Biology [Official]

CISCE

(English Medium)

Academic Year: 2023-2024

Date & Time: 18th March 2024, 11:00 am

Duration: 2h **Marks: 80**

1. Answers to this Paper must be written on the paper provided separately.
2. You will not be allowed to write during the first 15 minutes.
3. This time is to be spent reading the question paper.
4. The time given at the head of this Paper is the time allowed for writing the answer s.
5. Section A is compulsory. Attempt any four questions from Section B.
6. The intended marks for questions or parts of questions are given in brackets [ ].

SECTION-A (40 Marks) (Attempt all questions from this Section.)

Question 1. Select the correct answers to the questions from the given options. (Do not copy the questions, write the correct answer only).

1.1. Duplicated chromosomes are joined at a point termed ______.

1. Centrosome
2. Centromere
3. Centriole
4. Chromatid

Solution

Duplicated chromosomes are joined at a point termed centromere.

Explanation:

Until they are split during cell division, the centromere is the point of attachment between the two sister chromatids of a chromosome.

1.2. The process of conversion of ADP to ATP during photosynthesis is called ______.

1. Photolysis
2. Phagocytosis
3. Photophosphorylation
4. Polymerisation

Solution

The process of conversion of ADP to ATP during photosynthesis is called **photophosphorylation**.

Explanation:

A phosphate group (a process known as phosphorylation) transforms adenosine diphosphate into adenosine triphosphate. Photophosphorylation (photo means light) is the process by which this is accomplished with light energy during photosynthesis.

1.3. The process in which water is lost from the margins of strawberry leaves is ______.

1. Osmosis
2. Imbibition
3. Diffusion
4. Guttation

Solution

The process in which water is lost from the margins of strawberry leaves is **guttation**.

Explanation:

Guttation is the process by which liquid water droplets from the leaves are removed. This morning process takes place on the leaves margins of the strawberry plant through pores known as hydathodes.

1.4. The hormone that affects urination is ______.

1. Adrenaline
2. Vasopressin
3. Oestrogen
4. Thyroxine

Solution

The hormone that affects urination is **vasopressin**.

Explanation:

Secreted by the posterior lobe of the pituitary gland, vasopressin, sometimes known as antidiuretic hormone (ADH), regulates the osmotic pressure of bodily fluids. It stimulates water reabsorption in the nephrons and returns it into the body's blood flow. Less quantity and concentrated urine are thus produced in the kidneys.

1.5. Which one of the following helps in the opening of stomata?

1. Cobalt ions
2. Potassium ions
3. Magnesium ions
4. Aluminium ions

Solution

Potassium ions

Explanation:

Potassium ions play a part in opening and closing the stomata holes. Guard cells become hypertonic and water enters them as the K+ ion concentration rises there. This swells them, and when the membrane stretches, the stomata pore opens. In the shutting of stomata, the reverse occurs. K+ ion concentration lowers; the cell becomes hypotonic and water leaves the cell, flaccid.

1.6. A zygote which has Y chromosome inherited from the father will develop into a ______.

1. Will depend on the chromosome inherited from the mother
2. Girl
3. Either boy or a girl
4. Boy

Solution

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

Explanation:

The combination will have XY set in this regard because the mother always carries the X chromosome. That will be a boy, then.

1.7. The ear ossicle that transports sound vibrations to the inner ear:

1. **Stapes**
2. Mal
3. Incus
4. Cochlea

Solution

Stapes

Explanation:

The innermost bone of the middle ear, the stapes, links it to the inner ear. From the malleus and incus, the sound waves proceed to stape into the inner ear. The cochlea is not an ossicle or ear.

1.8. If a person has a heart attack, what must be done immediately?

P. Loosen his/her clothing

Q. Make him/her lie down in an airy room

R. Rush him/her to the hospital

S. Engage him/her in a conversation

1. P and Q
2. P and S
3. R and S
4. **P, Q and R**

Solution

P, Q and R

Explanation:

In the case of a heart attack, the patient must be made comfortable and ventilated properly. Any form of stress should be avoided. As a result, loosening tight clothes and causing him/her to lie down in an airy environment is correct. Also, we should rush the guy to the hospital. However, conversing with others can exhaust and stress a person.

1.9. Adjusting the focal length of the eye lens to view objects at different distances is done by ______.

1. Cornea
2. Iris
3. Ciliary muscles
4. Sclera

Solution

Adjusting the focal length of the eye lens to view objects at different distances is done by **ciliary muscles**.

Explanation:

Ciliary muscles both contract and relax to respectively make the eye lens thicker and flattening. This alters the eye lens's focus length and enables variable distance object viewing.

1.10. Four friends P, Q, R and S were discussing the examples of genetic disorders. The examples they quoted were as follows:

P. Colour blindness and Malaria

Q. Albinism and Cholera

R. Haemophilia and Colour blindness

S. Haemophilia and Albinism

Who gave the correct examples?

1. P and Q
2. R and S
3. P and R
4. Q and S

Solution

R and S

Explanation:

Malaria and cholera are examples of acquired diseases that result from bacterial infections. Genetic disorders include hemophilia (genetic anemia resulting from a lack of blood clotting capacity), color blindness (a genetic deficiency of distinguishing specific hues) and albinism (an inherited disorder of skin pigmentation or very light pale skin and hair).

1.11. Osmosis takes place when there is ______.

1. A freely permeable membrane
2. A cell wall
3. **A selectively permeable membrane**
4. An impermeable membrane

Solution

Osmosis takes place when there is **a selectively permeable membrane**.

Explanation:

On a semipermeable membrane, osmosis is the flow of solvent molecules along a concentration gradient. Solute molecules cannot pass over this membrane.

1.12. A male gorilla has 48 chromosomes in each of its body cells. How many chromosomes will each of the sperms have?

1. **24**
2. 48
3. 17

4. 16

Solution

24

Explanation:

In gametes, chromosomes split in half. 48 chromosomes will thus be halved and just 24 will be found in a gorilla sperm cell.

1.13. Assertion (A): Sympathetic nervous system prepares the body for violent action against abnormal conditions.

Reason (R): Sympathetic nervous system accelerates heartbeat.

Which of the following is correct?

1. Both A and R are True.
2. A is True, R is False.
3. A is False but R is True.
4. Both A and R are False.

Solution

Both A and R are True.

Explanation:

Catecholamine hormones (epinephrine and nor-epinephrine) released by sympathetic nerve systems raise heart rate. Our body so gets ready for fight or flight and becomes hyperactive or violent under uncommon circumstances.

1.14. Birth rate is the number of live births per thousand persons in ______.

1. 1 year
2. 2 years
3. 10 years
4. 20 years

Solution

Birth rate is the number of live births per thousand persons in **1 year**.

Explanation:

Birth rate, sometimes referred to as natality, is the total number of live human births during a particular period divided by the period's length expressed in one year.

1.15. Industrial melanism was observed in ______.

1. Mice
2. Peppered Moth
3. House Flies
4. Crow

Solution

Industrial melanism was observed in **peppered moth**.

Explanation:

A perfect example of natural selection, industrial melanism shows how dark-coloured peppered moths evolved in response to air pollution in Great Britain during the Industrial Revolution.

Question 2.

2.1.

2.1.a. Name the following:

Unicellular outgrowths from the epidermis of roots.

Solution

Root hair

Explanation:

From the root epidermis, these unicellular outgrowths help to draw minerals and water from the ground.

2.i.b Name the following:

A defect in our eyes in which some parts of the object are in focus while the other parts are blurred.

Solution

Astigmatism

Explanation:

It happens if the cornea or lens of the eye has uneven curves, resulting in vision blurriness due to the egg-shaped surface rather than the round shape.

2.i.c Name the following:

The tropic movement of plant parts in response to chemicals

Solution

Chemotropism

Explanation:

Chemotropism is the movement of plants brought on by chemical stimulation. Negative chemotropism results from a growth response away from the stimulus; positive chemotropism results from a growth response directed towards the stimulus. One such is the development of pollen tubes towards ovules.

2.i.d Name the following:

The main nitrogenous waste formed in the body.

Solution

Urea

Explanation:

It is the main waste product classified as nitrogenous. Together with other protein waste products, it is generated in the liver and removed by the kidneys as urine.

2.i.e Name the Following:

The process of attachment of fertilized ovum to the uterine wall.

Solution

Implantation

Explanation:

The sperm and egg unite in fertilisation to create a zygote in the fallopian tube; this zygote grows into a morula as it passes through it. Once in the uterus, the morula changes into a blastocyst. The blastocyst next settles within the uterine wall.

2.2.

2.2.a Arrange and rewrite the terms in group in correct order to be in a logical sequence, beginning with the term that is underlined:
<u>Australopithecus</u>, Cro-Magnon, Homo erectus, Neanderthal man.

Solution

Australopithecus, Homo erectus, Neanderthal man, Cro-Magnon

Explanation:

This is the series of stages in which modern man evolved.

2.2.b. Arrange and rewrite the term in group in correct order to be in a logical sequence, beginning with the term that is underlined:
Pupil, <u>Aqueous humour</u>, Retina, Vitreous humour.

Solution

Aqueous humour, Pupil, Vitreous humour, Retina

Explanation:

This is the order in which parts of eye develop from outside inside.

2.2.c. Arrange and rewrite the terms in group in the correct order to be in a logical sequence, beginning with the term that is underlined:
Effector, <u>Receptor</u>, Motor neuron, Sensory neuron.

Solution

Receptor, Sensory neuron, Motor neuron, Effector.

Explanation:

This is the series of steps involved in a reflex arc.

2.2.d. Arrange and rewrite the terms in group in correct order to be in a logical sequence, beginning with the term that is underlined:
Loop of Henle, Distal convoluted tubule, <u>Bowman's Capsule</u>, Proximal convoluted tubule.

Solution

Bowman's capsule, Proximal convoluted tubule, Loop of Henley, Distal convoluted tubule

Explanation:

As the filtrate passes through, this is the nephron's sequential arrangement of parts.

2.2.e. Arrange and rewrite the terms in group in correct order to be in a logical sequence, beginning with the term that is underlined:
Water vapour, <u>Soil water</u>, Leaves, Ascent of Sap.

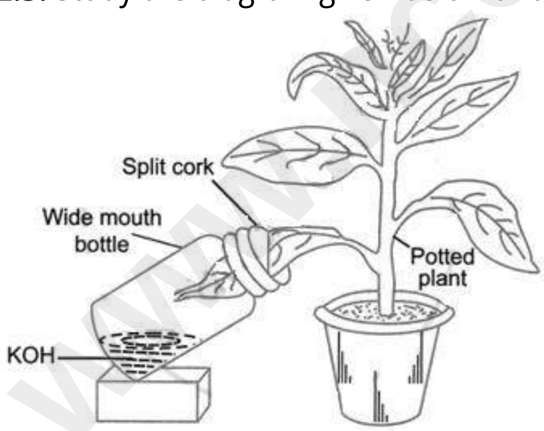
Solution

Soil water, Ascent of sap, Leaves, Water vapour.

Explanation:

This is the process by which water moves from the soil to the tip of the plant.

2.3. Study the diagram given below and fill in the blanks with suitable words:



In order to prove that carbon dioxide is necessary for

(a) ______, a potted plant is placed in dark for 48 hours to (b) ______ the leaves. A part of a leaf is inserted into a conical flask containing potassium hydroxide solution. This is to absorb (c) ______ from the flask. The plant is then placed in sunlight for a few hours. The experimental leaf is tested for starch. The part of the leaf that was inside the conical flask turns (d) ______, whereas the part of the left outside turns (e) ______ in colour.

Solution

(a) **Photosynthesis**, a potted plant is placed in dark for 48 hours to (b) **destarch** the leaves. A part of a leaf is inserted into a conical flask containing potassium hydroxide solution. This is to absorb (c) **carbon dioxide** from the flask. The plant is then placed in sunlight for a few hours. The experimental leaf is tested for starch. The part of the leaf that was inside the conical flask turns (d) **colourless**, whereas the part of the left outside turns (e) **blue-black** in colour.

2.4.

2.4.a. Select the odd one from the following:

1. Prothrombin
2. Thrombin
3. Fibrinogen
4. Albumin

Solution

Albumin

Explanation:

Albumin (the others are blood coagulation factors). Albumin is a blood protein that isn't involved in blood coagulation.

2.4.b. Choose the odd one out from the following terms and name the category to which the others belong:

1. Tonsils
2. Glomerulus
3. Spleen
4. Lymph nodes

Solution

Glomerulus

Explanation:

Glomerulus (the rest are lymph nodes in the human body). The glomerulus is a section of the nephron.

2.4.c Choose the odd one out from the following terms and name the category to which the others belong:

1. Neutrophils
2. Basophils
3. Monocytes
4. Eosinophils

Solution

Monocytes

Explanation:

Granulocytes; all other types are monocytes. An agranulocyte is a monocyte.

2.4.d. Choose the odd one out from the following terms and name the category to which the others belong:

1. Leaves
2. Styrofoam
3. Grass
4. Cow Dung

Solution

Styrofoam

Explanation:

Styrofoam (all others are biodegradable).

2.4.e. Choose the odd one out from the following terms and name the category to which the others belong:

1. Pulmonary artery
2. Renal artery
3. Coronary artery
4. Hepatic artery

Solution

Pulmonary artery

Explanation:

Pulmonary artery (the others carry oxygenated blood; renal artery to the kidneys, coronary artery to the heart, hepatic artery to the liver). Deoxygenated blood is carried by the pulmonary artery to the lungs.

2.5. Match the items given in Column I with the most appropriate ones in Column II and rewrite the correct matching pairs:

	Column I		**Column II**
(a)	Leydig Cells	1.	Lack of thyroxine in children
(b)	Stoma	2.	12 pairs
(c)	Ova	3.	Testosterone
(d)	Cranial nerve	4.	Diffusion of respiratory gases
(e)	Cretinism	5.	Haploid cells
		6.	31 Pairs
		7.	Diploid cells

Solution

	Column I		**Column II**
(a)	Leydig Cells	3.	Testosterone
(b)	Stoma	4.	Diffusion of respiratory gases
(c)	Ova	5.	Haploid cells
(d)	Cranial nerve	2.	12 pairs
(e)	Cretinism	1.	Lack of thyroxine in children

Explanation:

a. **Leydig cells:** The main function of these cells is to secrete androgens, such as testosterone (a male sex hormone).

b. **Stoma:** The stoma facilitates gas transfer between the plant's leaves and the atmosphere.

c. **Ova:** These are female gametes, which are haploid.

d. **Cranial nerves:** Higher vertebrates have twelve pairs of cranial nerves.

e. **Cretinism:** It is a disorder that causes aberrant mental and physical growth in children as a result of a shortage of thyroid gland hormones, or thyroxine.

SECTION-B (40 Marks) (Attempt any four questions from this Section.)

Question 3.

3.1. Expand the abbreviation - NADP.

Solution

NADP: Nicotinamide Adenine Dinucleotide Phosphate

3.2. Mention two adaptations in roots for absorption of water from the soil.

Solution

The root hair cell's vacuole contains water. The root hair can absorb water from the soil in two ways:

1. The presence of several elongated root hairs increases the overall root surface area available for water absorption.
2. Their thin walls promote water intake via osmosis.

3.3. Differentiate between Afferent arteriole and Efferent arteriole.

Solution

Afferent arteriole	Efferent arteriole

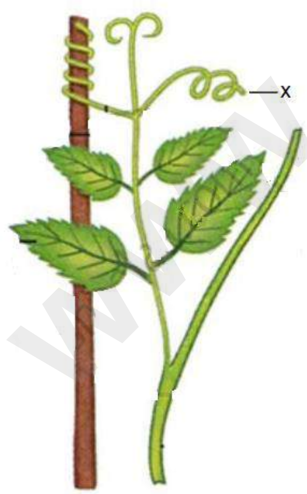
It brings oxygenated blood into the kidney.	It carries deoxygenated blood away from the kidney.
It carries blood to the glomerulus of the nephron.	It takes the blood away from the glomerulus.
It has a larger diameter.	It has a narrower diameter.
It is a branch of the renal artery and so it carries blood containing more water and nitrogenous wastes.	Efferent arterioles join to form renal veins and so they carry filtered blood back to circulation, containing much less water and nitrogenous waste.

3.4. Give two examples of water pollutants.

Solution

Chemical fertilizers and pesticides, DDT (dichloro-diphenyl-trichloroethane), lead and industrial effluents, oil spills.

3.5. Ali has some pea plants in his garden which need a support to grow as seen in the picture given below:



a. Name the phenomenon depicted by the shoot in the given figure.

b. Define the above phenomenon.

c. Write the name of the part marked X.

Solution

a. Thigmotropism. Tendrils coiling towards objects they come into contact with show thigmotropism.

b. In plants, thigmotropism is a tropic movement in response to an external stimulus, sometimes referred to as a contact stimulus.

c. The part marked X is Leaf Tendril.

Question 4.

4.1. Give the biological term for the surgical method of contraception in human females.

Solution

Tubectomy. This surgical operation closes the fallopian tubes, so the egg from the ovary cannot reach the uterus.

4.2. State two harmful effects of acid rain on the environment.

Solution

Acid rain causes damage to plants, fresh water supplies, soil, destruction of insects and aquatic life, corrosion of steel infrastructure like bridges, weathering of stone buildings and sculptures and detrimental effects on human health.

4.3. Enlist different advantages of transpiration.

Solution

1. It removes excess water.
2. It aids in the passive absorption of soil water and nutrients.
3. It promotes sap ascent.
4. Because stomata are open, gaseous exchange is enhanced, which is essential for photosynthesis and respiration.
5. It keeps the turgor of the cells intact.
6. Transpiration aids in lowering the temperature of the leaf and providing a cooling effect.

4.4. Write any two objectives of Swachh Bharat Abhiyan.

Solution

Objectives of the Swachh Bharat Abhiyan:

1. Increasing the quality of life in rural areas by encouraging cleanliness and personal hygiene.
2. Bringing open defecation to an end across the country.
3. Building 90 million toilets in rural regions with an estimated budget of Rs. 1.96 lakh crore.
4. Promoting adjustments in people's attitudes towards sanitation and hygiene.
5. Encouraging communities to adopt proper sanitation methods for enhanced health.
6. Educating people about the relationship between sanitation, health, and well-being.
7. Encouraging and acknowledging technological advances in sanitation and hygiene.

4.5. Mohan is fond of playing basketball. His concentration is on shooting the ball into the opponent's basket as given in the picture.

a. Which part of the brain helps Mohan to concentrate in putting the ball into the basket?
b. Name the sense organ that helps to gauge the distance between the ball and the basket.
c. Name the part of the brain that co-ordinates all the voluntary muscles of his body.

Solution

Mohan is fond of playing basketball. His concentration is on shooting the ball into the opponent's basket as given in the picture.

a. Which part of the brain helps Mohan to concentrate in putting the ball into the basket?
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c. Name the part of the brain that co-ordinates all the voluntary muscles of his body.

Question 5.

5.1. Name the type of nerve which has the fibres of both sensory and motor neurons.

Solution

Mixed nerves

Explanation:

A mixed nerve includes both sensory (afferent) and motor (efferent) nerve fibres. All 31 spinal nerve pairs are mixed nerves, as are four of the twelve cranial nerves.

5.2. Differentiate between Australopithecus and Modern man based on body hair.

Solution

	Australopithecus	**Modern Man**
1.	Australopithecus, our distant ancestors, had a significant amount of body hair covering their entire bodies.	Modern humans have significantly less body hair compared to Australopithecus.

2.	This dense fur provided them with protection against the elements and predators, much like how fur coats keep us warm in the winter.	This evolutionary ·change is attributed to the development of clothing and the migration of early humans to different climates as well as protection.

5.3. Give suitable biological reasons for the following statement:

The birth rate in India is very high.

Solution

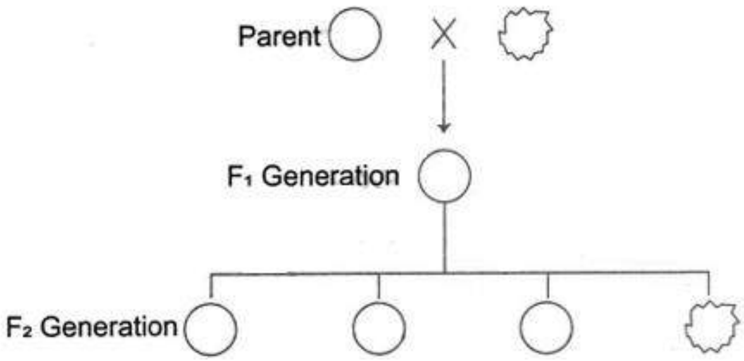
1. **Illiteracy:** Many people in rural regions are illiterate, uneducated, and superstitious, with limited knowledge of the human reproductive system.
2. **Religious and social customs:** Cultural beliefs and traditions can deter people from following family planning measures.
3. **Desire for a male child:** Many Indian households emphasise male offspring for carrying on the family name and supporting elderly parents, which leads to the birth of several children in search of a son.
4. **Inadequate access to family planning services:** The scarcity of contraceptives, combined with poverty and a lack of information, prevents people from choosing small family practices, adding to the persistently high birth rate.

5.4. Give the exact location of the pericardium.

Solution

Outside our chest cavity, the pericardium surrounds the heart walls. It is a double-layered membrane that protects the heart from shock and injury.

5.5. Given below is a schematic representation of the inheritance of the shape of the seeds of garden peas. Answer the questions that follow:



a. Which is the dominant and recessive allele of the trait?
b. What does the ratio 3 : 1 in the F_2 generation represent?
c. State Mendel's Law of Dominance.

Solution

a. The dominant allele is R (for round seeds), while the recessive allele is r (for wrinkled seeds). This is obvious because only round seeds develop in F_1, whereas the wrinkled characteristic is entirely concealed.

b. 3:1 indicates that three of the four seeds are spherical and one is wrinkled. That is, 75% of the F_2 progeny have round seeds (the dominant characteristic), but only 25% have wrinkled seeds (the recessive trait).

c. Mendel's law of dominance states that if an organism has two distinct alleles for a trait, the dominant allele will be expressed, hiding the recessive allele. This means that only the dominant allele determines the organism's phenotype.

Question 6.

6.1. Define the following terms:

Diapedesis

Solution

Diapedesis is the movement of white blood cells from lymph capillary walls to neighbouring tissues, often for immunological defence.

6.2. Distinguish between Diabetes mellitus and Diabetes insipidus (endocrine gland concerned).

Solution

Feature	Diabetes mellitus	Diabetes insipidus

Endocrine Gland Concerned	Pancreas (Islets of Langerhans)	Pituitary Gland (Posterior part)
Hormone Involved	Insulin	Antidiuretic Hormone (ADH), also known as vasopressin
Primary Dysfunction	Inability to produce or use insulin effectively, leading to high blood glucose levels	Inability to regulate water balance, leading to excessive urination and thirst

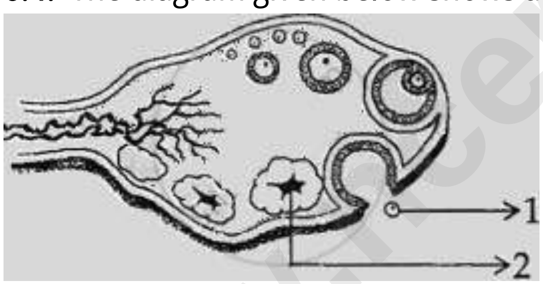
6.3. Give a scientific reason:

Carbon monoxide is highly dangerous when inhaled.

Solution

Carbon monoxide, when inhaled and absorbed into the blood, binds with haemoglobin and forms an irreversible complex called carboxyhaemoglobin. The formation of this complex reduces the oxygen-carrying capacity of the blood. Hence, carbon monoxide is highly dangerous when inhaled.

6.4. The diagram given below shows a section of the human ovary.



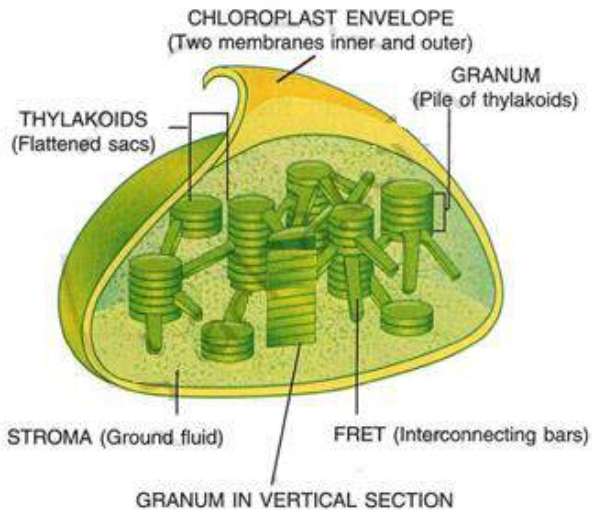
a. Name the process for the release of the part labelled 1.

b. Write the name of the structure marked 2.

Solution

1. Ovulation. It is the release of a mature egg from the ovary into the fallopian tube.
2. Corpus luteum. The corpus luteum appears soon after ovulation, when an egg is released from the ovary. The corpus luteum's primary role is to secrete hormones (progesterone) that prepare the uterus to sustain growth.

6.5. Draw a neat, labelled diagram of a chloroplast.



Question 7.

7.1. Define the following:

Hormone

Solution

Hormones are chemical messengers created by the endocrine glands and transported through the bloodstream to govern body functions such as development, metabolism, reproduction and mood by interacting with specific target cells.

7.2.

7.2.a. Which part of the human ear gives 'Static balance' to the body?

Solution

The utricle and saccule of the vestibular system (part of the inner ear) are in charge of static balance. They detect linear movements and the position of the head relative to gravity, showing whether you are upright, slanted, or lying down.

7.2.b. Which part of the human ear gives ' Dynamic balance' to the body?

Solution

The semicircular canals in the inner ear are the primary source of dynamic balance. They detect rotational head motions and assist you in maintaining your balance while in motion, such as when walking, running, or turning quickly.

7.3. Describe the structural differences between an artery and a vein.

Artery	**Vein**
An artery is a vessel that carries blood away from the heart towards any organ.	A vein is a vessel which conveys the blood away from an organ towards the heart.
An artery has thick muscular walls.	A vein has thin muscular walls.
It has a narrow lumen.	It has a broad lumen.
There are no valves.	Thin pocket-shaped valves are present in the veins.
Arteries progressively decrease in size and branch to form arterioles. Arterioles further break up to form capillaries.	Capillaries unite to form branches called Venules. Venules further unite to form veins.

7.4. Write any two limitations of using a Ganong's potometer to demonstrate the uptake of water.

Solution

The limitations of using Ganong's potometer to demonstrate the uptake of water are:

1. One of the biggest disadvantages is that correctly setting up and calibrating can take some time and effort, which can be inconvenient if you need to gather data rapidly.
2. Because the potometer relies on the plant's water intake to measure transpiration, variations in soil moisture or root pressure can skew your results.
3. Air bubbles in the tubing or leaks in the system can potentially interfere with your measurements.

7.5. A teacher drew the diagram of the heart on the blackboard and told the students to copy it in their notebooks. Mahesh couldn't see the diagram clearly as it appeared blurred to him.

a. Name the defect of the eye Mahesh is suffering from.
b. Where is the image formed in this defect?
c. Mahesh consults an eye doctor and is prescribed suitable lenses to correct the defect. Which type of lens do his spectacles have?

Solution

a. Myopia or near-sightedness. Individuals suffering from this illness have difficulty seeing distant objects clearly, resulting in fuzzy vision for faraway objects while keeping crisp focus on close ones.
b. The image is formed in front of the retina. This issue arises when the eye's power is excessive, which is typically a result of the crystalline lens's shorter focal length.
c. A concave lens. A concave lens, which diverges incoming rays and focuses them on the retina, is widely used to rectify this issue.

Question 8.

8.1. Define the following term:

Ultrafiltration

Solution

Ultrafiltration is the process of filtering blood through the glomerulus. Because of the tiny efferent arteriole, urea-containing blood enters the glomerulus via the afferent arteriole at high pressure. The high pressure causes the liquid component of the blood to filter from the glomerulus into the renal tubule, resulting in the glomerular filtrate. The filtrate comprises water, urea, salts, glucose and other plasma solutes, whereas blood cells, proteins and big molecules remain in the glomerulus. As a result, the blood that the efferent arteriole transports is relatively concentrated.

8.2.

8.ii.a Name the mineral elements required for the clotting of blood.

Solution

Calcium

Explanation:

Calcium is an important mineral for blood coagulation. Blood platelet release of thromboplastin, which serves as a cofactor for vitamin K, which aids in activating blood coagulation factors and promoting blood clotting, causes it.

8.ii.b Name the mineral element required for the synthesis of thyroxine.

Solution
Iodine

Explanation:
Iodine is the primary component of the thyroxine protein. Thyroxine cannot establish its structure without the presence of iodine.

8.3. State any two harmful effects of noise pollution on human health.

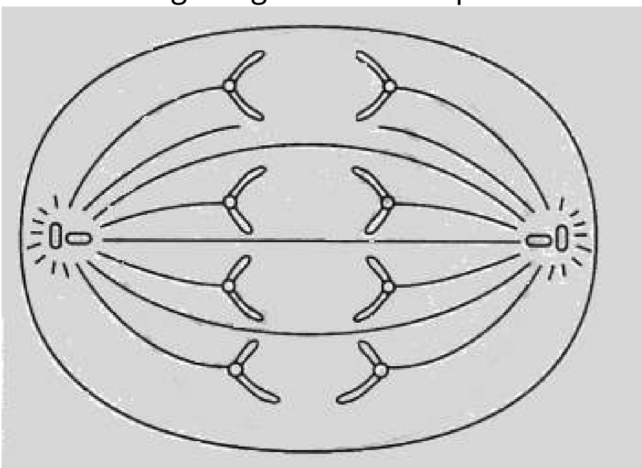
Solution
Harmful effects of noise pollution on human health:

1. Prolonged exposure to high-decibel noise damages the eardrums and can cause permanent hearing impairment.
2. Noise pollution can lead to high blood pressure (hypertension), constant headaches and a lack of concentration.
3. It interrupts the thought process, resulting in low efficiency at work.
4. It disturbs sleep, which causes irritability and nervous disorders.
5. In urban areas, noise pollution from traffic, construction sites and industrial activities can disrupt wildlife habitats and interfere with their ability to communicate and find food.

8.4. Why are RBCs efficient in their functions though they lack nucleus and mitochondria?

Solution
A mature mammalian red blood cell lacks a nucleus or mitochondria. The absence of a nucleus increases the surface area to volume ratio of red blood cells, allowing for more oxygen absorption. Furthermore, the absence of a nucleus reduces cell size, facilitating smooth passage through blood veins and allowing for a higher cell count in a tight space. Without mitochondria, the cell cannot use the ingested oxygen for respiration, hence increasing oxygen transport efficiency by guaranteeing that all absorbed oxygen is transferred without loss. Erythrocytes produce and store high-energy phosphates through the anaerobic transformation of glucose.

8.5. The diagram given below represents a stage in mitosis.



a. Identify the stage given above.
b. Give one reason to support your answer in (a).
c. Mention the number of chromosomes given in the diagram.

Solution

a. Anaphase
b. Anaphase is characterised by the splitting of centromeres and the separation of chromatids, which move to opposite poles. This is readily obvious in the image provided. Hence, it is anaphase.
c. The image contains eight chromosomes. The parent cell contained four chromosomes, which duplicated throughout the synthesis phase. During anaphase, they break and divide themselves evenly between the two daughter nuclei, resulting in each new cell having the same four chromosomes as the original.