immunity
- Active acquired immunity
- Passive Acquired Immunity

30. What is immunization schedule?

The immunization schedule indicates the stages at which the vaccinations and inoculations have to be given to safeguard children against different diseases.

31. Name the schedule.

- BCG - Tuberculosis Vaccine
- DPT- Diphtheria, Pertussis, Tetanus
- Vaccine - (Triple antigen)
- MMR - Mumps , Measles, Rubella
- DT - Diphtheria, Tetanus (Dual antigen)
- TT - Tetanus toxoid

32. What is treatment?

Treatment means the medical management of the symptoms of a disease

33. What do medical management include?

Medical Management includes:

- Treatment involving medicine.
- Treatment not involving medicine.

34. What is bio technology?

Biotechnologically synthesized insulin has been effectively used replacing the defective insulin to treat diabetes mellitus in the field of medicine.

35. What is AIDS?

Acquired Immuno Deficiency Syndrome (AIDS) is a dreadful disease transmitted through sexual contact or through transfusion of blood and blood products.

36. What is HIV?

Human Immuno Deficiency Virus(HIV)

20. The World of Plants

1. What is herbal plants?

The plants that have medicinal properties are known as herbal plants.

2. Name some medicines used for daily health problems?

Some spices are also used as medicines. Dry ginger, mint and fenugreek are used as medicines for common cold, fever and stomach ache. Turmeric and clove are used as antibiotics and antiseptics.

3. What are the uses of flower?

We all love beautiful flowers such as rose, lily, jasmine, etc. Flowers play a key role in the preparation of cosmetics like bathing soap, talcum powder, deodorant and perfumes.

4. What are spices?

Spices are obtained from many parts of plants. By adding them to the food, the food gets good smell and colour. Spices increase the amount of food eaten and the digestion rate. Many parts of plants such as leaves, stems and flowers are used as spices.

5. Name some spices which has underground stem?

Ginger and turmeric are the stems of the plant found under the ground. These stems do the function of food storage.

6. What are fiber plants?

The dress, the jute and the gunny bag we use are the products of fibre plants. Long, thin, strong strand obtained from plants is known as fibre.

7. What are leaf fiber?

Fibres are obtained from the leaves of Aloevera and Pineapple. These are called as leaf fibres.

8. What are external fiber?

Fibres obtained from the outer region of the seed are known as external fibres. eg. Cotton, Coconut, Silk cotton.

9. What is wood?

The part of the tree that is used for various construction purposes is called wood. The dark inner region of the stem is called heartwood and the outer region is called as sapwood.

10. Fact file

- Thickest African tree found in Zimbabwe is Boabab tree.
- Orange trees yield fruits for about 400 years.
- Rafflesia produces the largest flowers. The diameter of the flower is one metre.
- Red wood tree doesn't easily catch fire
- From a watermelan, 6,00,000 watermelon plants can be produced and from them watermelon weighing 180 tonne can be obtained.

21. Addiction and Healthy Lifestyle

1. What is addiction?

The term ‘addiction’ is used to describe a compulsion by an individual to engage obsessively in some specific activity. Addiction leads to harmful consequences to an individual’s health, mental state and social life.

2. What are the reasons for addiction?

There are several reasons for addiction, both personal and social. Some become addicts due to personal trauma or emotional disturbances. Others become addicts due to peer pressure and unregulated habits.

3. What are the two ways of dependence of addiction?

Substance-related Addiction: This includes dependence on any of the following:

- Tobacco
- Alcohol
- Street drugs (illegally sold drugs that are taken for non-medicinal use. e.g. LSD, amphetamines)
- Prescription drugs (medicinal drugs that are misused. e.g. sleeping pills and pain-killers)

Behaviour-related Addiction: This may be due to excessive indulgence in the following activities:

- Gambling
- Eating
- The Internet
- Video Games
- Work
- Sex

4. What is Alcoholism?

Alcoholism is also known as alcohol dependence. Alcoholics suffer from an uncontrollable desire to consume alcohol individuals, it starts as social drinking that eventually leads to heavier and heavier alcohol consumption, and later causes serious health and psychological problems.

5. What are the symptoms of alcoholism?

Drinking alone, drinking in secret, blacking out - not being able to remember the passage time, being annoyed when not able to drink, having alcohol hidden in unlikely places, gulping drinks

down in order to drink more and then feel good, needing a larger quantity of alcohol to feel its effect, feeling nausea, sweating, or even shaking when not drinking.

6. What is the reason for liver cirrhosis?

One of the reasons for liver cirrhosis is alcoholism. It starts with inflammation of the liver. Over a period of time it leads to scarring of the liver tissue and finally cirrhosis of the liver. A healthy liver is able to regenerate most of its own cells when they become damaged. At the final stage of cirrhosis, the liver can no longer effectively replace damaged cells.

7. What does cigarette made of?

Nicotine is one of the most frequently used addictive drugs and the leading preventable cause of disease and disability and death in India. Cigarettes and tobacco in any form are illegal substance in most countries.

8. How does cigarette smoking affects lungs?

Smoking destroys the small hairs (cilia) present in the upper respiratory tract (trachea). In normal persons these hairs protect lungs from germs, dust, smoke and other harmful chemicals which enter the lungs causing infection, cough and lung cancer. The air sacs of lungs (alveoli) get permanently damaged causing difficulty in breathing.

9. How does smoking affects digestive system?

Smoking causes heart burn, delays the healing of peptic ulcer, increases risk of Crohn's diseases and formation of gall stones. It affects the liver and increases the chances of stomach cancer.

10. How does smoking cause cancer?

Smoking causes cancer in lungs, larynx, oral cavity, pharynx, oesophagus and bladder.

Tobacco smoke contains more than 60 substances that could cause cancer. Most of the lung cancer occurs due to smoking.

11. What is illegal drugs or narcotics?

A drug or other substance affecting mood or behavior and sold for non-medical purposes are called illegal drugs or narcotics

12. What are the signs of drug abuse?

- Sudden change of mood and temper.
- Bouts of drowsiness or sleeplessness.
- Body pain, nausea, unsteady gait.
- Losing interest in job and studies.
- Telling lies and stealing money.

13. What are the steps taken in a rehabilitation centre?

- **First step :**The identification of addicted individuals.
- **Second step** The composition of the drug is analyzed.
- **Third step** The addicted individual is studied to find out whether the dependency is physical or psychological.
- **Fourth step** A suitable chemotherapy is given to the addicts to detoxify the drug consumed.
- **Fifth step** Treatment should be given for a long time.
- **Sixth step** There should be periodical observation given according to his/her physical, mental, social and occupational status

14. What is healthy life style?

"Healthy lifestyle" is a term given to a group of habits like healthy eating, being physically active, leading a smoke-free and stress-free life. India is predicted to become the diabetic and cardio-vascular disease capital of the world.

15. What is obesity?

Addiction to rich food can lead to obesity. It is defined as an excessive accumulation of fat in the body. It will to increased health problems. Lethargy, sluggishness and difficulty in carrying out the activities of daily living are some of the adverse effects of obesity. The causes of obesity are

unhealthy dietary habits, lack of physical activity, genetic susceptibility, endocrine disorders and some medicines.

16. Name some stress relief activities?

The following activities can relieve us from stress. Share your feelings with family and friends, manage your time, get enough sleep, spend time with nature, listen to music, engage in gardening, painting, playing with pets or going out for picnics with family, or any activity that helps you to relax.