ICSE 2025 EXAMINATION

Sample Question Paper - 16

BIOLOGY

Time: 2 Hours. **Total Marks: 80**

General Instructions:

1. *Answers to this paper must be written on the paper provided separately.*
2. *You will be not allowed to write during first 15 minutes.*
3. *This time is to be spent in reading the question paper.*
4. *The time given at the head of this paper is the time allowed for writing the answers.*

Section A** is compulsory. Attempt any **four questions** from **Section B.

The intended marks for questions or parts of questions are given in brackets [ ]

SECTION A

(Attempt all questions from this Section.)

Question 1

Choose the correct answers to the questions from the given options.

(Do not copy the question, write the correct answer only.) **[15]**

(i) Given below are few characteristics which describe a human ancestor.

I. Absolute bipedalism

II. Successors of *Homo erectus*

III. Strong, lower jaw with almost no chin

IV. Semi-erect, stooping posture

Based on the above description, identify the human ancestor.

1. *Neanderthal* man
2. *Cro-magnon* man
3. *Homo habilis*
4. *Homo sapiens sapiens*

(ii) The instrument used to demonstrate geotropism is

1. Manometer
2. Thermostat
3. Clinostat
4. Barometer

(iii) The centromere division occurs during

1. Prophase
2. Metaphase
3. Anaphase
4. Telophase

(iv) **Assertion (A):** Population density is the number of individuals in an area of 100 square kilometres per year.
Reason (R): Population density gives us an idea of all the living organisms of different species in a particular area every year.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(v) The median or cochlear canal is filled with

1. Endolymph
2. Perilymph
3. Exolymph
4. Neurilymph

(vi) **Assertion (A):** The normal pH of urine is 6.
Reason (R): Protein diet makes the urine more alkaline while vegetable diet makes it more acidic.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(vii) A rise in the blood pressure above 140/90 is termed as

1. Myocardial infarction
2. Hypertension
3. Hypotension
4. Atherosclerosis

(viii) **Assertion (A):** The arrangement of white and gray matter is the same in both brain and spinal cord.
Reason (R): Gray matter consists of cell bodies of the neuron, whereas white matter contains the axons of the nerve cells. One region is termed as the cortex and the other is medulla.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(ix) Which hormone is responsible for the ossification of bones?

1. Thyroxine
2. Insulin
3. Calcitonin
4. Somatotropin

(x) A pea plant shows the genetic makeup TtRr. How will the plant appear externally?

1. Tall with wrinkled seeds
2. Tall with round seeds
3. Dwarf with wrinkled seeds
4. Dwarf with round seeds

(xi) Desert plants tend to have thicker cuticles to cut down the rate of

1. Transpiration
2. Guttation
3. Photosynthesis
4. Respiration

(xii) The inorganic ion present in chlorophyll is

1. Manganese
2. Iron
3. Magnesium
4. Chlorine

(xiii) Richa's father had fully stocked his basement godown with bags containing foodgrains. However, due to heavy rains, the godown got flooded with rainwater and their walls developed cracks. This phenomenon can be attributed to

1. Guttation
2. Osmotic pressure
3. Turgor pressure
4. Root pressure

(xiv) **Assertion (A):** Leydig cells produce oestrogen and progesterone.
Reason (R): Leydig cells are also called interstitial cells, which are located as packing tissues between the coils of seminiferous tubules.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(xv) Rajeev's mother had ordered disposable plastic plates for his birthday to reduce the cleaning work. However, Rajeev convinced his mother that instead of plastic, they should opt for paper plates. What could be the reason behind not using disposable plastic plates?

1. They choke landfills.
2. They are ingested by marine animals.
3. They contaminate soil and water resources.
4. All of these

Question 2

(i) **Name the following:** **[5]**

(a) The canal through which the testes descend into the scrotum just before birth in a human male child.

(b) The part of the brain where the respiratory centre is located.

(c) The process of passing out urine from the body.

(d) An instrument used to find the rate of transpiration in plants.

(e) The condition of a cell in which the cell contents are shrunken.

(ii) **Given below are five sets with four terms each. In each set, one term is odd. Choose the odd one out from the terms given and name the category to which the other three belong.** **[5]**

Set	Odd Term	Category
(a) Myopia, Cataract, Hypermetropia, Cretinism		
(b) Blinking, Knitting, Crying, Blushing		
(c) Steroids, Cortisone, Testosterone, Adrenaline		
(d) Tea leaves, Nylon, Wood, Animal bones		
(e) Uterus, Cervix, Fallopian tube, Ureter		

(iii) **Given below are five sets of terms. In each case, arrange and rewrite each set so that the terms are in a logical sequence.** **[5]**

(a) *Homo erectus*, *Homo sapiens*, *Australopithecus*, *Cro-Magnon*, *Neanderthal man*

(b) Graafian follicle, Uterus, Funnel of oviduct, Fallopian tube, Ovum

(c) Soil water, Root hair, Xylem, Cortex, Endodermis

(d) Association neuron, Effector, Motor neuron, Receptor, Sensory neuron

(e) Lens, Pupil, Conjunctiva, Yellow spot, Cornea

(iv) **The first pair in the following lists indicates the kind of relationship that exists between both items. Rewrite and complete the second pair on a similar basis.[5]**

(a) Monohybrid ratio : 3:1 :: Dihybrid ratio : _____.

(b) Mineralocorticoids : Aldosterone :: Sex corticoids : _____.

(c) Cranial nerves : Cranium :: Spinal nerves : _____.

(d) Response to light : Phototropism :: Response to chemicals : _____.

(e) Male : Scrotum :: Female : _____.

(v) **Define the following:** **[5]**

(a) Crossing over

(b) Reflex action

(c) Diapedesis

(d) Gestation

(e) Population density

SECTION B

(Attempt any four questions from this section.)

Question 3

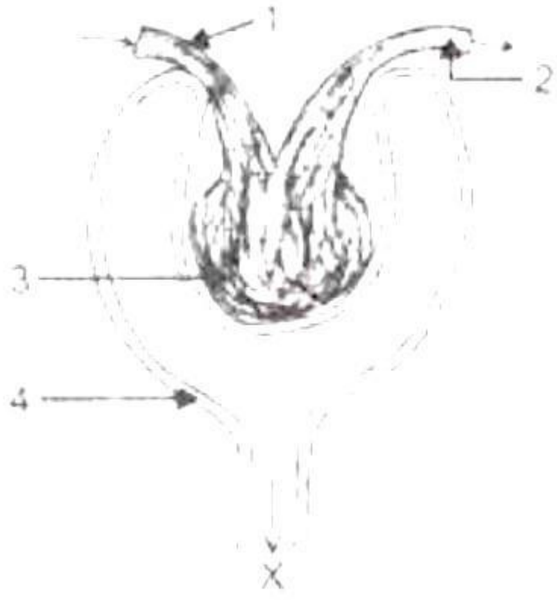
(i) When the temperature is high, the rate of transpiration is also high. [1]

(ii) Give two examples of hereditary traits. [2]

(iii) Differentiate between auxins and cytokinin's. [2]

(iv) Mention two adaptations in leaves to perform photosynthesis. [2]

(v) Study the given diagram and answer the questions that follow: [3]



(a) Label the parts 1-4.

(b) Which stage of urine formation takes place in part 3?

(c) Name the liquid flowing through 'X'.

Question 4

(i) Why are green plants called producers? [1]

(ii) How is the afferent arteriole different from the efferent arteriole? [2]

(iii) Which gland secretes glucagon? What is its effect on the blood sugar level? [2]

(iv) Mention any two functions of gibberellins. [2]

(v) The given figure represents an experimental set-up to demonstrate a certain phenomenon in plants. The set-up was kept in sunlight for about two hours. [3]

(a) What is the aim of this experiment?

(b) What do you observe in the experimental set-up after some time?

(c) Is there any control for this experiment? If so, mention it.

Question 5

(i) Name the two structures responsible for bringing about a change in the shape of the lens. [1]

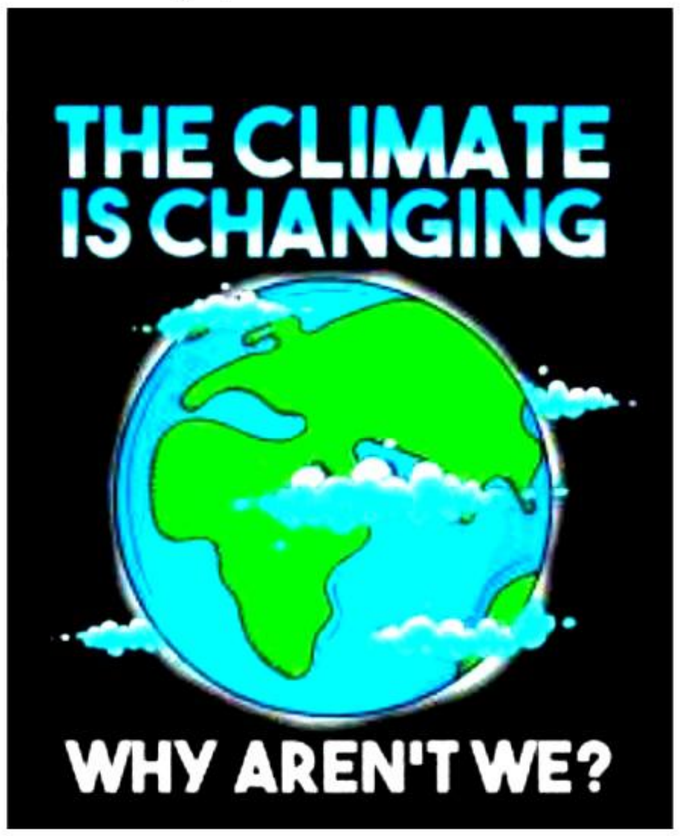
(ii) Name two famous biologists who proposed the 'Theories of Evolution.' [2]

(iii) What is adrenal virilism? What causes this condition? [2]

(iv) State two functions of aqueous humour. [2]

(v) The diagram given below depicts the climate change on planet Earth. [3]

Answer the following questions:



(a) Name the climatic phenomenon for an increase in the Earth's temperature.

(b) Mention *one* reason for this warming.

(c) What measure can be taken to prevent this climate change?

Question 6

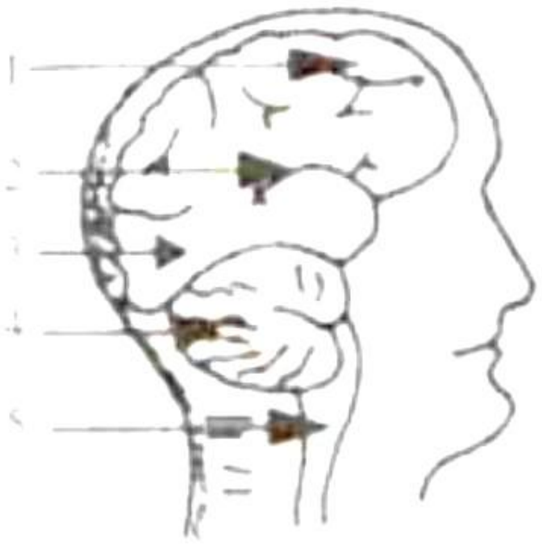
(i) What is the role of spindle fibres during cell division? [1]

(ii) Mention the two principles through which Lamarck explained his ideas. [2]

(iii) Addition of salt to pickles prevents the growth of bacteria. Explain by giving two suitable reasons. [2]

(iv) Why are leaves of xerophytic plants modified into spines? [2]

(v) The given figure represents the human brain. [3]



(a) Label the parts 1 – 5.

(b) How are neurons arranged in the brain?

(c) How is the brain protected?

Question 7

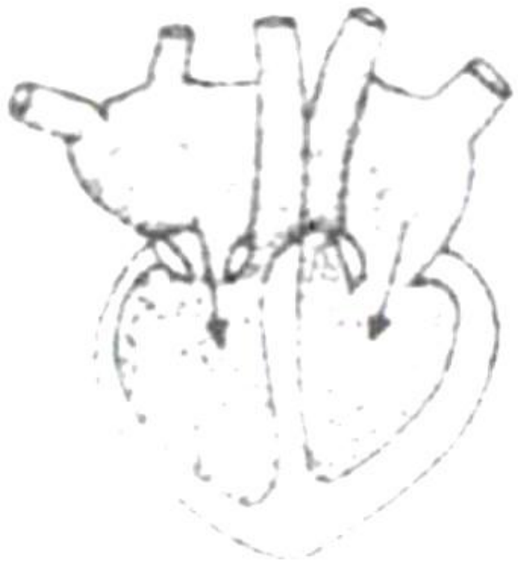
(i) How would you obtain a deplasmolysed cell from a plasmolysed one? [1]

(ii) Name two sex-linked inherited diseases and write their causes. [2]

(iii) State the significance of meiosis. [2]

(iv) Draw a diagram of the experimental set-up to show that O_2 is evolved during photosynthesis. [2]

(v) The given figure depicts a certain phase of the heart. Study it and answer the questions that follow: [3]



(a) Identify the phase of the heart.

(b) Give two reasons to support your answer.

(c) Define double circulation.

Question 8

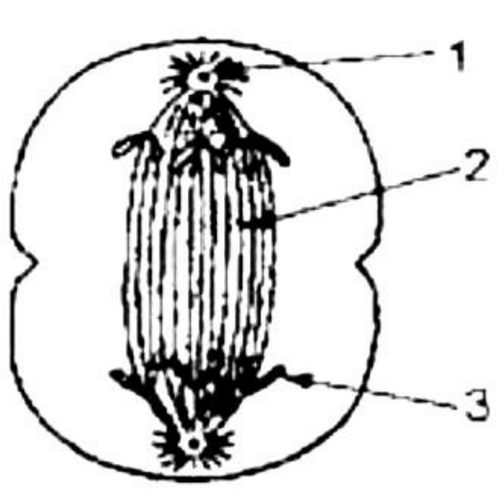
(i) Define – Biosynthetic phase of photosynthesis. [1]

(ii) A person exposed to bright outdoor light after leaving a dark cinema hall is unable to see properly. Why? [2]

(iii) State two advantages of a small family. [2]

(iv) Sterilisation in men means preventing the flow of sperms into the seminal vesicles by cutting or ligaturing the vas deferens. Is there a corresponding operation made in women? If yes, where? [2]

(v) The given diagram shows a stage during cell division. Study the diagram and answer the questions that follow: [3]



(a) Name the parts labelled 1, 2 and 3.

(b) Which stage of cell division is shown in the figure? Give reasons to justify your answer.

(c) Name the stage prior to this stage and draw a diagram to represent the same.

Solution

SECTION A

Solution 1

(i) *Neanderthal* man
(ii) Clinostat
(iii) Anaphase
(iv) Both A and R are False
(v) Endolymph
(vi) A is True and R is False
(vii) Hypertension
(viii) A is False and R is True
(ix) Thyroxine
(x) Tall with round seeds
(xi) Transpiration
(xii) Magnesium
(xiii) Turgor pressure
(xiv) A is False and R is True
(xv) All of these

Solution 2

(i)

(a) Inguinal canal
(b) Medulla oblongata
(c) Micturition
(d) Potometer
(e) Flaccid

(ii)

Set	Odd Term	Category
(a) Myopia, Cataract, Hypermetropia, Cretinism	Cretinism	Defects of the eye
(b) Blinking, Knitting, Crying, Blushing	Knitting	Natural reflexes
(c) Steroids, Cortisone, Testosterone, Adrenaline	Steroids	Hormones
(d) Tea leaves, Nylon, Wood, Animal bones	Nylon	Biodegradable wastes
(e) Uterus, Cervix, Fallopian tube, Ureter	Ureter	Parts of the female reproductive system

(iii)

(a) *Australopithecus*, *Homo erectus*, *Neanderthal man*, *Cro-Magnon*, *Homo sapiens*
(b) Graafian follicle, Ovum, Funnel of oviduct, Fallopian tube, Uterus
(c) Soil water, Root hair, Cortex, Endodermis, Xylem
(d) Receptor, Sensory neuron, Association neuron, Motor neuron, Effector
(e) Conjunctiva, Cornea, Pupil, Lens, Yellow spot

(iv)

(a) Monohybrid ratio : 3:1 :: Dihybrid ratio : 9:3:3:1
(b) Mineralocorticoids : Aldosterone :: Sex corticoids : Testosterone
(c) Cranial nerves : Cranium :: Spinal nerves : Spinal cord
(d) Response to light : Phototropism :: Response to chemicals : Chemotropism
(e) Male : Scrotum :: Female : Labia majora

(v)

(a) Crossing over**:** The process of exchange of genetic material between non-sister chromatids of homologous chromosomes is called crossing over.
(b) Reflex action**:** Reflex action is an automatic, quick, and involuntary action in the body brought about by a stimulus.
(c) Diapedesis**:** Diapedesis is the squeezing of leucocytes through the walls of the blood capillaries into the tissues.
(d) Gestation**:** Gestation is the time period required for the development of an embryo in the uterus.
(e) Population density: Population density is the number of individuals per square kilometre (km^2) at any given time.

SECTION B

Solution 3

(i) At higher temperature, the warm air in the atmosphere can hold more water. So, the rate of transpiration also increases. Therefore, when the temperature is high, the rate of transpiration is also high.

(ii) <u>Hereditary traits</u>:

1. Eyebrows - thin/thick
2. Ear lobes - free/attached

(iii) Differences between auxins and cytokinins:

Auxins	Cytokinins
1. Auxins are synthesized primarily in the shoots.	1. Cytokinins are synthesized primarily in the roots.
2. Promote cell elongation.	2. Stimulate cell division and cell enlargement.

(iv) Adaptations in leaves to perform photosynthesis:

1. Large surface area for maximum light absorption.
2. Transparent and waterproof cuticle and upper epidermis to allow light to enter freely.

(v)

(a) 1 - Afferent arteriole
2 - Efferent arteriole
3 - Glomerulus
4 - Bowman's capsule

(b) Ultrafiltration

(c) Glomerular filtrate

Solution 4

(i) Green plants prepare their own food using carbon dioxide and water in the presence of sunlight and chlorophyll. Since they provide food for all, green plants are called producers.

(ii) Differences between afferent arteriole and efferent arteriole:

Afferent arteriole	Efferent arteriole
1. Wider lumen	1. Narrow lumen.
2. Transports blood to the glomerulus.	2. Carries blood from the glomerulus.

(iii) Pancreas secretes glucagon. It stimulates the breakdown of glycogen in the liver to glucose (glycogenolysis). Thus, it raises the sugar level in the blood.

(iv) Functions of gibberellins: *(Any two)*

- Help in stem elongation
- Break dormancy of seeds and buds
- Delay senescence
- Induce parthenocarpy

(v)

(a) The aim of the experiment is to demonstrate the phenomenon of transpiration in plants.

(b) After some time, tiny water droplets are seen deposited on the inner side of the polythene bag.

(c) A control for this experiment would be an empty polythene bag without the plant with its mouth tied and kept in the sunlight.

Solution 5

(i) <u>Structures responsible for bringing about a change in the shape of the lens:</u>

1. Ciliary muscles
2. Suspensory ligaments

(ii) <u>Famous biologists who proposed the 'Theories of Evolution':</u>

1. Jean Baptiste de Lamarck
2. Charles Darwin

(iii) The condition in which a mature woman develops certain male characteristics such as beard, moustache and deep male voice is termed as adrenal virilism.
It is caused due to an overgrowth of the adrenal cortex in a mature woman.

(iv) <u>Functions of aqueous humour:</u>

- Maintains the shape of the eyeball.
- Provides nourishment to the eye lens and cornea.

(v)

(a) Global warming

(b) High fossil fuel consumption

(c) <u>Measures which can be taken to prevent global warming:</u>

- Planting more trees
- Reduction in the usage of private vehicles

Solution 6

(i) Spindle fibres hold the chromosomes in position during cell division and pull the chromosomes towards the poles during anaphase.

(ii) <u>Lamarck explained his ideas through the below two principles:</u>

1. <u>Use and disuse:</u> Parts of the body which are used extensively become larger and stronger, while those which are not used deteriorate.
2. <u>Inheritance of acquired characters</u>: An organism could pass its modifications to its offspring.

(iii) Addition of salt to pickles makes the solution hypertonic as compared to the cytoplasm of the bacterial cell. The bacterial cell undergoes exosmosis and hence bacteria get plasmolysed and destroyed. In this way, pickles are preserved by the addition of salt.

(iv) Xerophytic plants grow in extremely hot climatic conditions where they cannot afford to lose water. The rate of transpiration depends on the surface area of the leaves. The greater the surface area, higher is the rate of transpiration. To reduce the loss of water through transpiration, the leaves of xerophytic plants are modified into spines.

(v)

(a) 1 - Frontal lobe
2 - Temporal lobe
3 - Occipital lobe
4 - Cerebellum
5 - Medulla oblongata

(b) The outer part of the brain contains grey matter, i.e., the cytons of neurons and the inner part contains white matter, i.e., the axons of neurons.

(c) A bony box called the cranium protects the brain from external injuries. Inner to the cranium, lie three layers of meninges- duramater, arachnoid and piamater. The space between the meninges and the cavities of the brain contains cerebrospinal fluid which protects the brain from any mechanical injury.

Solution 7

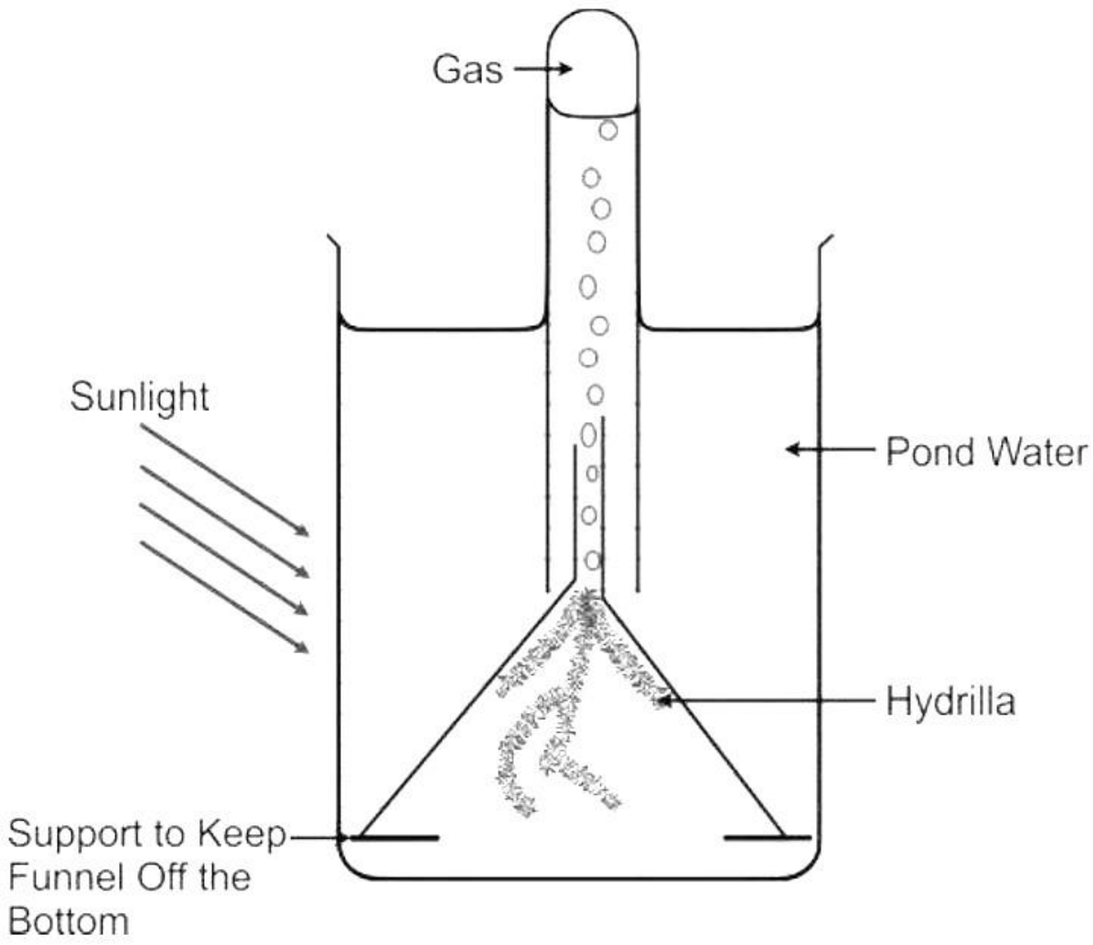
(i) When a plasmolysed cell is kept in a hypotonic solution, endosmosis occurs, and water starts entering the plasmolysed cell making it deplasmolysed.

(ii) Haemophilia and colour blindness are two sex-linked inherited diseases. These are caused due to the expression of recessive genes present on the 'X' chromosome.

(iii) <u>Significance of meiosis:</u>

1. Due to crossing over, progeny with several variations can be produced. This also provides scope for evolution.
2. The chromosome number of a species is kept constant.

(iv) <u>Experimental set-up to show that O_2 is evolved during photosynthesis</u>:



(v)

(a) Atrial systole

(b)

1. The cuspid valves are open.
2. The semilunar valves are closed.
3. The muscular walls of both the atria are in contracted state.

(c) The passing of blood twice through the heart in each cardiac cycle is called double circulation. It involves pulmonary circulation and systemic circulation.

Solution 8

(i) Biosynthetic phase is a light independent phase of photosynthesis during which hydrogen of NADPH is used to combine with carbon dioxide to produce ATP.

(ii) When a person is in a cinema hall, his pupils are dilated and there is regeneration of rhodopsin. When the person suddenly comes outdoors into bright light, his pupils remain dilated for some time and due to the presence of rhodopsin, he is unable to see properly for some time.

(iii) <u>Advantages of a small family:</u> *(Any two points)*

1. There is no economic pressure on the parents.
2. All the children get quality education.
3. The overall standard of living of such families improves.

(iv) Yes, there is a corresponding operation made in women. The name of the surgical procedure in females is 'tubectomy'. In tubectomy, the abdomen is opened, and the fallopian tubes (oviducts) are cut or ligated i.e., tied with a nylon thread to close the passage of the egg.

(v)

(a) 1 - Aster
2 - Spindle fibres
3 - Chromatids

(b) Anaphase is shown in the given figure because the two chromatids of each chromosome separate and move apart towards the opposite poles.

(c) The stage prior to anaphase is metaphase.