

SSC BIOLOGY STUDY MATERIAL 2024-2025

MODEL QUESTION PAPER 2024-2025

Instructions

1. Question paper consists of four sections and 17 questions
2. Internal choice is available only for question number 12 in section III and for all questions in section IV

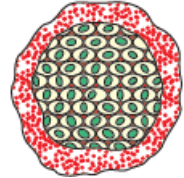
SECTION I

Note: Answer all the questions

Each question carries 1mark

6X1=6M

1. If a heterozygous tall plant is crossed with a homozygous dwarf plant, then what shall be the percentage of dwarf in offspring?
2. Identify the type of reproduction given in the figure.
3. We are two parts of Human digestive system and digest carbohydrates present in food. Who are we?
4. Valves are present in
 - I. Between heart chambers
 - II. veins
 - III. Arteries
 - A. I only
 - B. I and II Only
 - C. I, II and III
 - D. II and III only
5. Name the part of the brain which controls the involuntary actions like blood pressure and salivation in humans?
6. Bamboo plant is growing in a forest what will be the trophic level of it?



SECTION II

Note: Answer all the questions

Each question carries 2 marks

4X2=8M

7. Complete the following table

PLANT HORMONE	ITS ACTION
	Promotes cell division
Absciscic acid	

8. If you have a chance to meet Nephrologist what questions will you ask him on dialysis?
9. Write any two effects of non- biodegradable substances on environment?
10. How is the process of pollination different from fertilization?

SECTION III

Note: Answer all the questions

Each question carries four marks

5x4=20m

11. write differences between aerobic respiration and anaerobic respiration?
12. Draw one of the following Diagram and label it
 - a. Human female reproductive system (OR)
 - b. Human brain
13. observe the following table and answer the following questions

HORMONE	ENDOCRINE GLAND	FUNCTIONS
Growth hormone	Pituitary gland	Stimulates growth in all organs
Thyroxine	Thyroid gland	Regulates metabolism for body growth
Insulin	Pancreas	Regulates blood sugar level
Adrenaline	Adrenal Gland	Increases heartbeat rate.
Testosterone	Testes	Development of male sex organs

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oestrogen	Ovaries	Development of female sex organs, regulates menstrual cycle
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- A. Which Gland regulates blood sugar level in our body?
 - B. On which organ of the human body are adrenal glands located?
 - C. Which hormone is released from the testes?
 - D. What is the function of thyroxine hormone?
14. A farmer wants to grow banana plants genetically similar enough to the plants already available in his field. Which method would you suggest him for this purpose. Write a note on it?
15. How can you help in reducing the problem of waste disposal? Give any 4 methods?

SECTION IV

Note: Answer all the questions

Each question carries 8 marks

Each question has an internal choice

2X8=16M

16. Describe the sexual reproduction in flowering plants?

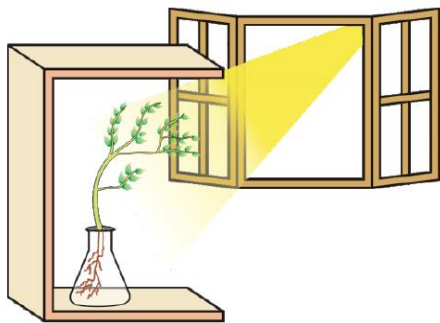
(OR)

How do you explain two separate traits shape and colour of seeds inherited independently?

17. Write about an experiment to prove carbon dioxide is essential for photosynthesis?

(OR)

Observe the following activity and answer the following questions



- A. What is the aim of this activity?
- B. What materials are needed to do this activity?
- C. What is geotropism and phototropism?
- D. Name the plant hormone released at the tip of root and shoot?

LAKSHMI'S
SCIENCE CLASS ROOM

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EXPERIMENT BASED QUESTIONS

1. How can you demonstrate the presence of starch in various areas of leaf?

AIM To prove the presence of starch and chlorophyll in a leaf

Materials required Variegated leaf, Iodine solution, Alcohol, Beaker, Bunsen burner

Procedure

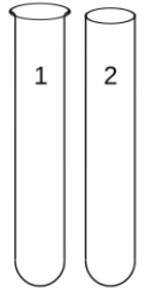
1. Take a potted plant with variegated leaves for example money plant or Croton.
2. Keep the plant in a dark room for three days so that all the starch gets used up.
3. Now keep the plant in sunlight for about 6 hours.
4. Pluck a leaf from the plant mark the green areas in it and trace them on a sheet of paper.
5. Dip the leaf in boiling water for a few minutes.
6. After this immersed it in a beaker containing alcohol.
7. Carefully place the above beaker in a water bath and heat till the alcohol begins to boil.

Observation

The leaf becomes colourless. Chlorophyll is resolved in alcohol and the alcohol turns green. If we dip the leaf in a dilute solution of iodine for a few minutes the green areas of leaf turn dark blue. It indicates the presence of starch in leaves.

Colourless part of a leaf shows no formation of starch.

Result The green areas of leaf which contain chlorophyll pigment perform photosynthesis. We can conclude the product of photosynthesis, starch by using iodine solution.



2. Write about an experiment to prove that carbon dioxide is essential for photosynthesis?

Aim To prove that carbon dioxide is necessary for photosynthesis

Materials required Potted plants, Bell jar, Potassium hydroxide, Vaseline, Glass plates

Procedure

1. Take two healthy potted plants which are nearly the same size.
2. Keep them in a dark room for three days so all the starch gets used up
3. Now place each plant on separate glass plates. Place a watch-glass containing potassium hydroxide by the side of one of the plants. The potassium hydroxide is used to absorb carbon dioxide.
4. Cover both plants with separate bell jars.
5. Use vaseline to seal the bottom of the jars to the glass plates so that the set-up is air-tight.
6. Keep the plants in sunlight for about two hours. Pluck a leaf from each plant and check for the presence of starch.

Observation

The leaf of a plant where potassium hydroxide is placed doesn't turn into blue black colour Because carbon dioxide is absorbed by the potassium hydroxide another leaf turns into blue black colour with iodine solution.

Result

This experiment proves that carbon dioxide is necessary for photosynthesis.

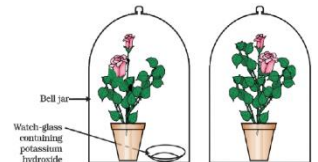
3. Write about an experiment to prove action of saliva on starch?

Aim To demonstrate action of saliva on starch

Materials required Test tubes starch solution iodine solution saliva

Procedure

Take 1 mL starch solution (1%) in two test tubes (A and B). Add 1 mL saliva to test tube A and leave both test tubes undisturbed for 20-30 minutes. Now add a few drops of dilute iodine solution to the test tubes

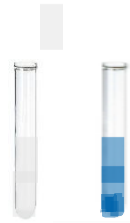


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Observation Test tube B Contains starch we will observe the colour change in test tube B. Test tube A does not contain starch.

Result

By adding saliva to test tube A, starch in starch solution gets converted into maltose sugars so we didn't observed the colour change proves the action of saliva on starch.



4. How can you prove that exhaled air contains more carbon dioxide than atmospheric air?

Aim To prove that exhaled air contains more carbon dioxide than atmospheric air

Materials required Test tubes, Lime water, Pichkari

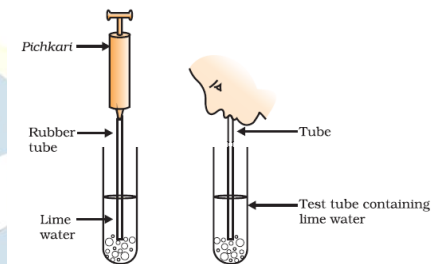
Procedure Take some freshly prepared lime water in a test tube. Blow air through this lime water. Use a syringe or pichkari to pass air through some fresh lime water taken in another test tube.

Observation

If we blow air into the lime water it immediately turns into Milky White. Blowing through Pichkari will take much time to turn the lime water milky

Result

Exhaled air contains more carbon dioxide (4.4%) than atmospheric air(0.4%).



5. How can you prove that carbon dioxide is released during anaerobic respiration?

Aim To prove that carbon dioxide is released during fermentation.

Materials required Test tubes, lime water, fruit juice or sugar solution, bent tube, yeast

Procedure

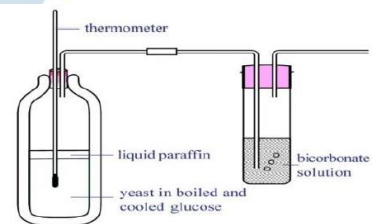
Take some fruit juice or sugar solution and add some yeast to this. Take this mixture in a test tube fitted with a one holed cork.

Fit the cork with a bent glass tube. Dip the free end of the glass tube into a test tube containing freshly prepared lime water.

Observation Carbon dioxide taken out through the tube converts lime water milky.

Result

Yeast Cells during respiration produces carbon dioxide and alcohol by using fruit juice. The carbon dioxide gas passes through the bent tube and turns lime water milky.



6. How can you demonstrate the transpiration in plants

Aim To demonstrate the transpiration in plants

Materials required Potted plant, polythene cover, stick

Procedure

Take two small pots of approximately the same size and having the same amount of soil. One should have a plant in it. Place a stick of the same height as the plant in the other pot.

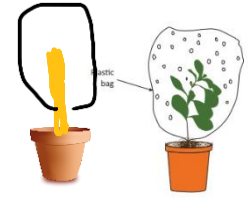
Cover the soil in both pots with a plastic sheet so that moisture cannot escape by evaporation.

Cover both sets, one with the plant and the other with the stick, with plastic sheets and place in bright sunlight for half an hour.

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Observation

In the pot with plant water droplets are found in the plastic sheet. It is due to the condensation of water vapour released by transpiration. In another pot Water droplets are not formed.



Result Plants release excess water from their body through the stomata Is called as transpiration.

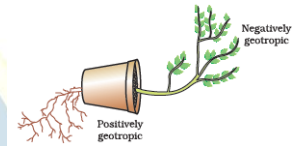
7. How can you prove the phototropism and geotropism in plants?

Aim To prove Phototropism and geotropism in plants

Materials required Conical flask, Wire mesh, bean seeds, cardboard

Procedure

1. Fill a conical flask with water. Cover the neck of the flask with a wire mesh. Keep two or three freshly germinated bean seeds on the wire mesh.
2. Take a cardboard box which is open from one side. Keep the flask in the box in such a manner that the open side of the box faces light coming from a window.
3. After two or three days, you will notice that the shoots bend towards light and roots away from light.
4. Now turn the flask so that the shoots are away from light and the roots towards light. Leave it undisturbed in this condition for a few days.



Observation

The old parts of the shoot and root have no noticeable change in direction. New growth parts show change in direction shoot bends towards light and root bend away from light.

Result

Plant roots show Geotropism and plant shoots show phototropism.

8. How can you observe yeast cells budding in your laboratory

Aim To observe yeast cells budding in laboratory

Materials required Yeast granules, sugar solution, Cotton, test tubes

Procedure

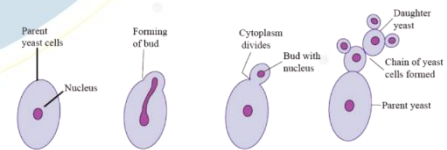
1. Dissolve about 10 gm of sugar in 100 mL of water.
2. Take 20 mL of this solution in a test tube and add a pinch of yeast granules to it.
3. Put a cotton plug on the mouth of the test tube and keep it in a warm place.
4. After 1 or 2 hours, put a small drop of yeast culture from the test tube on a slide and cover it with a coverslip.
5. Observe the slide under a microscope.

Observation

We see yeast reproducing by forming buds

Result

Yeast reproduces by budding asexually.



Budding in yeast

9. How do you observe bread mould at your school

Aim To observe bread mould or Rhizopus

Materials required Bread slice, microscope, slide, magnifying glass, water, toothpick

Procedure

1. Wet a slice of bread, and keep it in a cool, moist and dark place. Observe the surface of the slice with a magnifying glass. Record your observations for a week.
2. By using toothpick scrape the material developed on the bread slice and put it on a slide containing a drop of water on it. Observe it under a microscope

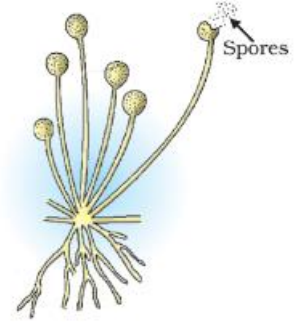
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Observation

A layer of white mass is seen on the slice. It is a mould called Rhizopus. Area of white mass with black colour balls increases on subsequent days.

Result

The thread like structures that developed on the bread are the Hyphae of the bread mould. The ball like structures are called sporangium which contains spores



10. Describe a method to observe Spirogyra filaments

Aim To observe green filamentous structure Spirogyra

Materials required

Green filamentous structures collected from the pond water, Microscope, Slide, Glycerine, Cover slip in in

Procedure

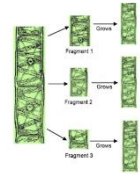
1. Collect water from a lake or pond that appears dark green and contains filamentous structures. Put one or two filaments on a slide.
2. Put a drop of glycerine on these filaments and cover it with a cover slip.
3. Observe the slide under a microscope.

Observation

Spirogyra Filament consists of many cells attached to form a filament. Spirogyra simply breaks up into smaller pieces. upon maturation these pieces of fragments grow into new individuals.

Result

Spirogyra filaments are long, thin, unbranched chains of cylindrical cells that are characteristic of the filamentous green algae Spirogyra found in water.



11. Write about an activity that shows vegetative propagation in potato

Aim To observe vegetative propagation in potato

Materials required Potato, Blade

Procedure

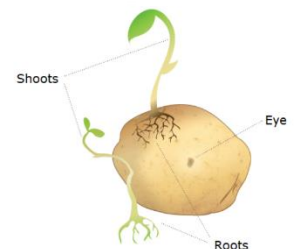
1. Take a potato and observe its surface. Notches can be seen.
2. Cut the potato into small pieces such that some pieces contain a notch or bud and some do not.
3. Spread some cotton on a tray and wet it. Place the potato pieces on this cotton.
4. Note where the pieces with the buds are placed.
5. observe changes taking place in these potato pieces over the next few days make sure that the cotton is kept moistened.

Observation

The potato pieces having buds gradually grows and develops, but there is no growth and development in potato pieces without buds.

Result

Potato is a stem reproduce asexually through vegetative propagation, which is the process of creating new plants from a plant's vegetative parts.



12. Describe an activity to prove vegetative propagation in money plant

Aim To observe vegetative propagation in money plant

Materials required Money plant water

Procedure

- Cut some pieces such that they contain at least one leaf.
- Cut out some other portions between two leaves.

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Dip one end of all the pieces in water and observe over the next few days.

Observation

Portion of money plant with at least one leaf grows and gives rise to fresh leaves. But money plant without leaf dies.

Result

Money plant with green leaves can synthesise food through photosynthesis and able to grow into a plant through vegetative propagation



13. Describe an activity of observing Bengal gram seeds

Aim To observe the seeds of Bengal gram

Materials required Soaked Bengal gram seeds

Procedure

Soak a few seeds of Bengal gram (chana) and keep them overnight.

Drain the excess water and cover the seeds with a wet cloth and leave them for a day. Make sure that the seeds do not become dry.

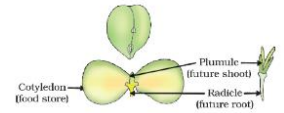
Cut open the seeds carefully and observe the different parts.

Observation

Bengal gram is a dicotyledon. Two cotyledons of the seed can be observed showing radical and plumule.

Result

Radicle developed into a future root and plumule developed into a future shoot



14. what experiment would we do to confirm that the F2 generation did in fact have a 1:2:1 ratio of TT, Tt and tt trait combinations?

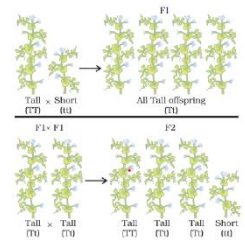
Aim To observe mono-hybrid cross by using pure tall plant and pure short plant

Procedure:

1. Select a purebred individual with the dominant trait (TT) and a purebred individual with the recessive trait (tt).
2. Cross the purebred dominant individual with the purebred recessive individual. This mating is known as a test cross.
3. Allow the offspring to grow and observe their phenotypes.
4. Count the number of individuals displaying the dominant trait (TT), the heterozygous trait (Tt), and the recessive trait (tt).
5. Record the number of individuals for each phenotype.

Observation If we cross the pure tall breed and pure short breed in F1 Generation all plants are tall. If we cross the F1 generation plants tall plants and short plants will appear in the Phenotypic ratio of 3:1

Result



In F2 generation the plants has the genotypic ratio of 1:2:1 Means 1 homozygous tall plant, 2 heterozygous tall plants and a homozygous short plant

	T	T
t	Tt	Tt
t	Tt	Tt

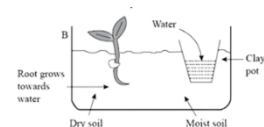
F1 generation

	T	t
T	TT	Tt
t	Tt	tt

F2 generation

15. Write about an activity to prove hydrotropism in plants

Plant a seedling in a pot with soil. place a porous pot with water next to the seedling. leave the setup for few days observe that the seedling roots bend towards the water source



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LONG ANSWER QUESTIONS

1. Explain with the help of neat and well labelled diagrams the different steps involved in nutrition in Amoeba.

The mode of nutrition in amoeba is Holozoic, and the process of obtaining food by amoeba is called phagocytosis. The different processes involved in the nutrition of amoeba are:

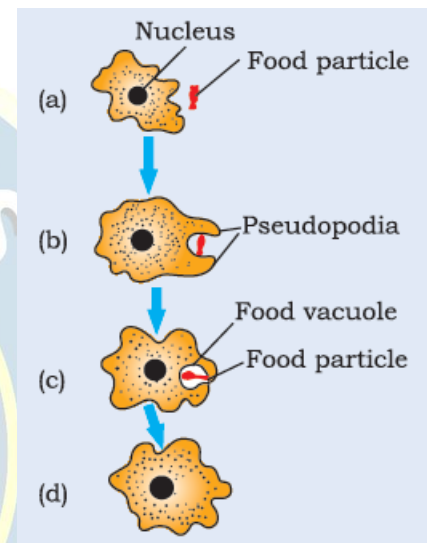
(i) **Ingestion:** Ingestion is the process of taking food into the body. Amoeba is a unicellular animal, so it doesn't have a mouth for ingestion of food. Amoeba ingests the food by encircling it by forming pseudopodia. When the food is completely encircled, the food is engulfed in the form of a bag called food vacuole.

(ii) **Digestion:** Digestion is the process of breaking the large and insoluble molecules into small and water soluble molecules. In amoeba, several digestive enzymes react on the food present in the food vacuoles and break it down into simple and soluble molecules.

(iii) **Absorption:** The food digested by digestive enzymes is then absorbed in the cytoplasm by the process of diffusion. While the undigested food remains in the food vacuole. If a large amount of food is absorbed by amoeba, the excess food is stored in the cytoplasm in the form of glycogen and lipids.

(iv) **Assimilation:** During this step the food absorbed by the cytoplasm is used to obtain energy, growth and repair. This process of utilizing absorbed food for obtaining energy, repair and growth is called assimilation.

(v) **Egestion:** When sufficient amount of undigested food gets collected in the food vacuole, it is thrown out of the body by rupturing cell membrane. The process of removal of undigested food from the body is called egestion.



2. Answer the following questions

- (a) Why is nutrition necessary for the human body?
(b) What causes movement of food inside the alimentary canal?
(c) Why is small intestine in herbivores longer than in carnivores?
(d) What will happen if mucus is not secreted by the gastric glands?

Answer:

(a) Human body continuously require energy for their life activities like respiration, circulation, excretion, etc. Energy is required even we are sleeping because a number of biological processes keep on occurring. All these processes require energy and this energy is obtained from nutrition. Nutrition is also needed for growth and repair of human body.

(b) The wall of alimentary tract contains muscles which can contract and expand alternately. The contraction and expansion movement of the walls of food pipe is called peristaltic movement. The peristaltic movement moves the partially digested food in all the digestive organs throughout the alimentary canal.

(c) Herbivores eat plants which is rich in cellulose. Cellulose takes longer time for complete digestion by the enzymes present in symbiotic bacteria. Therefore, they have longer small intestine. Carnivores, feed on flesh which is easier to digest and do not contain cellulose also. Therefore, they have shorter intestine for digestion of food eaten by them.

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(d) Gastric glands secrete HCl, mucus, rennin and pepsin enzymes. Mucus protects the inner lining of stomach from the action of HCl and enzymes. In the absence of mucus, there would be erosion of inner lining of stomach leading to acidity and ulcers.

3. Explain the mechanism of the urine formation.

Main function of nephron is to form urine. The three main processes involved in the urine formation are:

(i) **Ultrafiltration:** It is the filtration of body fluids and solutes from the blood, out of the glomerular capillaries into the Bowman's capsule due to the pressure of the glomerulus. All substances from the blood are filtered out except the large protein molecules and blood corpuscles. This fluid in the glomerular capsule is called glomerular filtrate. It consists of water, urea, salts, glucose and other plasma solutes.

(ii) **Selective reabsorption:** Glomerular filtrate contains a lot of useful materials like water, glucose and salts such as sodium. These substances are reabsorbed by blood capillaries surrounding the nephron from the renal tubule at various levels and to various extents.

(iii) **Tubular secretion:** This occurs mainly in the renal tubule and the collecting duct of the nephron. It is a process performed by the cells of the cuboidal epithelium lining the tubules which excrete additional wastes from the blood stream into the filtrate by active transport. In this process substances like potassium, hydrogen, creatinine and certain drugs like phenol, penicillin, etc., are directly excreted by the tubular cells from the blood. The fluid which now flows through collecting tubule is urine which consists of water, urea, uric acid, mineral ions like sodium, potassium, chloride, phosphates, etc.

4. Trace the sequence of events which occur in our body when a bright light is focussed on your eyes

(a) The pathway taken by the nerve impulses in a reflex action, from receptor organ to spinal cord and back to effector organ of reflex action is called reflex arc. Receptor organ could be a sense organ such as eyes, skin, etc., and effector organ could be muscles, glands, etc.

(b) When a bright light is focussed on eye, receptor cell receives the stimulus and an impulse is generated. This impulse is passed on to sensory neuron, then it goes to brain, brain sends the impulse to the motor neuron which contracts the pupil. Sequence of events can be summarised as :

Photoreceptors in eye → Sensory (Receptor) neuron → Brain → Motor (Effector) neuron → Eye muscle → Constriction of pupils

5. Mention three major regions of brain. Write one function of each.

Brain is divided into three main regions forebrain, midbrain and hindbrain.

(i) Forebrain consists of cerebrum, olfactory lobes and diencephalon. Its main function is thinking and controlling various activities such as touch, smell, hearing, speech and sight.

(ii) Midbrain controls reflex movements of the head, neck and trunk in response to visual and auditory stimuli.

(iii) Hindbrain has three centres called pons, cerebellum and medulla. This part is responsible for regulating respiration, maintaining posture and balance of body and controlling involuntary actions such as heartbeat, breathing, swallowing, coughing, sneezing, vomiting, etc.

6. Write a note on plant hormones?

Auxins control the tropic (growth related) movements of the plants in response to light, gravity, touch etc by increasing the size of cells. Under the influence of auxins, the plant stem bends towards unidirectional light whereas the roots bend away from it.

Gibberellins stimulate stem elongation and leaf expansion. Its application causes stem elongation in small plants such as cabbage. Spraying gibberellins on sugarcane plant increases the stem size and hence the yield.

Cytokinins are produced in regions of the plant body where rapid cell division occur, such as root tips, developing shoot buds, young fruits and seeds. Cytokinins promote growth by stimulating cell division. They also help in production of new leaves and chloroplasts in leaves.

Ethylene causes ripening of the fruits.

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Abscisic acid inhibits (i.e., slows down) the growth in different parts of the plant body. It also inhibits germination of seeds. It increases the tolerance of plant to different kinds of stresses such as temperature changes. So, it is also called the stress hormone in plants. It also causes the drying and falling of older leaves, flowers and fruits.

7. Write one example each of the following tropic movements:

(i) Positive phototropism (ii) Negative phototropism

(iii) Positive geotropism (iv) Negative geotropism

(v) Hydrotropism (vi) Chemotropism

(i) Positive phototropism: shoots growing towards light.

(ii) Negative phototropism: roots growing away from light towards ground.

(iii) Positive geotropism: growth of roots towards earth due to the pull of the earth.

(iv) Negative geotropism: shoots growing away from the earth.

(v) Hydrotropism: roots growing towards the source of water.

(vi) Chemotropism: growth of pollen tubes towards the ovules.

8. What happens when

(a) Planaria gets cut into two pieces

(b) a mature Spirogyra filament attains considerable length

(c) on maturation sporangia burst?

(a) When Planaria is cut into two pieces then each piece grows into a complete organism. This is known as regeneration.

(b) When a mature Spirogyra filament attains a considerable length it breaks into small pieces called fragments. These fragments grow into new individuals and this mode of reproduction is called fragmentation.

(c) When a sporangium burst, large number of spores are released in the air. When these spores land on food or soil, under favourable conditions they germinate into new individuals.

9. What is vegetative propagation? List with brief explanation three advantages of practising this process for growing some types of plants. Select two plants from the following which are grown by this process:

Banana, Wheat, Mustard, Jasmine, Gram

Vegetative propagation is an asexual method of reproduction in plants. In this method, new plants are obtained from the parts of old plants (like stems, roots and leaves), without the help of any reproductive organs.

Advantages of vegetative propagation are as follows:

- 1. Vegetative propagation is usually used for the propagation of those plants which produce either very few seeds or do not produce viable seeds.*
 - 2. Seedless plants can be obtained by artificial vegetative propagation.*
 - 3. Grafting is a propagation method which is very useful for fruit trees and flowering bushes. It enables to combine the most desirable characteristics of two plants.*
 - 4. Plants like rose, sugarcane, cactus, etc., can be rapidly propagated through stem cuttings as this method produces new plants from just one plant quickly without waiting for flowers and seeds.*
- Banana and jasmine are generally grown through vegetative propagation method*

10. Mention the role of the following organs of human male reproductive system.

(i) Testes (ii) Scrotum (iii) Vas deferens

(iv) Prostate gland

(b) What are the two roles of testosterone?

(i) Testes: The two testes in male are the sites where male gametes, i.e., sperms are formed. Testes also produce the male sex hormone called testosterone.

(ii) Scrotum: The scrotum is a pouch of skin that lie outside abdominal cavity. The two testes lie in respective scrotal sacs. The scrotum acts as a thermoregulator and provides an optimal temperature for the formation of sperms.

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(iii) *Vas deferens*: This is a straight tube, about 40 cm long, which carries the sperms to the seminal vesicles, where mucus and a watery alkaline fluid containing fructose, mix with the sperms.

(iv) *Prostate gland*: It is a single large gland that surrounds the urethra and produces a milky, slightly acidic secretion. Secretion of prostate gland nourishes and activates the sperm to swim.

b) Two roles of testosterone are:

(i) It plays a key role in development of male secondary sex organs such as prostate, etc.

(ii) It promotes the secondary sexual characteristics in males such as increased muscle and bone mass, growth of body hair, etc.

11. Define pollination. Explain the different types of pollination. List two agents of pollination. How does suitable pollination lead to fertilisation?

The process of transfer of pollen grains from anther of a flower to the stigma of the same flower or another flower of the same species is known as pollination. Pollination may be of two major types-

(i) self pollination and (ii) cross pollination.

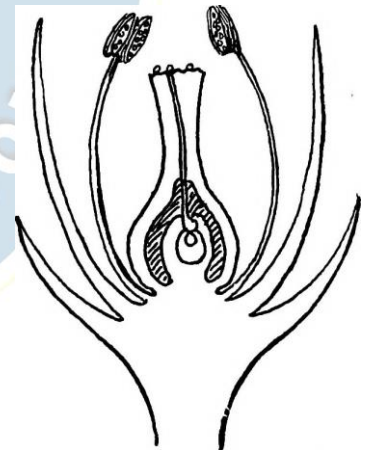
(i) Self pollination is the transfer of pollen grains from the anther to the stigma of the same flower, or to the stigma of another flower of the same plant. This pollination generally takes place in bisexual flowers because they have both male and female gametes in them.

(ii) Cross pollination is the transfer of pollen grains from the anther of a flower of one plant to the stigma of a flower of another plant of the same species. This occurs in unisexual as well as bisexual flowers.

Two agents of pollination are wind and water.

Pollination results in the deposition of related pollen grains over the receptive stigma of the carpel. Pollen grains after landing on stigma, absorb water, swell and then germinate to produce pollen tubes. Many pollen tubes grow into the stigma, but only one passes through the style and then moves towards the ovary. Two non-motile male gametes are formed inside the tube during its growth through the style. After reaching the ovary, pollen tube enters the ovule through the micropyle. The tip of the tube finally pierces the micropylar end of the embryo sac. After penetration, the tip of pollen tube ruptures releasing two male gametes into the embryo sac.

The mature embryo sac consists of an egg apparatus (one haploid egg and two synergids), two polar nuclei and three antipodal cells. During the act of fertilisation, one male gamete fuses with the egg to form the diploid zygote.

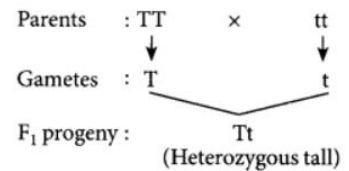


12. Write a note on monohybrid cross? OR

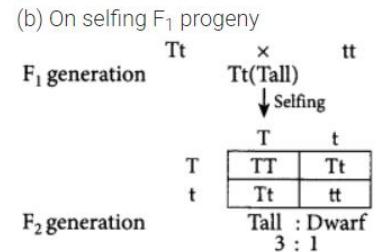
Why is the F1 progeny always of tall plants when a tall plant is crossed with a short pea plant? How is F2 progeny obtained by self-pollination of F1 progeny different from F1 progeny? Give reason for this observation.

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When a tall plant (TT) is crossed with a short tea plant (tt), only tall plants are obtained in F1 progeny. It is because out of two contrasting traits only one appears in the progeny of first generation. This means that the trait which appears in F1 generation is dominant and the trait which does not express is recessive. The character Tt for tall plant is dominant, so all the plants are tall.



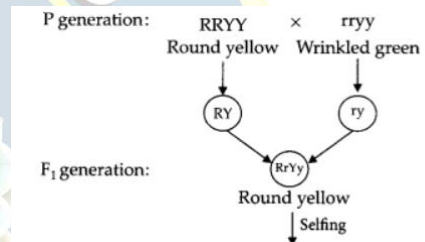
In F2 generation we obtained both tall and dwarf plants. Appearance of suppressed recessive trait in individuals of F2 generation in Mendelian cross indicates that characters of recessive traits are not lost. When the F1 generation plants were allowed to self-fertilise both the parental trait were expressed in definite proportion in F2 generation.



(c) Above observation shows that only one dominant allele is expressed. This is called law of dominance. In a heterozygous individual, two dissimilar alleles remain together and do not get mixed up. At the time of gamete formation, they separate so that each gamete receives only one allele is always pure. This is called "law of purity of gametes".

13. How did Mendel's experiments show that different traits are inherited independently? Explain

In a dihybrid cross given by Mendel, it was observed that when two pairs of traits or characters were considered, each trait expressed independent of the other. Thus, Mendel was able to propose the Law of Independent Assortment which says about independent inheritance of traits. This could be explained clearly from the given cross generation ratio: Round-yellow = 9: Round- green = 3: Wrinkled-yellow = 3: Wrinkled-green = 1



	RY	Ry	rY	ry
RY	RRYY Round yellow	RRYy Round yellow	RrYY Round yellow	RrYy Round yellow
Ry	RRYy Round yellow	RRyy Round green	RrYy Round yellow	Rryy Round green
rY	RrYY Round yellow	RrYy Round yellow	rrYY Wrinkled yellow	rrYy Wrinkled yellow
ry	RrYy Round yellow	Rryy Round green	rrYy Wrinkled yellow	rryy Wrinkled green

14. (a) Write two harmful effects of using plastic

bags on the environment. Suggest alternatives to the usage of plastic bags.

(b) List any two practices that can be followed to dispose off the waste produced in our homes.

(a) Two harmful effects of using plastic bags on the environment:

(i) Plastic bags are non-biodegradable substances which are not acted upon by microbes. So, they cannot be decomposed and therefore persist in the environment for a long time causing harm to the soil fertility and quality.

(ii) Plastic bags choke drains which result in waterlogging, that allows breeding of mosquitoes and hence leads to various diseases.

Jute bags and cloth bags are the alternatives to the polyethene bags.

(c) Practices that can be followed to dispose the waste produced in our homes:

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1. Separation of biodegradable and non- biodegradable wastes.
2. The biodegradable waste can be converted to manure.
3. Non-biodegradable waste should be disposed at suitable places from where municipal authorities can pick them up and dispose properly and scientifically.
4. Use discarded bottles and jars to store food, items.

15. Describe the structure of neuron

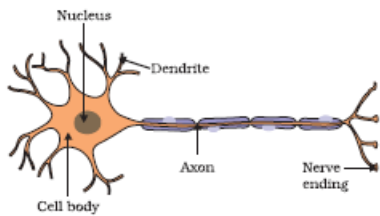
A neuron is the structural and functional unit of the nervous system.

Neuron: Neuron is a highly specialized cell which is responsible for the transmission of nerve impulses. The neuron consists of the following parts

(i) Cyton or cell body: The cell body or cyton is somewhat star-shaped, with many hair like structures protruding out of the margin. These hair-like structures are called dendrites. Dendrites receive the nerve impulses.

(ii) Axon: This is the tail of the neuron. It ends in several hair-like structures, called axon terminals. The axon terminals relay nerve impulses.

(iii) Myelin sheath: There is an insulator cover around the axon. This is called myelin sheath. The myelin sheath insulates the axon against nerve impulse from the surroundings



16. Energy from various sources is considered to have been derived from the sun. Do you agree? Justify your answer?

Yes, sun is the ultimate source of energy. Directly or indirectly, all the forms of energy are derived from solar energy. Fossil fuels like coal, petroleum and natural gas are formed due to burial of large plants and ancient creatures whose ultimate source of energy is sun. They are indirectly derived from solar energy such as

(i) – Clouds are formed when water in lakes, rivers, seas etc. evaporates due to solar energy. They bring rainfall and snowfall. The rain and melting snow feed rivers, streams etc. This flowing water can be used for getting hydroelectricity.

(ii) – Wind energy arises due to uneven heating of the earth's surface by the sun rays at two different adjoining places. Due to this, wind possesses kinetic energy.

(iii) – Plants in the process of photosynthesis convert the solar energy into food (chemical energy). This food is consumed by animals. Thus, the animal wastes and remains of the plants constitute biomass which can be utilised as a source of energy.

(iv) – The waves are generated by strong winds (due to solar energy) blowing across the sea.

(v) – Sun is responsible for the temperature difference between the water at the surface and water at depth in seas and oceans.

Thus the energy from various sources is considered to have been derived from the sun.

17. What are the environmental consequences of using fossil fuels? Suggest the steps to minimise the pollution caused by various sources of energy including non-conventional sources of energy?

Environmental consequences of using fossil fuels are:

(i) They are the largest emitters of greenhouse gases such as carbon dioxide and methane.

(ii) Extraction of conventional fuels threatens the ecological balance in many areas.

(iii) These fuels cause environmental problems due to pollution.

Steps to minimize the pollution are:

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- (i) The dependency on fossil fuels should be reduced by switching to alternate sources of energy.
- (ii) The judicious use of energy by avoiding wastage can reduce environmental problems. –
- (iii) Regular servicing of energy conversion devices should be done in order to maintain their efficiency.
- (iv) We should focus on developing technology that could make the energy conversion devices much more efficient and cleaner.
- (v) Research should be continued to produce long lasting devices so that the environmental damage caused by assembly of devices gets minimized.

18. Write a note on heterotrophic nutrition

The mode of nutrition in which an organism takes food from another organism is called heterotrophic nutrition. Organisms, other than green plants and blue-green algae follow the heterotrophic mode of nutrition. Heterotrophic nutrition can be further divided into three types, viz. saprophytic nutrition, holozoic nutrition, and parasitic.

Saprophytic Nutrition: In saprophytic nutrition, the organism secretes the digestive juices on the food. The food is digested while it is still to be ingested. The digested food is then ingested by the organism. All the decomposers follow saprophytic nutrition. Some insects, like houseflies, also follow this mode of nutrition.

Holozoic Nutrition: In holozoic nutrition, the digestion happens inside the body of the organism. i.e., after the food is ingested. Most of the animals follow this mode of nutrition.

Parasitic Nutrition: The organism which lives inside or outside another organism (host) and derives nutrition from it is known as parasites and this type of mode of nutrition is called parasitic nutrition. For example *Cuscuta*, tick etc.

19. Write a note on Human Respiratory system

The human respiratory system is composed of a pair of lungs. These are attached to a system of tubes which open on the outside through the nostrils.

Following are the main structures in the human respiratory system:

Nostrils: There are two nostrils which converge to form a nasal passage. The inner lining of the nostrils is lined by hair and remains wet due to mucus secretion. The mucus and the hair help in filtering the dust particles out from inhaled air. Further, air is warmed up when it enters the nasal passage.

Pharynx: It is a tube-like structure which continues after the nasal passage.

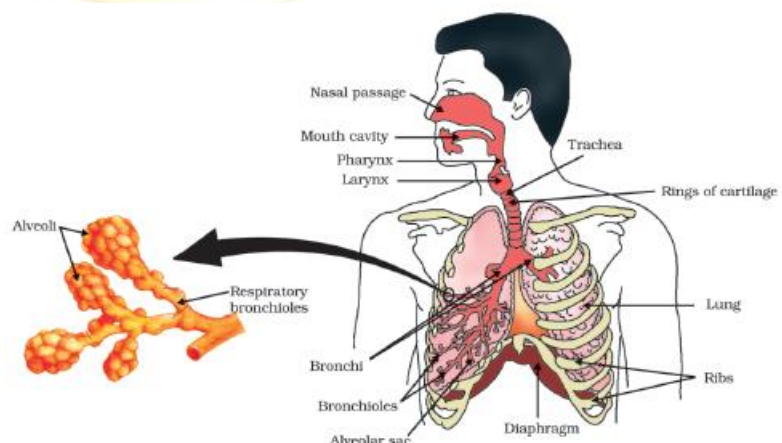
Larynx: This part comes after the pharynx. This is also called voice box.

Trachea: This is composed of rings of cartilage. Cartilaginous rings prevent the collapse of trachea in the absence of air.

Bronchi: A pair of bronchi comes out from the trachea, with one bronchus going to each lung.

Bronchioles: A bronchus divides into branches and sub-branches inside the lung.

Alveoli: These are air sacs at the end of bronchioles. The alveolus is composed of a very thin membrane and is the place where blood capillaries open. This is alveolus, where the oxygen mixes with the blood and carbon dioxide exits from the blood. The exchange of gases, in alveoli, takes place due to the pressure differential.



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20. Write about types of Asexual reproduction?

Types of Asexual Reproduction in Unicellular Organism

1. **Binary Fission:** Seen in bacteria, protozoa like Amoeba, Paramecium. (In these first pseudopodia withdrawn (karyokinesis) the nucleus of the parent cell divides and then the cytoplasm divides (cytokinesis) resulting in the formation of two daughter cells). It occurs during highly favourable conditions. The cell division can occur in any plane as in case of Amoeba. However, organisms like Leishmania. (cause Kala-azar), which have a whip like flagella at one end, binary fission occurs in a definite orientation in relation to the flagellum.

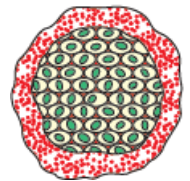
Cytokinesis: Division of cytoplasm.

Karyokinesis: Division of Nucleus.

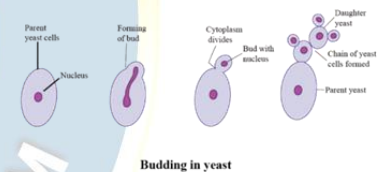


Figure 7.1
(a) Binary fission in Amoeba

2. **Multiple Fission:** Seen in Plasmodium, (a malarial parasite). In this during unfavourable conditions, the parent cell develops a thick resistant wall around itself forming a cyst. Within the wall, the cytoplasm divides many times to form many plasmodia. When conditions become favourable, the cyst wall breaks and the Plasmodium are released



3. **Budding:** Seen in Yeast (a fungus). The parent yeast cell develops a protrusion or an outgrowth at its upper end. The nucleus of the parent cell divides and one of them moves into the outgrowth which grows bigger and finally separates from the parent cell to lead an independent existence. Very often if the conditions are highly favourable, a chain of buds is formed.



Budding in yeast

Types of Asexual Reproduction in Multicellular Organisms:

(i) **Fragmentation:** Seen in multicellular organisms which have a relatively simple body organisation like Spirogyra. Spirogyra has a filamentous body. (If it breaks into smaller pieces or fragments). Each fragment has the capacity to form a new individual.

However, all multicellular organisms cannot show cell-by-cell division as cells from tissues which form organs. These organs are placed at definite positions in the body. Hence, they need to use more complex methods of reproduction.

(ii) **Regeneration:** It is the ability of organisms to develop their lost parts. Some organisms show have high regenerative capacity it is also a means of reproduction for example; Planaria. (Regeneration is carried out by specialized cells which redivide to form a mass of cells from which different cells undergo changes to become different cell types and tissues. These changes occur in an organized sequence known as development)

iii) **Budding:** Seen in Hydra. Parent Hydra develops a bud at its lower end. This grows in size and finally breaks off to live independently.

(iv) **Spore Formation:** Seen in Rhizopus (a fungus). Rhizopus body is made up of thread-like structures called hyphae. The erect hyphae bear sporangia inside which reproductive structures called spores are formed. Spores are asexually reproducing bodies having a thick protective wall. They are produced during

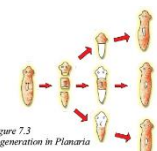
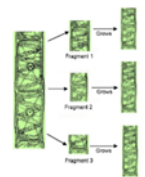
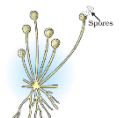
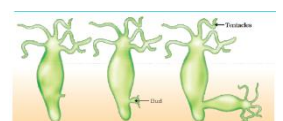


Figure 7.3
Regeneration in Planaria

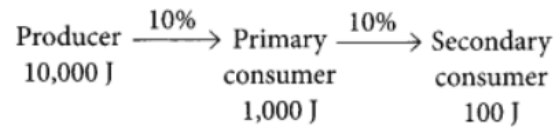


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unfavourable times and help to tide over the unfavourable environmental conditions. When the spores fall on a suitable medium, each one forms a new individual.

21. In a food chain, if 10,000 joules of energy is available to the producer, how much energy will be available to the secondary consumer to transfer it to the tertiary consumer?

According to ten percent law, 10% of the energy of producer will be available to primary consumer, and 10% of this energy will be available to secondary consumer and so on.



Hence, 100 J of energy will be available to the secondary consumer to transfer it to tertiary consumer.

22. Answer the following questions

(a) What is an ecosystem

(b) List any two natural ecosystems.

(c) We do not clean ponds or lakes but an aquarium needs to be cleaned regularly. Why?

(a) An ecosystem is defined as a structural and functional unit of the biosphere comprising of living organisms and their non-living environment.

(b) Two examples of natural ecosystem are: pond ecosystem and grassland ecosystem.

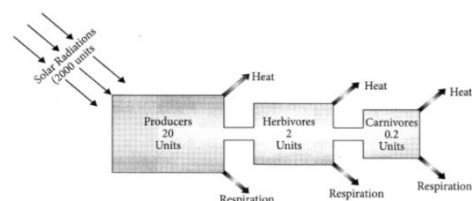
(c) Ponds or lakes being natural ecosystems are self sufficient and do not need to be maintained regularly. On the other hand, aquarium being an artificial ecosystem needs to be cleaned and maintained regularly as it contains mainly fishes as living organisms, as compared to natural ecosystems where presence of other organisms maintains a balance. Also, because the producers and decomposers are absent in aquarium the fish waste or excretory products, i.e., ammonia may turn into toxic compounds and accumulate to dangerous levels causing the fishes to die. Hence, the artificial ecosystems like aquarium needs to be cleaned regularly.

23. Define an ecosystem. Draw a block diagram to show the flow of energy in an ecosystem.

An ecosystem is defined as a structural and functional unit of the biosphere. It comprises of living organisms and their non-living environment that interact by means of food chains and biogeo-chemical cycles resulting in energy-flow, biotic diversity and material cycling to form stable self-supporting system.

Green plants capture about 1% of the solar energy incident on the earth to carry out the process of photosynthesis. A part of this trapped energy is used by plants in performing their metabolic activities and some energy is released as heat into the atmosphere. The remaining energy is chemical energy stored in the plants as photosynthetic products. When these green plants are eaten up by herbivores, the chemical energy stored in the plants is transferred to these animals. These animals (herbivores) utilise some of this energy for metabolic activities and some energy is released as heat while the remaining energy is stored in their body. This process of energy transfer is repeated till top carnivores. In an ecosystem, transfer of energy follows 10 percent law, i.e., only 10 percent of the energy is transferred to each trophic level from the lower trophic level. Nearly 90 percent of energy is lost when it moves from one trophic level to the next.

The given block diagram shows unidirectional flow of energy at different trophic levels in a freshwater ecosystem:



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23. What is meant by food chain? "The number of trophic levels in a food chain is limited." Give reason to justify this statement.

The sequence of living organisms in a community in which one organism consumes or feeds upon another organism to transfer food energy, is called a food chain. The various steps in a food chain at which the transfer of food (or energy) takes place are called trophic levels. In fact, in a food chain, each step representing an organism forms a trophic level.

The number of trophic levels in a food chain are limited because at each trophic level only 10% of energy is utilised for the maintenance of organism which occur at that trophic level and the remaining large portion is lost as heat. As a result organisms at each trophic level pass on lesser energy to the next trophic level, than they receive. The longer the food chain, the lesser is the energy available to the final member of food chain. Food chains generally consist of three or four trophic levels because beyond that the energy available to the next organism will be too small and insufficient to sustain the life of that organism.

24. After the examinations Rakesh with his friends went on a picnic to a nearby park. All friends carried cooked food packed in plastic bags or plastic cans. After eating the food some friends collected the leftover food and plastic bags etc., and planned to dispose them off by burning. Rakesh immediately checked them and suggested to segregate the leftover food and peels of fruits from the plastic materials and respectively dispose them off separately in the green and red dustbins placed in the corner of the park.

(a) In your opinion, is burning plastic an eco-friendly method of waste disposal? Why? State the advantage of method suggested by Rakesh.

(b) How can we contribute in maintaining the parks and roads neat and clean?

(a) No, burning plastic is not an eco-friendly method of waste disposal, burning plastics can produce toxic fumes and cause air pollution. Plastic, being non-biodegradable cannot be dumped (land filled), so the best way to dispose plastic items is to recycle them. Recycling is a less polluting and more sustainable option.

Rakesh segregated left over food items, fruit peels, i.e., biodegradable waste and plastic material, i.e., non-biodegradable waste. The biodegradable waste can be converted to manure whereas non-biodegradable waste

25. What is ozone? How and where is it formed in the atmosphere? Explain how does it affect an ecosystem.

Ozone is a form of oxygen. It is made up of three atoms of oxygen. It is highly poisonous. However, good amount of ozone is present in upper part of the atmosphere called stratosphere. In the stratosphere ozone is being photo-dissociated and generated simultaneously by absorption of harmful ultraviolet (UV) radiations coming from sun. It can be recycled. This contributes in decreasing the level of pollution and easy disposal and treatment of waste.



The two reactions are in equilibrium thereby maintaining a steady concentration of ozone in the stratosphere. Ozone layer is commonly called ozone blanket. It acts as a protective shield to protect all types of life from the harmful effect of UV radiation. Therefore, any thinning or depletion of ozone layer allows entry of high energy UV radiations into the earth's surface, thereby causing harmful effects on plants, animals and human beings.

The harmful effects of ozone depletion on man, animals and plants includes :

- Incidences of skin cancer and herpes.
- Damage to eye sight, photoburning as well as increased incidences of cataract in eyes.
- Damage to immune system and hence lowering the body's resistance to disease.
- Increased embryonic mortality.
- 10-25% decline of photosynthesis in plants.

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- Global warming.

26. Write a note on components of ecosystem

Components of Ecosystem: There are two components of an ecosystem : (i) biotic component and (ii) abiotic component.

1. Biotic component: It includes three types of organisms:

(a) Producers: All green plants, blue green algae can produce their food (Sugar and starch) from inorganic substance using light energy (Photosynthesis). Therefore, all green plants are called producers. They are also called autotrophs. Planktons are very minute or microscopic organisms freely floating on the surface of water in a pond, lake, river or ocean. Planktons are of two types : Phytoplanktons and Zooplanktons.

The microscopic aquatic plants freely floating on the surface of water are called phyto planktons. The microscopic aquatic animals freely floating on water are called zooplanktons. The freely floating protozoa are an example of zooplankton.

(b) Consumers: They are organisms which consume other organisms or their products as their food. All animals belong to this category. The consumers depend upon producers for their food directly or indirectly. They get their food by eating other organisms or their products. For example, man, goat, deer, fish, lion, cow, buffalo, etc., are common consumers.

The consumers can be classified into the following types: Herbivores, carnivores and omnivores

- (i) **Herbivores:** These are organisms (animals) which get their food by eating the producers (or plant) directly. Herbivores are also called first order consumers. Some common examples of herbivores are : deer, rabbit, rat, squirrel, goat, cattle, etc.
- (ii) **Carnivores:** These are organisms (animals) which consume other animals. Therefore, carnivores feed on the flesh of herbivores. These are also called primary carnivores or second order consumers. Some common examples are snake, wild cat, jackal, frog, some birds, fishes, etc. There are animals which prey upon primary carnivores. They are called second order consumers or third order consumers. For example, owl, peacock, tiger, lion, etc., are some second order carnivores and may be eaten by third order carnivores. The carnivores which are not preyed upon further are called top carnivores. For example, lion is a top carnivore.
- (iii) **Omnivores:** The organisms which feed on both plants and animals are called omnivores. Human beings are common example of omnivores because they eat both plants (For example; pulses, grams, oilseeds, fruit, etc.) and animal products (milk, meat, egg, etc.).

(c) Decomposers: Fungi and bacteria which break down (decompose) the dead plants, animals complex compounds into the simpler one. The decomposers help in the replenishment of natural resources. These are also known as microorganism or saprotrophs. These are also called reducers.

2. Abiotic Components: These are non-living components of an ecosystem. These include the physical environment. Edaphic factors like soil texture, topography, water, and air.

Inorganic substances like carbon dioxide, nitrogen, oxygen, water, phosphorus, sodium, potassium, and calcium. These are involved in the cyclic of materials in the ecosystem.

Organic compounds like proteins, carbohydrates, and lipids. These largely form the living body and link the abiotic and biotic components.

Climatic factors: These are sunlight temperature, pressure humidity, moisture, rainfall, etc. these factors affect the distribution

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DIFFERENCES

1. Write differences between Breathing and Respiration

Breathing	Respiration
(i) It is a physical process. It involves inhalation and exhalation.	1. It is a biochemical process. It involves exchange of respiratory gases and also oxidation of food.
(ii) It is an extracellular process.	2. It is both an extracellular as well as intracellular process.
(iii) It does not involve enzyme action rather two types of muscles are involved in this process.	3. It involves a number of enzymes required for oxidation of food.
(iv) It does not release energy, infact it consumes energy	4. It releases energy.
(v) It is confined to certain organs only.	5. It occurs in all the cells of the body.

2. write differences between Autotrophic Nutrition and Heterotrophic Nutrition?

Autotrophic Nutrition	Heterotrophic Nutrition
1. Organism prepares its own food and is not dependent on any other organism	1. An organism that does not prepare its own food and is dependent on other organisms for food
2. Food is prepared from CO ₂ , water, and sunlight.	2. Food cannot be prepared from CO ₂ , water, or sunlight.
3. Chlorophyll is required for food preparation.	3. Chlorophyll is not required for food preparation.
4. Autotrophs are placed at the bottom of the food chain as producers.	4. Heterotrophs are placed above autotrophs in the food chain as consumers
5. Green plants and certain bacteria have autotrophic modes of nutrition	5. All animals and fungi, most bacteria, have heterotrophic modes of nutrition.

3. write differences between arteries and veins?

Arteries	Veins
(i) Arteries are the blood vessels which carry blood away from the heart for distribution to the body.	1. Veins are blood vessels which bring blood from the body back to the heart.
(ii) Arteries walls are thick and valves are absent.	2. Their walls are thin and valves are present to prevent back flow of blood.
(iii) Blood passing through narrow lumen of arteries is mostly oxygenated and has a considerable pressure.	3. The blood passing through wide lumen of veins is deoxygenated (except in pulmonary veins) and has low pressure.
(iv) More elastic and placed deeply.	4. Less elastic and superficially placed.

4. Write three points of difference between respiration in plants and respiration in animals.

plant respiration	Animal respiration
(i) All parts of plants, like roots, stem and leaves, perform respiration individually.	Animal performs respiration as a single unit.
(ii) There is little transport of respiratory gases from one part to the other during respiration.	Respiratory gases are usually transported over long distance inside an animal during respiration.
(iii) Respiration occurs at a very slow rate.	It is a fast process in animals.
(iv) There is no special gas transport system	Gases are transported by specialised blood vascular system.

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(v) Respiratory organ in plants are generally stomata in leaves, lenticels in stem and general surface of roots.

Respiratory organ in animals are generally lungs and gills.

5. List in tabular form three differences between nervous control and chemical control?

Nervous control	Chemical control
(i) Information travels rapidly in a fraction of second.	Information travels slowly.
(ii) Information is sent as an electrical impulse along axon and as a chemical across synapse.	Information is sent as a chemical messenger called hormone, via blood stream.
(iii) Information is directed to specific receptors which can be one or a few nerve fibres, gland cells or other neurons.	Information is spread throughout the body by blood from which the target cells or organs pick it up
(iv) Effect of message usually lasts for a very short while.	Effect of message usually lasts longer.

6. Write two differences between binary fission and multiple fission in a tabular form.

Binary fission	Multiple fission
(i) The parent organism, splits to form two new organisms, e.g., Amoeba, Paramecium.	The parent organism splits to form many new organisms at the same time, e.g., Plasmodium.
(ii) The nucleus of the parent body divides only once to produce two nuclei.	The nucleus of the parent body divides repeatedly to produce many nuclei.

7. Define the term pollination. Differentiate between self-pollination and cross-pollination. What is the significance of pollination?

The process of transfer of pollen grains from anther of a flower to the stigma of the same flower or another flower of the same species is known as pollination.

Character	Self pollination	Cross pollination
Occurrence	Occurs within a flower or between two flowers of the same plant.	Occurs between two flowers of two different plants of the same species.
Agent of pollination	Usually no external agent of pollination is required.	External agents such as wind, water, insects and birds are required.
Production of pollen grains	Produced in small numbers, thus no wastage of pollen grains occurs.	Produced in large numbers thus, wastage of pollen grains occurs.
Appearance of flowers	Flowers are generally not attractive.	Flowers are attractive with coloured petals
Fragrance and nectar	Commonly flowers do not produce scent or nectar.	Flowers generally produces scent and nectar.
Nature of offspring produced	Offspring produced have genetic makeup identical to the parent plant, no variation occurs.	Offspring produced may differ in genetic make-up and variations occur.

Pollination is important because it brings pollen grains to the female reproductive part (carpel) of the plant that leads to fertilisation.

8. write differences between fission and fragmentation?

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Fission	Fragmentation
(i) Occurs in unicellular organisms.	Occurs in multicellular organisms.
(ii) Body of organism divides by mitotic divisions into two or more daughter cells. E.g., Leishmania.	Body of the organism splits into one or more fragments and each fragment forms a complete organism. E.g., Spirogyra.

9. Write differences between sexual reproduction and asexual reproduction?

Asexual reproduction	Sexual reproduction
The process involves only one cell or one parent, so is called uniparental reproduction.	This process involves two cells or gametes belonging to different parents, so is generally biparental.
Reproductive organs are not present	Fully developed reproductive parts are present
Occurs in unisexual plants, Lower invertebrates and lower chordates	occurs in bisexual plants and in higher animals
The whole body of the parent acts as reproductive unit or it can be in a single cell or a bud.	The reproductive unit is gamete, which is unicellular and haploid.
In most of the methods the original parent disappears	Original parents remain alive after process of reproduction
The offsprings are genetically similar to parents.	The offsprings differ from parents.
Characteristics of only one parent is inherited	characteristics of both parents are inherited
They are not evolutionary advantageous	They are evolutionary advantageous
It is a fast process. Only Mitosis division takes place	It is a slow process. Both Mitosis and Meiosis divisions take place

10. write differences between inherited traits and Acquired traits?

Inherited traits	Acquired traits
(i) These are passed from the parent to offspring.	These are developed during the life of an individual.
(ii) These are genetic variations.	These are somatic variations.
(iii) These develop due to crossing over phenomenon and mutations.	These develop due to use and disuse of organs and direct effect of environment.
(iv) These are passed on from one generation to the other.	These traits die with the death of the individual.
(v) Example: Skin colour, eye colour, form of hair, polydactyly (extra fingers), free and attached ear lobes, blood groups of human beings.	Example: If a group of mice are normally bred, all their progenies will have tails. Now, if the tails of these mice are removed surgically in each generation, tailless mice will not be produced. It is so because removal of tail is an acquired character and it will not bring change in the genes of the germ cells of the mice.

11. write differences between biodegradable wastes and non-biodegradable wastes

Biodegradable Wastes	Non-biodegradable Wastes
(i) These are biological in origin.	These are mostly man-made.
(ii) These are degraded by microorganisms such as bacteria and fungi.	These are not degraded by micro-organisms.
(iii) These do not get biologically magnified in food chains.	These enter into the food chains and get biologically magnified
4. They pollute the environment only when they are produced in quantity beyond the capacity of the environment to degrade them.	Non-biodegradable wastes pollute the environment even in small quantity.

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(v) These can be converted into resource. Examples- sewage, cattle dung, household garbage, etc.	Some of these can be recycled. Examples-plastic objects, synthetic fibres, glass objects, etc.
Bioconcentration does not occur.	Bioconcentration or biomagnifications occurs when wastes enter food chains

12. Write differences between food chain and food web?

Food chain	Food web
Food chain is a straight sequence of organisms	Food web is a complex network formed of many food chains
Food chain do not have any cross linkages	Food web has many cross linkages
The entire food chain gets affected if any organisms die in it	There is no specific effect on other organisms in the food web if any organism die in it
It has maximum of five to six populations of different species	It has many populations of different species

13. Write differences between aerobic respiration and anaerobic respiration

Aerobic respiration	Anaerobic respiration
It takes place in the presence of oxygen	It takes place in the absence of oxygen
Glucose oxidised completely	Glucose oxidised incompletely
End products are carbon dioxide and water	End products are ethyl alcohol or lactic acid and carbon dioxide
More amount of energy is liberated	Less amount of energy is liberated
It occurs in plants and animals	It occurs in some bacteria and human muscle cells

14. Write Differences between light reaction and dark reaction

Light reaction	Dark reaction
Light reaction occurs in the presence of light	It occurs in the presence and absence of light (light independent reaction)
It occurs in the grana of thylakoids	It occurs in the stroma of chloroplast
In this reaction ATP and NADPH are formed	In this reaction ATP and NADPH are utilised
This reaction is also known as photochemical phase	This is also called Biosynthetic phase
ATP, NADPH and oxygen are the end products in this reaction	Glucose is the end product in this reaction

15. Write differences between Chlorophyll and chloroplast

Chlorophyll	Chloroplast
It is a colour pigment	It is a cell organelle and it possesses the chlorophyll
It is present in chloroplast	It is present in Palisade tissue of leaves
It traps solar energy and converts into chemical energy	It is responsible for photosynthesis

16. Write differences between single circulation and double circulation

Single circulation	Double circulation
In this type of circulation blood flows through the heart only once	In this type of circulation blood flows through the heart twice
Heart is two chambered with one atrium and one ventricle	Heart is four chambered with two auricles and two ventricles
Heart transports only deoxygenated blood	Transports both deoxygenated and oxygenated blood
It is a less efficient system and blood flows at a low pressure	It is a more efficient system and blood flows at a high pressure
Example fishes	Example mammals

17. write differences between Involuntary actions and reflex actions?

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Involuntary actions	Reflex actions
Occurs without the consciousness of an organism	Rapid automatic responses to a stimulus without the conscious involvement of the brain
Controlled by midbrain or medulla oblongata	Controlled by spinal cord
Relatively slower	Very quick and instantaneous
Involves only smooth muscles	May involve any muscle or a gland
Cannot be influenced by external conditioning	Can be conditioned
Examples heartbeat, blood circulation	Examples blinking of eyes, Salivation

18. What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?

Movement in sensitive plant	Movement in our legs
The movement in a sensitive plant is a response to stimulus which is an involuntary action	Movement in our legs is a voluntary action
No special tissue is there for the transfer of information	A complete system CNS and PNS is there for the information exchange
Plant cells do not have specialised protein for movement	Animal cells have specialised protein which help muscles to contract

19. Write differences between Gamete and Zygote?

Gamete	Zygote
(i) It is germ cell that takes part in fertilisation.	(i) It is a product of fertilisation.
(ii) There are two types of gametes – male and female.	(ii) Zygote is of one type.
(iii) A gamete has haploid or n chromosome number	(iii) Zygote has diploid or $2n$ chromosome number.
(iv) A gamete carries characteristics of only one parent.	(iv) It carries characteristics of both the parents.
(v) Gamete is the last cell of its generation.	(v) It is the first cell of new generation

21. How are the modes for reproduction different in unicellular and multicellular organisms?

Reproduction mode in unicellular organisms	Reproduction mode in multicellular organisms
(i) A sexual reproduction takes place in unicellular organisms.	(i) Sexual reproduction takes place in multicellular organisms.
(ii) Only one organism is required in this method.	(ii) A male and a female both are required in this method.
(iii) No special cells are present for reproduction.	(iii) Special cells are present for reproduction.
(iv) No special organs are present for reproduction	(iv) Special organs are present for reproduction located at the fixed position in the body.

22. write differences between xylem and phloem?

Xylem	phloem
It transports water and minerals	It transports food material
Only upward movement of substances is possible	Substances can move in both upward and downward directions

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TABLE BASED QUESTION

1. Complete the following table

Reaction	End products
Light reaction	
Dark reaction	

Light reaction- ATP, NADPH and oxygen

Dark reaction -glucose

2. Observe the following table and answer the following questions

Enzyme	Secreted by	Secreted into	Digestive juice	Acts on	Products
Salivary amylase ptyalin	Salivary glands	Buccal cavity	Saliva	Carbohydrates	Dextrin, maltose
Pepsin	Gastric glands	Stomach	Gastric juice	Proteins	Peptones
Bile juice (no enzymes)	Liver	Duodenum	Bile juice	Fats	Emulsification fat globules
Amylase	Pancreas	Duodenum	Pancreatic juice	Carbohydrates	Maltose
Trypsin	Pancreas	Duodenum	Pancreatic juice	Proteins	Peptones
Lipase	Pancreas	Duodenum	Pancreatic juice	Fats	Fatty acid
Intestinal juice (Sucrase Peptidases Lipase)	Small intestinal glands	Small intestine	Intestinal juice	Carbohydrates proteins Fats	Maltose sugars Amino acids Fatty acid and glycerol

1. Name the enzymes that act on proteins?

Pepsin, trypsin, peptidases

2. Pancreatic Juice Secreted into?

Duodenum

3. What are the end products of fats?

Fatty acid and glycerol

4. What is emulsification?

Breaking down of large fat molecules into small globules is called emulsification of fats

3. Complete the following table

Actions	Controlled by part of brain
A. walking in a straight line, riding a bicycle, picking up a pencil.	
B. Involuntary actions including blood pressure, salivation and vomiting	

A Cerebellum of Hindbrain,

B Medulla of Hindbrain

4. Complete the following table

Tropism	Its Action
	The movement of plant parts in response to light
	The movement of plant parts in response to water
	The movement of plant parts in response to gravity
	The movement of plant parts in response to chemicals
	The movement of plant parts in response to touch

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1. Phototropism 2. Hydrotropism 3. Geotropism 4. Chemotropism 5. Thigmotropism

5. Observe the following table and answer the following questions

s.no	Division 1	Division 2
1	Auxin	Adrenaline
2	Gibberellin	Testosterone
3	Ethylene	Growth hormone
4	Abcisic acid	Thyroxine

1. on what basis the above classification is done?

Plant hormones and animal hormones

2. what are the duties of adrenaline?

Adrenaline prepares the body for a fight-or-flight response by increasing heart rate and blood pressure, and increasing blood flow to the brain and muscles.

3. Which gland secretes Growth hormone?

Pituitary gland

4. Which hormone ripens the fruits?

Ethylene

7. In the following table Hormones secreted by endocrine glands were given. But a student wrote them in wrongly. Correct and rewrite them?

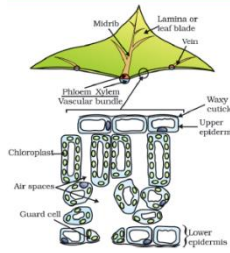
Endocrine gland	Hormone secreted	location	Uses of hormones
Thyroid	Adrenalin	Neck	Increase in heart beat rate
Ovary	Testosterone	Scrotal sac	Growth of hair on face
Testis	Thyroxine	Lower abdomen	Menstrual cycle
Adrenalin	oestrogen	Attached to kidneys	General growth rate and metabolic activity

Endocrine gland	Hormone secreted	location	Uses of hormones
Thyroid	Thyroxine	Neck	General growth rate and metabolic activity
Ovary	oestrogen	Lower abdomen	Menstrual cycle
Testis	Testosterone	Scrotal sac	Growth of hair on face
Adrenalin	Adrenalin	Attached to kidneys	Increase in heart beat rate

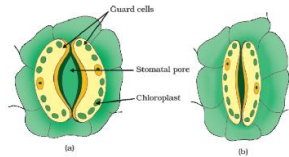
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DIAGRAM BASED QUESTIONS

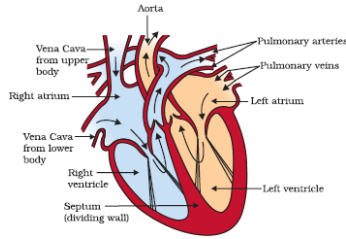
Cross section of a leaf



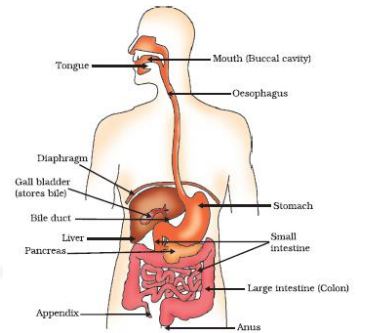
Stomata of leaf



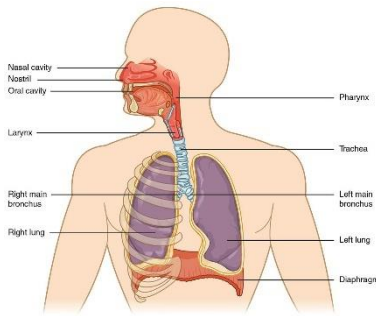
Internal structure of Heart



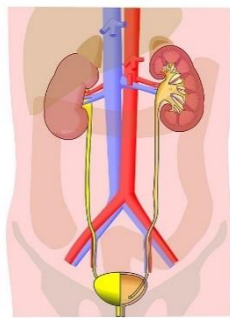
Human Digestive system



Human Respiratory system

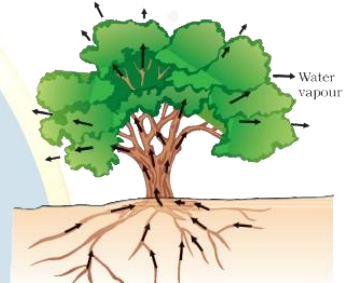
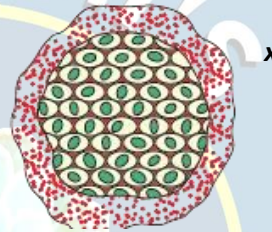


Human Excretory system

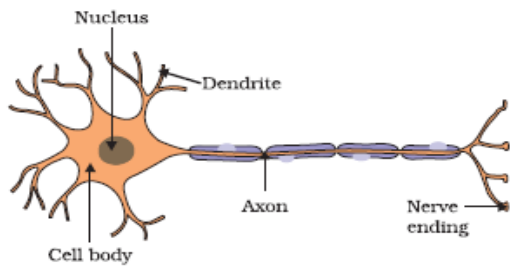


Multiple fission in plasmodium

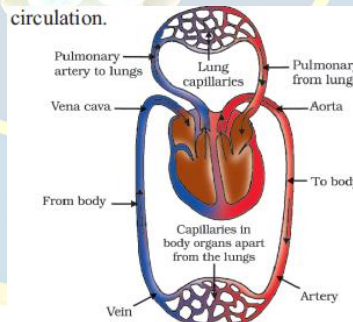
Transpiration in a tree



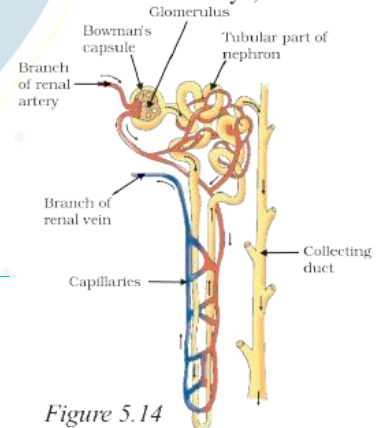
Neuron



Double circulation



Nephron



Neuromuscular junction

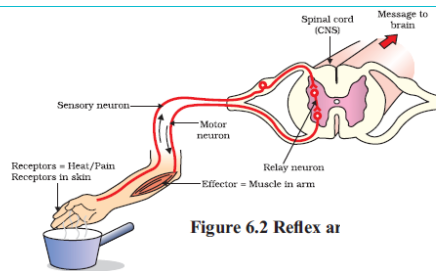
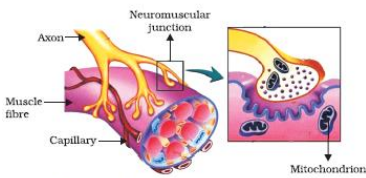
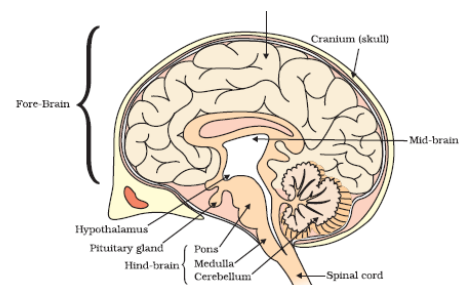


Figure 6.2 Reflex arc

Figure 5.14 Structure of a nephron



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Human Brain

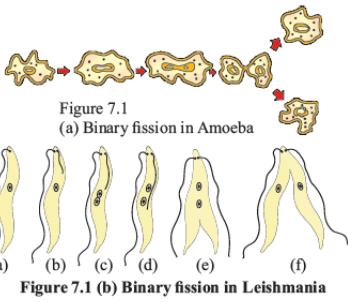
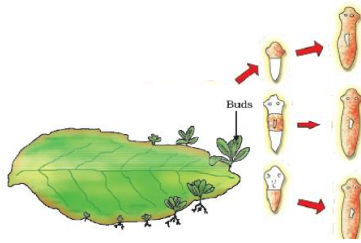


Figure 7.1 (a) Binary fission in Amoeba

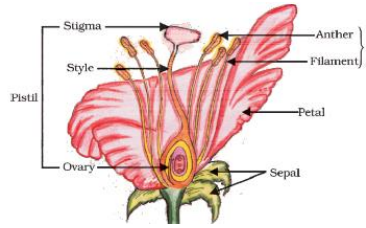
Figure 7.1 (b) Binary fission in Leishmania



propagation in Bryophyllum

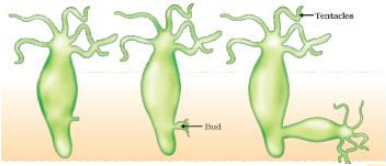
Budding in Hydra

Vegetative



Structure

of a flower



Germination of Pollen grain on stigma

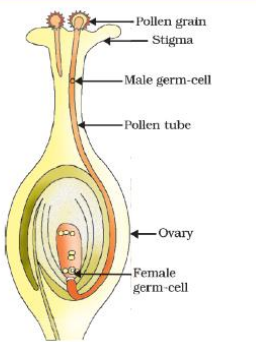


Figure 7.10 Human-male reproductive system

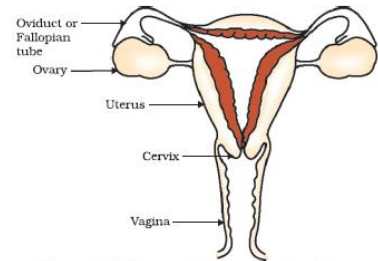


Figure 7.11 Human-female reproductive system

Spore formation in Rhizopus

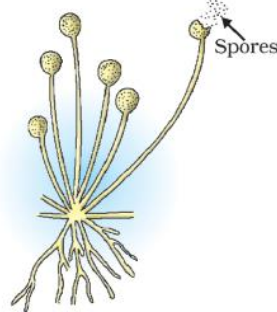


Figure 13.1 Food chain in nature (a) in forest, (b) in grassland and (c) in a pond

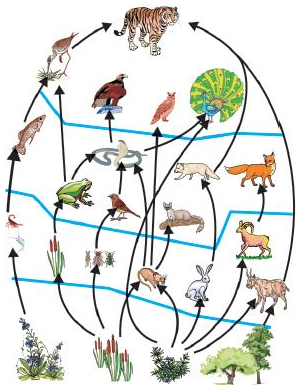
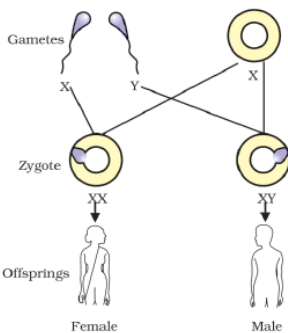
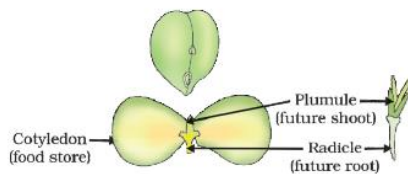


Figure 13.3



Sex determination in Human Beings

Germination

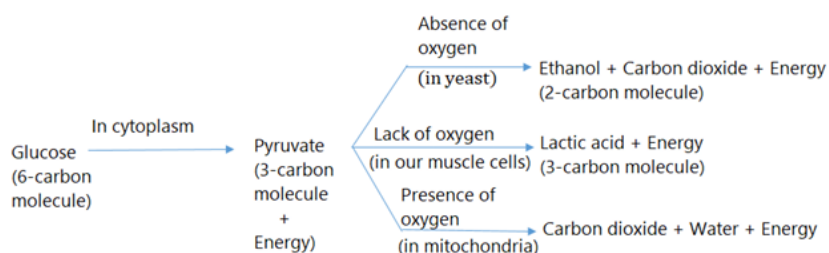


General questions

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GENERAL QUESTIONS

- Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?**
Multi-cellular organisms like humans have very big bodies and require a lot of oxygen to diffuse into the body quickly in order to meet the oxygen requirement. Diffusion is a slow process which will take a lot of time to circulate oxygen to all the body cells. Because of its slow nature, diffusion is insufficient to meet the oxygen requirements of multicellular organisms like humans.
- What criteria do we use to decide whether something is alive?**
Walking, breathing, growth and other visible changes can be used to determine whether something is alive or dead.
- What is the role of the acid in our stomach?**
HCl present in the stomach dissolves food particles and creates an acidic medium. In an acidic environment, protein digesting enzymes, pepsinogen, are converted into pepsin. HCl in the stomach also acts as a protective barrier against many disease-causing pathogens.
- What advantage over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?**
Terrestrial organisms breathe by using atmospheric oxygen, whereas aquatic organisms take oxygen dissolved in water. The oxygen level is high in the atmosphere when compared to oxygen in the water. Hence, terrestrial organisms need not breathe fast to obtain oxygen, whereas aquatic organisms need to breathe faster to get the required oxygen.
- How are oxygen and carbon dioxide transported in human beings?**
Oxygen and Carbon dioxide are transported in human beings via the bloodstream. Oxygen is carried to the cells, whereas carbon dioxide is carried away from the cells. The exchange of gases takes place between the alveoli of the lungs and the surrounding blood capillaries. Oxygen is absorbed by the blood capillaries from the lungs' alveoli by diffusion, while carbon dioxide is absorbed by the lungs' alveoli from the blood capillaries by diffusion.
- Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?**
Mammals and birds are warm-blooded animals which keep their body temperature constant irrespective of the environment they live. This process requires a lot of oxygen for more cellular respiration so that warm-blooded animals produce more energy to balance their body temperature. Hence, it is very important for warm-blooded animals to separate oxygenated and deoxygenated blood to keep their circulatory system efficient.
- What will happen if there were no alveoli in our lungs?**
If there were no alveoli in our lungs less oxygen moves into our bloodstream so metabolic activities become decreased.
- What will happen if there is no acid in the stomach?**
Without enough stomach acid, your body can't properly digest food or absorb nutrients. This can make it harder to digest proteins, which are broken down by the digestive enzyme pepsin.
- What are the different ways in which glucose is oxidised to provide energy in various organisms?**
In the cytoplasm, Glucose is first broken down into two 3 carbon compounds called pyruvate by the process known as Glycolysis. Further breakdown takes place in different organisms by different processes.



- What will happen if nephrons do not function properly?**

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This condition is called uremia. Your hands or feet may swell. You will feel tired and weak because your body needs clean blood to function properly. Untreated uremia may lead to seizures or coma and will ultimately result in death.

11. What suggestions will you give to your friend to keep their digestive system healthy?

Eat a high-fibre diet like fruits, vegetables and whole grains

Be certain to get both soluble and insoluble fibre

Minimize the intake of foods which are rich and high in fat.

Prefer lean meats such as skinless poultry

Add probiotics to the diet to improve nutrient absorption

Follow a typical eating schedule

Drink plenty of water to keep the body hydrated and for good digestion.

12. If you have a chance to meet Gastroenterologist what type of questions will you ask to him?

1. What is indigestion?

2. Is there any relationship between acidity and indigestion?

3. How can I keep my gut healthy?

4. What I can do to prevent future Digestive issues?

13. If you have a chance to meet pulmonologists what type of questions will you ask him about lungs?

1. What is the cause for lung cancer?

2. What is asthma?

3. Is there any relation between breathing and metabolic activities?

4. How can asthma be cured?

5. Is cancer heritable?

14. If you have a chance to meet cardiologist what type of questions will you ask him about heart attack?

1. What is heart attack?

2. What should my blood pressure be?

3. Are there any activities I should avoid?

4. How does my family history affect me?

5. How does my cholesterol affect my heart?

6. What treatment options are available?

15. If you have a chance to meet Nephrologist what type of questions will you ask him about kidneys?

How can I prevent formation of stones in kidney?

Does a renal failure hereditary?

What are the dietary measures to be taken for normal functioning of kidney?

How does diabetes harm kidneys?

What shall I do to keep my kidneys healthy for a long time?

What are the factors responsible for kidney failure?

16. Why is the use of iodized salt advisable?

Iodized salt is recommended because iodine is a vital nutrient that helps the thyroid gland produce thyroxine, a hormone that regulates metabolism and brain acuity. If the quantity of iodine in food is less than required, then the neck will swell up due to the enlargement of the thyroid gland. This deficiency disease is known as goiter. Therefore iodized salt is advised.

17. What would be the consequences of a deficiency of haemoglobin in our bodies?

Haemoglobin is a protein responsible for the transportation of oxygen to the body cells for cellular respiration. A deficiency of Haemoglobin can affect the oxygen-carrying capacity of RBCs. This leads to a lack of oxygen in our body cells. Haemoglobin deficiency leads to a disease called anaemia.

18. Describe the double circulation of blood in human beings. Why is it necessary?

Double circulation means, in a single cycle, blood goes twice in the heart. The process helps in separating oxygenated and deoxygenated blood to maintain a constant body temperature. The double circulatory system of blood includes ① Pulmonary circulation ② Systemic circulation.

19. What will happen if there were no villi in the small intestine?

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If the villi in the small intestine are not present, the body will not be able to absorb nutrients and digested food efficiently, which can lead to severe nutritional disorders. This can cause a person to become malnourished or even starve, even if they eat a lot of food.

20. What processes would you consider essential for maintaining life?

Life processes such as respiration, digestion, excretion, circulation and transportation are essential for maintaining life.

21. What is the difference between a reflex action and walking?

Reflex actions are the involuntary actions that occur in response to stimuli. They occur without involvement of conscious areas of brain. All the reflex actions are unconscious actions. Reflex action involves the brain and spinal cord of central nervous systems. On the other hand, voluntary actions are those which occur under the control of cerebellum of the brain. Walking is learnt as we grow. Walking is controlled by the brain and is consciously used whenever required.

22. What happens at the synapse between two neurons?

Solution: At the synapse between two neurons, electric signals are converted into chemicals that can easily cross over the gap and pass on the chemical messenger to the next neuron where it is converted back to electrical signal.

23. Which part of the brain maintains the posture and equilibrium of the body?

Cerebellum, which is a part of the brain, is responsible for controlling the motor functioning. Hence, it is the part engaged in the maintenance of posture and equilibrium of the body.

24. How do we detect the smell of an agarbatti (incense stick)?

The smell of an agarbatti is detected by the nose. The olfactory receptors present in the nose sends electrical signal to the fore brain. The fore brain interprets this signal as the smell of the incense stick.

25. How do auxins promote the growth of a tendril around a support?

Auxins are the plant hormones produced at the tips of shoots and roots. Auxins are present at the tip of tendrils. When tendrils are attached around any support, their growth is slowed down as auxins are sensitive to touch. This makes them move to the other side of the tip to get support; this makes the other side grow faster than the side of tendril in contact with the support and the tendril bends towards the support.

26. How does chemical coordination take place in animals?

Chemical coordination takes place in animals with the help of chemical messengers called hormones. Hormones are the chemicals that are secreted by specific endocrine glands. Hormones regulate the growth, development and homeostasis of the animals.

27. How does our body respond when adrenaline is secreted into the blood?

Adrenaline is a hormone secreted when a person is frightened or mentally disturbed. When Adrenaline reaches the heart, heartbeat will increase to increase blood supply to our muscles. Adrenaline also increases the breathing rate because of contraction of diaphragm and the rib muscles. Adrenaline rush also increases blood pressure and allows entry of more glucose into blood. All these occur when our body responds to the secretion of adrenaline into our blood.

28. Why are some patients of diabetes treated by giving injections of insulin?

Diabetes is a condition where the pancreatic cells of a person stops producing or reduces the production of insulin hormone. Insulin regulates blood glucose by converting extra glucose to glycogen. When insulin is not produced adequately, a person's blood glucose level is affected and this leads to adverse effects. In order to maintain the insulin and blood glucose levels, diabetes patients are treated with injections of insulin.

29. What is the function of receptors in our body? Think of situations where receptors do not work properly. What problems are likely to arise?

Receptors are present throughout our body – mainly in sense organs. Receptors collect the information about changes that happen around us and send the signal/information to the brain which responds to the change detected. When receptors do not work properly, the environmental stimuli are not able to create nerve impulses and body does not respond

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30. Which signals will get disrupted in case of a spinal cord injury?

In case of a spinal cord injury, signals coming from the nerves, as well as the signals coming to the receptors, will be disrupted. Both these signals meet in a bundle in the spinal cord. Hence, both these signals get disrupted.

31. How does chemical coordination occur in plants?

Plant growth, development and responses to the environment is controlled and coordinated by a special class of chemical substances known as hormones. Hormones are produced in one part of the plant and are transported to all the needy parts of the plant. The five major types of phytohormones are auxins, gibberellins, cytokinins, abscisic acid, and ethylene. These phytohormones are either growth promoters (such as auxins, gibberellins, cytokinins, and ethylene) or growth inhibitors such as abscisic acid.

32. What is the need for a system of control and coordination in an organism?

There are various organs in an organism. These organs must be carefully controlled and coordinated for the survival of an organism. In the body of an organism, various fluids are secreted from the glands of the endocrine system. These hormones are responsible for the overall growth and development of an organism. All other daily decisions that include voluntary and involuntary actions are controlled by the central nervous system (CNS).

Coordination is needed for all human activities we perform. Our nervous system receives information from surroundings which is processed and a response is elicited. The endocrine system (hormonal system) helps in integrating various metabolic activities like reproduction, development, and all reflex actions (cope up with various give up situations).

The hormonal system in plants helps in process of photosynthesis; they need carbon dioxide, water and sunlight. The stomatal opening in leaves opens up to allow in carbon dioxide gas, the roots bend towards water, the stem grows towards sunlight, and the tendrils in climbing plants are supported by the hormonal system of the plant body. Thus, we need a control and coordination system in an organism.

33. Newly formed DNA copies may not be identical at times. Give one reason.

When a cell reproduces, DNA replication occurs which results in formation of two similar copies of DNA. The process of copying the DNA leads to some variations each time. As a result, the DNA copies produced are similar to each other but sometimes may not be identical.

34. What is the importance of DNA copying in reproduction?

DNA – Deoxyribonucleic acid is the genetic material that is present in the cells of all organisms. DNA carries genetic information from one generation to the other, and this helps in producing organisms of its own types. DNA copying is a must for inheriting the traits from parents. Any variations in DNA copying will give rise to origin of new species.

35. Why is the variation beneficial to the species but not necessarily for the individual?

The reason why the variation is beneficial to the species rather than individuals is because sometimes the climatic changes have a drastic effect on the species, which makes their survival difficult. For examples, if the temperature of the water body increases, there might be certain species of microorganisms which might die. This may result in disturbance in the environment. So, variation is beneficial to species and not for the individuals.

36. How will an organism be benefited if it reproduces through spores?

Following are the ways through which an organism will be benefited if it reproduces through spores:

- 1. Number of spores produced in one sporangium would be large.*
- 2. In order to avoid competition at one place, spores can be distributed to faraway places with the help of air.*
- 3. In order to prevent dehydration under unfavourable conditions, the spores are covered by thick walls.*

37. Can you think of reasons why more complex organisms cannot give rise to new individuals through regeneration?

Organisms at higher complex levels cannot give rise to new individuals through regeneration because they have organization of their organs system at different levels. All these organ systems are interconnected.

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and work in full coordination. They can regenerate a few of their lost body parts like skin, blood, muscles, etc. but can't give rise to new individuals.

38. Why is vegetative propagation practised for growing some types of plants?

Following are the advantages of practising vegetative propagation for growing some types of plants:

1. Crops like orange, banana, pineapple do not have viable seeds, so vegetative propagation can be used.
2. It is a rapid, cheap and easier method to grow crops. It can be used in places where seed germination fails.
3. A good quality of variety can be preserved.

39. What is the role of the seminal vesicles and the prostate gland?

Lubrication of sperms and providing of a fluid medium for the easy transportation of sperms takes place with the help of secretions from the seminal vesicles and the prostate gland. These secretions also provide nutrients in the form of fructose, calcium and some enzymes.

40. What are the changes seen in girls at the time of puberty?

Following are the changes seen in girls at the time of puberty:

1. Hair growth appears in genital area.
2. Hair growth in other areas like underarms, face, hands and legs.
3. The size of uterus and ovary increases.
4. The size of the breast increases followed by darkening of the nipple skin that is present at the tip of the breast.
5. Beginning of menstrual cycle.
6. Appearance of pimples, as there is more oil secretion from the skin.

41. How does the embryo get nourishment inside the mother's body?

The lining of the uterus thickens after fertilization. The blood flow is good so as to nourish the growing embryo. Placenta is a special tissue which is embedded in the uterine wall and helps the embryo get the nourishment from the mother's tissue. Placenta has villi on the embryo side and blood space on the mother's side. This spacing provides a large area between the mother and the embryo and also for waste removal.

42. If a woman is using a Copper-T, will it help in protecting her from sexually transmitted diseases?

No, the usage of copper-T cannot stop the contact of body fluids. Hence, it cannot protect her from getting sexually transmitted diseases.

43. What are the advantages of sexual reproduction over asexual reproduction?

Following are the advantages of sexual reproduction:

1. The offspring has the characters of both the parents.
2. The survival of the species is ensured as there are more variations.
3. The offspring can easily adapt to environmental changes.
4. It also improves the health of humans.

44. What are the functions performed by the testis in human beings?

Following are the functions performed by the testis in human beings:

1. Apart from the production of sperms, it also produces the male hormone known as androgens.
2. They also produce hormone called testosterone, which is responsible for secondary sexual characters in boys.

45. Why does menstruation occur?

Menstruation is the normal bleeding of the vaginal line, which starts at puberty and lasts till menopause. During this period, the body prepares itself for pregnancy. Every month an egg is released from one of the ovaries at the same time when the uterus prepares itself for the fertilized egg. The inner lining of the uterus gets thickened and is supplied with a sufficient amount of blood for the embryo. Since there is no interaction between the egg and the sperms, the fertilization of egg doesn't take place. So when the egg doesn't get fertilized, the uterus lining breaks down slowly resulting in menstruation.

46. . What are the different methods of contraception?

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Following are the different methods of contraception:

Natural method: In this method, the main focus is to avoid the meeting of sperms and ovum. This can be achieved by avoiding the mating from 10th to 17th day of the menstrual cycle. During this period, there are high chances of fertilization as ovulation is expected.

Barrier method: In this method, the meeting of sperms and ovum is avoided by using a barrier. These barriers are available for males as well as for females. Condoms for both male and female, diaphragms for female, cervical cap and contraceptive sponge for females.

Oral contraceptives: In these methods, pills are taken orally. These pills contain small portion of hormones that block the eggs so that fertilization doesn't take place.

Implants and surgical method: In this method, contraceptive devices like copper-T or a loop can be used to block the meeting of sperms and ovum. In surgical method, the fallopian tubes are blocked in females to stop the flow of eggs and vas deference is blocked in men to stop the flow of sperms.

47. How are the modes for reproduction different in unicellular and multicellular organisms?

The different modes of reproduction in unicellular organisms are fission, budding, etc. Here, the cell divides into two daughter cells and this process of cell division continues.

Whereas, in multicellular organisms there is a different organ system for reproduction. The different modes of reproduction in multicellular organisms are vegetative propagation, spore formation, etc. In more complex organisms like humans and animals, reproduction is through sexual reproduction.

48. How does reproduction help in providing stability to populations of species?

Reproduction is the process of producing the same kind of species by the existing species. This is done so as to maintain the population of that species and also to take forward their species to the next generations. Stability is maintained by keeping a check of rate of births and rate of deaths.

49. What could be the reason for adopting contraceptive methods?

Following are the reasons for adopting contraceptive methods:

1. To control population
2. To avoid unplanned pregnancy
3. To avoid transfer of sexually transmitted diseases

50. How do Plasmodium and Leishmania reproduce? Write one difference in their mode of reproduction?

Plasmodium and Leishmania reproduce by the process of fission which is an asexual mode of reproduction. Plasmodium reproduces by multiple fission. About 1000 daughter cells are produced by the multiple fission of a Plasmodium. Leishmania reproduces by the process of binary fission. In Leishmania, the splitting of parent cell takes place in a definite plane (longitudinally) with respect to flagellum at its end to produce two daughter cells.

51. What happens when

(a) accidentally, Planaria gets cut into many pieces-

(b) Bryophyllum leaf falls on the wet soil

(c) on maturation sporangia of Rhizopus bursts?

(a) When Planaria accidentally gets cut into many pieces then its each piece grows into a complete organism. This is known as regeneration.

(b) When the Bryophyllum leaf falls on the wet soil, the buds present in the notches along the leaf margin develop into new plants. This is known as vegetative propagation.

(c) The sporangia of Rhizopus contain cells or spores that can eventually develop into new Rhizopus

52. What is the role of the seminal vesicles and the prostate gland?

Lubrication of sperms and providing of a fluid medium for the easy transportation of sperms takes place with the help of secretions from the seminal vesicles and the prostate gland. These secretions also provide nutrients in the form of fructose, calcium and some enzymes.

53. If a trait A exists in 10% of a population of an asexually reproducing species and trait B exists in 60% of the same population, which trait is likely to have arisen earlier?

Trait B is more probable to arise early as this trait has already been existing and replicating in a larger percentage of the population as compared to trait A.

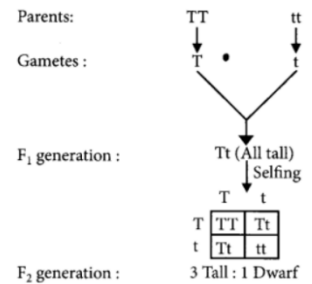
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54. How does the creation of variations in a species promote survival?

Genetic variations enable the species to better adapt to changes in its environment. Moreover, it is an important force in evolution as it allows the frequency of alleles to increase or decrease through natural selection. These variations will determine the difference between extinction or continuation of the species.

55. How do Mendel's experiments show that traits may be dominant or recessive?

Mendel crossed the pea plant for two contrasting characters under consideration. The trait that expressed itself in F1 generation was dominant and the one not expressed in F1 generation was recessive. He later self-pollinated the plants of F1 generation and recovered, both parental traits in a definite proportion in F2 generation. Mendel interpreted his results as, the trait that expressed itself in F1 was dominant and the one that reappeared in F2 generation was recessive. It can be demonstrated by the following cross:



56. 3. A man with blood group A marries a woman with blood group O, and their daughter has blood group O. Is this information enough to tell you which of the traits – blood group A or O – is dominant? Why or why not?

Given information is not enough to tell us which characteristics are dominant – blood group A or O. Blood type A is always dominant in ABO blood, and blood type O is always recessive. Here, the father's blood group may be genotypically AA (homozygous) or AO (heterozygous), whereas that of the mother can be OA or OO.

57. How is the sex of the child determined in human beings?

The sex of the child in humans is determined by the males. Males have XY chromosomes, while females have XX chromosomes. Hence, if:

1. The male's X chromosomes combine with the female's X chromosomes, the mother gives birth to a girl
2. The male's Y chromosome combines with the female's X chromosome, the mother gives birth to a boy

58. What are the different ways in which individuals with a particular trait may increase in a population?

An individual attribute could increase a population in the following 2 ways:

(a) Natural selection: If an attribute is useful to a population, it'll increase naturally. For example, mosquitoes which are resilient against a particular pesticide will pass on their genes so that future generations become resistant as well. The mosquitoes which are affected by the pesticide die out.

(b) Genetic drift: If a species faces a catastrophic event where most of the population is wiped out, the surviving population can pass on their traits to the following generations. This may result in a rise in the attribute within the population.

59. Why are traits acquired during the lifetime of an individual not inherited?

Traits acquired during a lifetime cannot be inherited by successive generations as the changes do not reflect in the DNA of the germ cells. For instance, a football player cannot pass on his skills to his offspring as they are limited to nonreproductive cells only.

60. Why are the small numbers of surviving tigers a cause of worry from the point of view of genetics?

As the size of the tiger population decreases, the genetic pool of the species decreases too. This results in a limitation on the variations which will be introduced within the genetic makeup of the tigers. This lack of variation will result in serious implications. For example, if an illness spreads within the tiger population, it can potentially wipe out the whole population, possibly causing their extinction.

61. What factors could lead to the rise of a new species?

Factors that would result in a new species are as follows:

- (a) Mutation
- (b) Genetic drift
- (c) Natural selection
- (d) Geographical isolation
- (e) Generative isolation for prolonged periods
- (f) Environmental factors on the isolated populations
- (g) Quantum of genetic variant transmissible from one generation to the following generation

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62. Will geographical isolation be a major factor in the speciation of an organism that reproduces asexually? Why or why not?

In the case of asexually reproducing organisms, geographical isolation can't be considered a factor. This is due to the fact that meiosis does not occur during asexual modes of reproduction.

63. Will geographical isolation be a major factor in the speciation of a self-pollinating plant species? Why or why not?

In the pollination of plant species, geographical isolation is usually not a major factor, as no new trait will become part of the genetic makeup of a self-pollinating plant species. However, there are some possibilities of some environmental changes which could result in some variations.

64. Give an example of characteristics being used to determine how close two species are in evolutionary terms.

Let us take the instance of humans and chimpanzees. Chimpanzees are able to express a wide range of emotions, such as busting out in laughter or smiling – this trait was once thought to be a feature exclusive to humans. The smile can be linked to the activation of the brain's limbic system, where the orbicularis oculi muscle involuntarily contracts and raises the cheeks, forming wrinkles around the eyes. This implies that the smile is a true and genuine smile. Interestingly, this type of reflex has a name – the Duchenne smile. Moreover, research has shown that chimpanzees share 98.6% of our DNA – This means that humans and chimpanzees shared a common ancestor aeons ago. It is also important to note that chimpanzees are the closest living relatives to humans.

65. Can the wing of a butterfly and the wing of a bat be considered homologous organs? Why or why not?

The wing of a butterfly and the wing of a bat cannot be considered homologous organs as they do not share a common ancestor. Even though both structures aid in flying, they have evolved separately. To prove this, the wings of a butterfly are composed of two chitinous membranes, whereas the wings of a bat are composed of a bony skeleton, complete with blood vessels. Hence, these aren't homologous organs but rather analogous organs.

66. What are fossils? What do they tell us about the process of evolution?

Fossils are the preserved remains of animals or plants, or other organisms that died out millions of years ago. These fossils tell us about a lot of extinct animals and also give insights into how evolution might have occurred. Fossils can be used to understand how an organism would have lived and what it may have looked like. More importantly, we can correlate with fossils as well as extant organisms to understand their relationships. For instance, scientists were able to recover protein sequences from a dinosaur called the T-rex, which confirmed its avian lineage. This means birds are the extant relatives of (avian) dinosaurs. Moreover, the pattern of fossil distribution gives us an idea of the time in history when various species were formed or become extinct.

67. Why are human beings who look so different from each other in terms of size, colour and looks said to belong to the same species?

While human beings do vary in colour and general appearance, their genetic makeup is identical to any other human. One of the speculations put forth for our drastic changes is due to evolutionary pressure, where the need to be easily recognised pushed us towards having widely different faces.

68. In evolutionary terms, can we say which among bacteria, spiders, fish and chimpanzees have a 'better' body design? Why or why not?

Body designs are the result of environmental needs and pressure. Hence, we can't conclude that one organism has a better body compared to another. For instance, fish have evolved a streamlined design as it is best suited for an aquatic environment. On the other hand, a spider or a chimpanzee might be ill-equipped to survive in such aquatic environments.

69. A study found that children with light-coloured eyes are likely to have parents with light-coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not?

Knowledge of at least 3 generations is required to find if an attribute is dominant or recessive. Hence, it is not possible to identify if the given trait is dominant or recessive.

70. How are the areas of study – evolution and classification – interlinked?

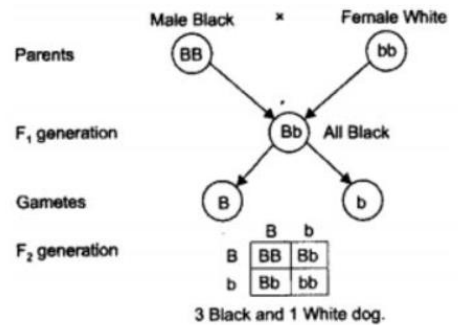
Classification and evolution are two related fields of biology. Evolution pertains to how organisms evolve, and classification deals with finding out how two species are related to each other. For example, evolution

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and fossil evidence point to the fact that *Australopithecus afarensis* is considered one of our earliest ancestors. And classification tells us that *Australopithecus afarensis* belongs to the genus *Homo*, which is also the same genus as modern humans.

71. Outline a project which aims to find the dominant coat colour in dogs.

A homozygous black (BB) male dog and a homozygous white (bb) female dog is taken and given to mate and produce offspring in F₁ generation. If black colour is dominant out of every 4 dogs, 3 will be black and if white colour is dominant 3 out of 4 dogs will be white.



72. How is the equal genetic contribution of male and female parents ensured in the progeny?

Genetically organisms are of types

(i) **Haploid:** They have single set of chromosomes, where each chromosome is represented singly. As the chromosomes are the bearer of genes so haploids have single set of genes. A single gene determines the expression of character.

(ii) **Diploid:** 'They have two sets of homologous chromosomes, where the chromosome occur in pair, one maternal contributed by the mother through her ovum and the second of the pair is contributed by the male parent through his sperm. The resultant cell zygote produced by the fusion of male and female gametes have two sets of chromosomes – each set contributed by each parent. In diploids a character is controlled by two genes/factors. Both the father and mother contribute practically equal amount of genetic material to the child. It means that each trait can be influenced by both paternal and maternal DNA

73. Only variations that confer an advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

No, many of the times the variations are not advantageous to an individual organism but still survive in a population, e.g., take the case of free ear lobe and attached ear lobe. Most of the other variations not only give survival advantage to an individual but also contribute to genetic drift. Thus, we can say that most of the variations lead to better adaptation of an organism to the changing environment. In this way, it gives survival advantage to that organism and will also survive in the coming population.

74. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers, but almost half of them were short. This suggests that the genetic makeup of the tall parents can be depicted as

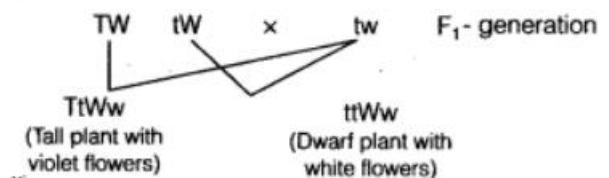
(a) TTWW

(b) TTww

(c) TtWW

(d) TtWw

Parent with genotype TtWW produce two types of gametes TW and tW, while the other with genotype ttww produce only one type of gamete tw.



75. Explain some harmful effects of agricultural practices on the environment?

Some harmful effects of agricultural practices on the environment are as follows:

1. Use of fertilisers change the chemistry of soil and kills useful microbes.
2. Use of non-biodegradable pesticides leads to bio-magnification.
3. Extensive cropping causes loss of soil fertility.
4. Use of ground water for agriculture ' has resulted in lowering water table,
5. Natural ecosystems and habitat have been damaged during clearing of land for agriculture.

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76. Name the wastes which are generated in your house daily. What measures would you take for their disposal?

The wastes generated daily are kitchen wastes, paper wastes like newspapers, bags, envelopes, plastic bags, vegetable and fruit peels, dust and empty cartons, etc. Measures for disposal are:

1. Separation of biodegradable and non-biodegradable recyclable and non-recyclable wastes.
2. Safe disposal of plastic bags.
3. Preparation of compost from kitchen wastes for home garden or given to waste collector for disposal.
4. Paper waste can be given for recycling.

77. Suggest any four activities in daily life which are eco-friendly.

1. Use of cloth bags instead of plastic bags.
2. Gardening.
3. Harvesting of rainwater and preventing wastage of resources.
4. Use of compost

78. What are the advantages of cloth bags over plastic bags during shopping?

Advantages of cloth bags:

They are made of biodegradable material.

They can be recycled and reused.

They do not pollute the environment.

They are strong and more durable than plastic bags.

They are capable of carrying more things.

They are washable.

79. Why is improper disposal of waste a curse to environment?

Improper disposal of waste is a curse to environment because it pollutes the environment, air, water, soil and cause harmful effects on living organisms.

For example, passage of sewage into water body cause eutrophication, killing of animals and source of water-borne pathogens.

80. What is the role of decomposers in the ecosystem?

Fungi and bacteria which break down (decompose) the dead plants, animals complex compounds into the simpler one. The decomposers help in the replenishment of natural resources. These are also known as microorganism or saprotrophs. These are also called reducers.

Importance of Decomposers

Decomposers help in disposing of the wastes and dead bodies of plants and animals. Therefore, they clean the environment and create space for a living of newer generations of organisms.

The decomposers release minerals and other raw materials trapped in organic matter. These are picked up by plants. This also helps to maintain the fertility of soil.

The decomposers produce some acids which are useful in solubilization of some minerals.

Decomposers help in recycling the materials in the biosphere so that, the process of life may go on and on like an unending chain.

81. What are trophic levels? Give an example of food chain and state the different trophic levels in it.

Trophic Levels: The various steps in a food chain at which the transfer of food (or energy) takes place are called trophic levels.

Example: A food chain operating in a grassland is given below :

Grass → Insects → Frog → Birds

In this food chain

Grass represents first trophic level.

Grasshopper represents second trophic level.

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Frog represents third trophic level.

Eagle represents fourth trophic level.

82. Why are some substances biodegradable and some non-biodegradable?

The microorganism like bacteria and other decomposer organisms (called saprophytes) present in our environment are specific in their action. They break down the materials or products made from natural materials (say, paper) but do not break down man-made materials such as plastics. So, it is due to the property of decomposer organisms of being specific in their action that some waste materials are biodegradable, whereas others are non-biodegradable.

83. Give any two ways in which biodegradable substances would affect the environment.

- (i) Biodegradable substances are decomposed by the action of microorganisms and decomposed materials are recycled through geo-chemical cycle
- (ii) These substances keep the environment clean.

84. Give any two ways in which non-biodegradable substances would effect the environment.

- (i) They cause air, water and soil pollution.
- (ii) They may cause bio-magnification in the food chain and end up in humans.

85. What is ozone and how does it affect any ecosystem?

Ozone (O₃) is an isotope of oxygen, i.e., it is a molecule formed by three atoms of oxygen. At the higher levels of the atmosphere, ozone performs an essential function. It shields the surface of the earth from ultraviolet (UV) radiations from the sun. These radiations are highly damaging to organisms. Ultraviolet rays can cause skin cancer

86. How can you help in reducing the problem of waste disposal? Give any two methods.

Answer:

- (i) Recycling: The solid wastes like paper, plastics and metals, etc. are recycled.
- (ii) Preparation of Compost: Biodegradable domestic wastes such as leftover food, fruit and vegetable peels and leaves of potted plants, etc. can be converted into compost by burying in a pit dug into ground.

87. What will happen if we kill all the organisms in one trophic level?

The food chain would end and ecological balance would be affected.
If the herbivores are killed, then the carnivores would not be able to get food and would die.
If carnivores are killed, then the population of herbivores would increase to unsustainable level.
If producers are killed, then the nutrient cycle in that area would not be completed.

88. Will the impact of removing all the organisms in a trophic level be different for different trophic levels? Can the organisms of any trophic level be removed without causing any damage to the ecosystem?

Yes, the impact of removing all the organisms in a trophic level will be different for different trophic levels. For example, on removing producers; herbivores would not be able to survive or they would migrate and ecosystem would collapse. If herbivores are removed, producers would grow unchecked and carnivores would not get food. If carnivores are removed, herbivores would increase to unsustainable levels and could destroy the producers. If decomposers are removed, the dead animals would pile up due to which the environment would become polluted. In addition to this, if dead animals will not decompose, the recycling of nutrients in the soil will be stopped and its fertility will be reduced. As a result the green cover of the earth will be lost. Thus to maintain the balance of the ecosystem the presence of organisms is necessary at each trophic level.

89. What is biological magnification? Will the levels of this magnification be different at different levels of the ecosystem?

Biological magnification: The increase in concentration of harmful chemical substances like pesticides in the body of living organisms at each trophic level of a food chain is called biological magnification.

Yes, levels of bio-magnification would increase as the trophic level increases and would be the highest for topmost trophic level. It would affect their biological process such as growth, reproduction, etc.

90. What are the problems caused by the non-biodegradable wastes that we generate?

- (i) Non-biodegradable wastes persist in the environment for a long time and cause greater harm to the various members of the ecosystem by causing biological magnification.

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(ii) Non-biodegradable waste such as fertilizers, pesticides, weedicides, etc., changes the soil chemistry. In turn affects the fertility of soil and subsequently reduces the crop yield.

91. If all the waste we generate is biodegradable, will this have no impact on the environment?

Biodegradable waste will be recycled easily by the decomposers such as bacteria and fungi. It will have only this bad impact on our environment that, many of the gases released during decomposition process may result in global warming.

92. Why is damage to the ozone layer a cause for concern? What steps are being taken to limit this damage?

The ozone shields the surface of the earth from ultraviolet (UV) radiation from the sun. These radiations are highly damaging as they can cause cancer in both plants and animals, damage to eyes and immune system. They can also lead to variations in global rainfall, ecological disturbances and dwindling of global food supplies. Due to these reasons, damage to the ozone layer is a major cause for concern.

Steps which are taken to limit this damage:

To decrease the use of synthetic chemicals like chlorofluorocarbons (CFCs) which are used as refrigerants and in fire extinguishers.

In 1987, the United Nations Environment Programme (UNEP) succeeded in reaching an agreement to freeze CFC production at 1986

93. If all the waste we generate is biodegradable, will this have no impact on the environment?

If all the waste we generate is biodegradable, it will also have impact on the environment. If it is disposed off properly, the problem of air, water and soil pollution can be lessened to an extent. There would be less health problems and humans would be disease-free.

But if it is not disposed off properly, it will affect the environment adversely.

94. Search the internet or library to find out what hazardous materials have to be dealt with while disposing of electronic items. How would these materials affect the environment?

Electronic waste (e-waste) contains hazardous materials that can contaminate the environment and harm human health:

- **Toxic substances**

E-waste can contain toxic substances like lead, mercury, cadmium, chromium, beryllium, and polyvinyl chloride (PVC).

- **Environmental impact**

Improperly disposed e-waste can contaminate soil, water, and air. It can also contribute to global warming.

- **Health impact**

Exposure to these substances can cause severe health problems, including cancer, respiratory illnesses, and nervous system disorders.

- **Atmosphere**

When e-waste is burned, it releases toxic fumes into the atmosphere, which can degrade air quality and cause respiratory problems.

- **Groundwater**

When e-waste is thrown in landfills, the toxic materials can seep into groundwater, which can affect drinking water supplies and aquatic ecosystems.

- **Land**

When e-waste is improperly processed, the toxic substances can leach into the soil, making the land unsuitable for agriculture.

95. Find out how plastics are recycled does the recycling process have any impact on the environment?

Plastic recycling reduces the need to extract new, raw materials from the earth as it reuses the stuff that's already processed and protects natural resources. This can help reduce emissions of heat-trapping gases into the atmosphere. It also prevents adding more rubbish to landfills.

Reduced fossil fuel consumption

Plastic production uses a lot of oil. Although recycling also uses fossil fuels, it's significantly less than the amount used when creating new plastics.

CO2 emission reduction

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Reduced oil consumption also means reduced emissions of CO₂ and other greenhouse gases that are produced whilst new plastics are being made. Additionally, recycling reduces pollution that is caused by burning waste.

Reduced landfill use

If more plastics are being recycled, it means less are ending up in landfills. Another benefit is that fewer plastics in landfills means less emission of common landfill gases, like carbon dioxide and methane. Both of these gases cause environmental damage.

Promotes a sustainable lifestyle

By recycling plastic, we're aware of the dangers that the overconsumption of plastic can have. Just having this information is important, so we know the impact that our habits can have on the planet and can make the right changes in our daily lives.

96. What methods could be applied to reduce our intake of pesticides?

Rinsing with warm water removes pesticides from the surface of fruits and vegetables

Using a small portion of detergents with a large portion of water also removes pesticides

Preferring organic or locally grown fruits and vegetables also reduces the level of pesticides in takes to some extent

97. Can we leave the aquarium as such after we set it up? Why does it have to be cleaned once in a while? Do we have to clean ponds or lakes in the same manner? Why or why not?

Ponds and lakes being natural ecosystems have natural decomposers and cleaners embedded as an integral part of the ecosystem, hence we do not have to clean them.

Aquariums are artificially built ecosystems which generally do not contain every aspect of a natural ecosystem. These artificial systems do not contain any form of natural decomposers and cleaners in the ecosystem as a result, food and waste generated by the organisms living in the aquarium accumulate and contaminate the water in the tank making it toxic. Hence they have to be cleaned manually.

98. How each of the groups of organisms are dependent on each other in an ecosystem explain?

Organisms in an ecosystem are interdependent, meaning they depend on each other for food, protection, and shelter to survive. Here are some examples of how organisms depend on each other:

Plants and animals Plants use the sun's energy to make food from water, air, and gas. Animals get energy, nutrients, and food from plants. Plants need animals for pollination and seed dispersal, while animals need plants for food and shelter.

Animals and carbon dioxide and oxygen Animals exhale carbon dioxide, which plants take in and release oxygen back into the air.

Plants and water Plants filter water, making it clean for animals to drink.

Decomposers and producers Decomposers consume plant and animal waste, returning nutrients to the soil that producers need to continue making food.

Ecosystem balance In an ecosystem, there is a balance of energy and matter being transferred between different components. Small changes in an ecosystem can have large consequences that are difficult to predict.

99. Name the materials that remain unchanged over long periods of Time?

Materials that remain unchanged over long periods of time are non-biodegradable substances, such as: Empty milk packets, Empty medicine bottles, Broken plastic footwear, and Bubble packs.

100. Name the materials that remain changed their form over a period of time?

Food

Vegetable peels

Used tea leaves

Waste paper

Torn clothes

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SHORT ANSWER QUESTIONS

- 1. What would happen if green plants disappear from earth?**
Green plants are the sources of energy for all organisms. If all green plants disappear from the earth, all the herbivores will die due to starvation and so will the carnivores and then the decomposers.
- 2. What is the energy currency in the living organisms?**
Adenosine tri phosphate ATP
- 3. What is the common nature between cuscuta, ticks and leeches?**
All are parasites. They collect nutrients from plants or animals without killing them.
- 4. We are the glands present in the wall of the stomach, Secrete mucus and enzyme Pepsin. Who are we?**
Gastric glands
- 5. What will happen if platelets were absent in the blood?**
The process of clotting will be affected. When cut the blood will not stop oozing out
- 6. Plants have low energy needs as compared to animals. Explain.**
Plants do not move. In a large plant body there are many dead cells like sclerenchyma as a result it requires less energy as compared to animals. Animals need more energy as they have to move in search of food, shelter and mates.
- 7. Why do fishes die when taken out of water?**
Fishes respire with the help of gills. Gills are richly supplied with blood capillaries and can readily absorb oxygen dissolved in water. Since fishes cannot absorb gaseous oxygen from the atmosphere they die soon after they are taken out of water.
- 8. Name the factors, which affect photosynthesis.**
The factors which affect photosynthesis, are light, water, temperature, humidity, age of the leaf and carbon dioxide.
- 9. Define a herbivore and a carnivore.**
*The animals that feed only on plants are called herbivores.
The animals that feed only on flesh are called carnivores*
- 10. How does amoeba engulf its food?**
Amoeba engulfs its food by extending pseudopodia. This process is known as Phagocytosis.
- 11. In which kind of respiration is more energy released?**
In aerobic respiration more energy is released.
- 12. Which part of the roots is involved in exchange of respiratory gases?**
Root hair is the part of the root which is involved in exchange of respiratory gases.
- 13. What are (i) stomata and (ii) lenticels?**
*(i) Stomata are tiny apertures found on the surface of the leaf, which regulate the exchange of respiratory gases and transpiration.
(ii) Lenticels are the raised pores in the woody plants that allow the exchange of gases between the atmosphere and the internal tissues.*
- 14. Name the respiratory organs of**
*(i) fish
(ii) mosquito
(iii) earthworm
(iv) dog*
The respiratory organs of
*(i) fish – gills
(ii) mosquito – tracheoles
(iii) earthworm – skin
(iv) dog – lungs.*
- 15. From where do the following take in oxygen?**
(i) prawn (ii) rat.

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(i) Prawns take in oxygen that is dissolved in water.

(ii) Rat takes in oxygen from the atmosphere.

16. State the function of epiglottis.

Epiglottis prevents the food from entering into the trachea

17. Splitting of water molecule in the presence of light and chlorophyll is called as
Photolysis

18. one cell thick vessels are called

- A. arteries
 - B. veins
 - C. capillaries
 - D. pulmonary veins
- Capillaries*

19. Name the excretory organs in amoeba and Earthworm

Amoeba Cell membrane

Earthworm outer covering /skin

20. What is glycolysis

Breakdown of glucose into pyruvate is called glycolysis

21. Select the mismatched pair

- A. Adrenaline- pituitary gland
- B. Testosterone- Testis
- C. Thyroxine- Thyroid gland
- D. Oestrogen- ovary

Answer A

22. Which is the largest and most prominent part of the brain?

Cerebrum is the largest and most prominent part of the brain.

23. What is meant by tropic movements?

Directional movements or orientations of specific part of a plant in response to external stimuli are called tropisms or tropic movements

24. State the function of thyroxine in human body.

Thyroxine regulates carbohydrate, protein and fat metabolism in the body. It promotes growth of body

25. Name the part of the brain which controls posture and balance of the body.

Cerebellum in hind-brain controls the posture and balance of the body.

26. Smita's father has been advised by a doctor to reduce his sugar intake.

Name the disease he is suffering from and name the hormone whose deficiency is?

Identify the gland that secretes it and mention the function of this hormone.

Explain how the time and amount of secretion of this hormone is regulated in human system.

He is suffering from diabetes. Deficiency of insulin causes diabetes.

Pancreas secretes insulin. Insulin helps in regulating blood sugar.

When the sugar level in blood increases, it is detected by the α -cells of the pancreas which responds by producing more insulin. As the blood sugar level falls, insulin secretion is reduced.

27. Which plant hormone is present in greater concentration in the areas of rapid cell division?

(b) Give one example of a plant growth promoter and a plant growth inhibitor.

(a) Cytokinin is present in greater concentration in the areas of rapid cell division.

(b) An example of a plant growth promoter is gibberellins and example of a plant growth inhibitor is abscisic acid.

28. What is reflex action?

It is defined as an unconscious, automatic and involuntary response of effectors, i.e. muscles and glands, to a stimulus, which is monitored through the spinal cord.

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29. What will happen if intake of iodine in our diet is low?

When iodine intake is low, release of thyroxin from thyroid gland will be less by which protein, carbohydrate and fat metabolisms will be affected.

A person might suffer from goitre in case of iodine deficiency in the body,

30. The gap between two neurons is called as _____

Synapse

31. Why are some patients of diabetes treated by giving injections of insulin

It helps keep blood sugar under control and prevents diabetes complications.

32. Which plant hormone promotes dormancy in seeds and buds?

Abscisic acid

33. Roots of plants are:

- (a) positively geotropic
- (b) negatively geotropic
- (c) positively phototropic
- (d) None of these

Answer a

34. A part of the body which responds to the in-structions sent from nervous system is called

- (a) receptor
- (b) effector
- (c) nerves
- (d) muscles

Answer b

35. Which nerves transmit impulses from the cen-tral nervous system towards muscle cells?

Motor nerves

36. Breathing is controlled by which part of the brain?

Medulla oblongata

37. Which gland acts as both endocrine and exocrine gland?

Pancreas

38. Which of the following endocrine glands does not exist in pairs?

- (a) Testes
- (b) Adrenal
- (c) Pituitary
- (d) Ovary

Answer c

39. The growth of pollen tubes towards the ovules is the result of a movement.

Chemotropic movement

40. Give the missing term in the given flow chart

Spinal cord

41. The ability of a cell to divide into several cells during reproduction in

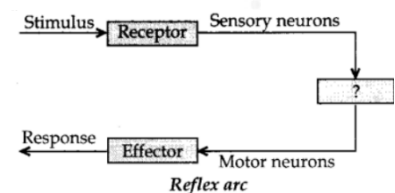
Plasmodium is called

- (a) budding
- (b) multiple fission
- (c) binary fission
- (d) reduction division

Answer b

42. Vegetative propagation refers to formation of new plants from

- (a) stem, flowers and fruits
- (b) stem, leaves and flowers
- (c) stem, roots and flowers
- (d) stem, roots and leaves



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Answer d

43. Name the parts of a bisexual flower that are not directly involved in reproduction.

Calyx and corolla are parts of a flower that are not directly involved in reproduction

44. Define the term pollination

The process of transfer of pollen grains from anther of a flower to the stigma of the same flower or another flower of the same species is known as pollination.

45. Can you consider cell division as a type of reproduction in unicellular organism? Give one reason.

Answer. Yes, because cell division in a uni-cellular organisms results in the formation of two daughter cells which means it produces more individuals of the organisms.

46. In tobacco plant, the male gametes have 24 chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?

The number of chromosomes in the female gamete is 24. The number of chromosomes in the zygote is 48

47. Mention the reproductive parts of a flower.

Male reproductive part – Stamens

Female reproductive part – Pistil.

48. The period during adolescence when the reproductive tissues begin to mature is called _____

Puberty

49. Expand AIDS, HIV

Acquired immune deficiency syndrome

Human immune deficiency virus

50. Which among the following diseases is not sexually transmitted?

(a) Syphilis

(b) Hepatitis

(c) HIV-AIDS

(d) Gonorrhoea

Answer b

51. Kala azar disease is caused by _____

Leishmania

52. Write the full forms of IUCD, OC.

The full forms for the above abbreviations are as follows

IUCD – Intrauterine Contraceptive Devices

OC – Oral Contraceptives.

53. Expand DNA, RNA

DNA Deoxyribose Nucleic acid

RNA Ribonucleic acid

54. Define fertilization.

The process of fusion of the male gamete with the female gamete of the same species is called fertilization.

55. Colonies of yeast fail to multiply in water, but multiply in sugar solution. Give one reason for this.

Energy is essential for any activity in living organisms. Sugar provides this energy for sustaining all life activities in yeasts. In water, it fails to reproduce because of inadequate energy in its cells. So, colonies of yeast fail to multiply in water but multiply in sugar solution.

56. Why does bread mould grow profusely on a moist slice of bread rather than on a dry slice of bread?

Bread mould require moisture and nutrients for its growth. A moist slice of bread contains both moisture and nutrients hence, it grows profusely as compared to a dry slice of bread which contains only nutrients but no moisture.

57. What would be the ratio of chromosome number between an egg and its zygote? How is the sperm genetically different from the egg?

The ratio of chromosome number between an egg and its zygote is 1: 2.

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Sperm is genetically different from the egg in the way that it contains either X or Y chromosome whereas, an egg always contains an X chromosome.

58. *The process in which small portion of the oviducts of a woman are removed by surgical operation and the cut ends are ligated is called as _____*

Tubectomy

59. *If a woman is using a copper T will it help in protecting her from sexually transmitted diseases*

No, the usage of copper T cannot stop the contact of body fluids hence it cannot protect her from getting sexually transmitted diseases

60. *What could be the reason for adopting contraceptive methods*

To avoid unplanned pregnancy to control population to avoid transfer of sexually transmitted diseases.

61. *What is a gene?*

A gene is a unit of DNA on a chromosome which governs the synthesis of particular protein that controls specific characteristics (or traits) of an organism.

62. *What is heredity?*

The inheritance of characters (or traits) from the parents to their offsprings is called heredity.

63. *What is heredity?*

The continuity of features from one generation to another is known as heredity. It is also defined as the transmission of traits from parents to the offsprings.

64. *Name the plant on which Mendel performed his experiments.*

Mendel performed his experiments on the plant, Pisum sativum – the garden pea plant.

65. *Do genetic combination of mothers play a significant role in determining the sex of new born?*

No, mothers have no role in determining the sex of the new born. Mothers have a pair of X chromosome. And all children will inherit an 'X' chromosome from their mother regardless of whether they are boys or girls

66. *Why are traits acquired during the lifetime of an individual not inherited*

Traits acquired during a lifetime cannot be inherited by successive generations as the changes do not reflect in the DNA of the germ cell. for instance, a singer cannot pass on his skills to his offsprings as they are limited to non-reproductive cells only

67. *A zygote which has an Y chromosome inherited from the father will develop into a*

Boy

68. *In pea plants, yellow seeds are dominant to green seeds. If a heterozygous yellow seeded plant is crossed with a green seeded plant what ratio of yellow and green seeded plants would you expect in the F1 generation*

50:50

69. *What is palaeontology*

Study of fossils is called as palaeontology

70. *The number of chromosomes in a human gamete is _____*

23 chromosomes

71. *Which of the following is an example of genetic variation*

- A. One person has a scar but his friend doesn't*
- B. One person is older than the other*
- C. Rani eats meat but her sister Rama is a vegetarian*
- D. Two children have different eye colour*

Answer D

72. *In peas, a pure tall plant (TT) is crossed with a pure short plant(tt) the ratio of pure tall plants to pure short plants in F2 generation will be*

1:1

73. *Select the group which shares maximum number of common characters*

- A. Two individuals of a species*
- B. Two species of a genus*
- C. Two genera of a family*
- D. Two genera off two families*

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Answer A

74. In which type of reproduction exchange of genetic material takes place

Sexual Reproduction

75. What is the phenotypic ratio of the F₂ generation in dihybrid cross

9:3:3:1

76. If a trait A exists in 10% of a population of an asexually reproducing species and a trait B exists in 60% of the same population which trait is likely to have arisen earlier?

Trait B is likely to have arisen earlier than trait A in an asexually reproducing species

77. How does the creation of variations in species promote survival?

Variations in a species promote survival by helping organisms adapt to environmental changes, which can prevent extinction and allow the species to continue

78. Which section of DNA provides information for one protein

Gene

79. From the list given below select the character which can be acquired but not inherited

A. Colour of eyes

B. colour of skin

C. Texture of hair

D. size of body

Answer D

80. Define the term homozygous and heterozygous

Individuals carrying two identical alleles are known as homozygous while individual organisms bearing different alleles are known as heterozygous.

81. Which of the following groups contain only biodegradable item

A. Grass, flowers and leather

B. Grass, wood and plastic

C. fruit peels, cake and lime juice

D. Cake, wood and grass

Answer A

82. Which of the following constitutes a food chain

A. Grass, wheat and mango

B. Grass, goat and human

C. Goat, cow and elephant

D. Grass, Fish and goat

Answer B

83. Which of the following are environment friendly practices?

(a) Carrying cloth-bags to put purchases in while shopping

(b) Switching off unnecessary lights and fans

(c) Walking to school instead of getting your mother to drop on her scooter

(d) All of the above

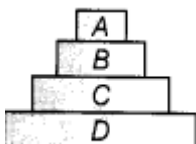
Answer:

(d) All of the above.

84. Define trophic level

Each step or level of the food chain forms a trophic level.

85. A teacher draws the pyramid of energy on board and writes A, B, C and D, in each trophic level as shown in the diagram given alongside. Which level represents the herbivores?



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- (a) A
- (b) B
- (c) C
- (d) D

Answer C

86. In a class activity, two students were asked to collect different items from their fellow mates and classify them as biodegradable and non-biodegradable. All the items have been identified except three. Find out which one is non-biodegradable among these?

- (a) Jute crafted bag
- (b) A sharpner
- (c) Empty fevistick
- (d) Both (b) and (c)

Answer:d

87. If a grasshopper is eaten by a frog, then the energy transfer will be from

- (a) producer to decomposer
- (b) producer to primary consumer
- (c) primary consumer to secondary consumer
- (d) secondary consumer to primary consumer

Answer c

88. In the given food chain, suppose the amount of energy at fourth trophic level is 5 kJ, what will be the energy available at the producer level?

Grass → Grasshopper → Frog → Snake → Hawk

Answer 5000 KJ

89. Which of the following will not be returned to the ecosystem and recycled?

- (a) carbon dioxide
- (b) heat energy
- (c) salts
- (d) urea

Answer b

90. In the following groups of materials, which group (s) contains only non-biodegradable items?

- (i) Wood, paper, leather
- (ii) Polythene, detergent, PVC
- (iii) Plastic, detergent, grass
- (iv) Plastic, bakelitC, DDT

- (a) (iii)
- (b) (iv)
- (c) (i) and (iii)
- (d) (ii) and (iv)

Answer d

91. Why are crop fields known as artificial ecosystems?

Crop fields are known as artificial ecosystems because they are man-made and some biotic and abiotic components are maintained, nourished and reaped by human beings.

92. What will happen if deer is missing in the food chain given below?

Grass → Deer → Tiger

- (a) The population of tiger increases.
- (b) The population of grass decreases.
- (c) Tiger will start eating grass.
- (d) The population of tiger decreases and the population of grass increases.

Answer d

93. The amount of energy that flows from one trophic level to another in a food chain is _____

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10%

94. The manufacturing of chlorofluorocarbons free refrigerators is mandatory throughout the world how does this help to prevent ozone depletion

- A. This will help to convert oxygen molecules into ozone
- B. This will help to convert the CFC'S into Ozone molecules
- C. This will reduce the production of CFC'S from oxygen molecules
- D. This will reduce the release of CFC'S that reacts with Ozone molecules

Answer D

95. Ozone hole may cause

- A. Mutations
- B. Global warming
- C. Skin cancer
- D. All of these

Answer D

96. The process of breaking down of organic matter by microorganisms is called as _____
Decomposition

97. Expand UNEP and CFC

UNEP United Nations environment programme

CFC Chlorofluorocarbons

98. Which of the following are the main contributors of the E waste in the world

- A. Refrigerator/ freezers, washing machines, dishwashers
- B. Small household appliances (toasters, coffee makers, irons, hair dryers)
- C. Personal computer, telephones, mobile phones, laptops, printers, scanners, photocopiers
- D. Gas cylinder, chimneys and home appliances

I. Only A,B,C

II. Only A and B

III. Only A, C,D

IV. All the above

Answer I

99. What is the main problem caused by the use of pesticides

- A. The deform the gills of some fishes
- B. The Kill Silkworm
- C. Mosquitoes have become resistant to DDT
- D. Their residues persist in water and other components of the environment

Answer D

100. What are the problems caused by the non biodegradable waste that we generate?

Non-biodegradable waste can pollute the air, water, soil, and land. Burning non-biodegradable waste releases toxic chemicals into the air