

Date: 24/03/2025



Question Paper Code

T25 523

Aakash

Medical | IIT-JEE | Foundations

Corporate Office : AESL, 3rd Floor, Incuspaze Campus-2, Plot-13, Sector-18, Udyog Vihar,
Gurugram, Haryana-122015

Time: 2 Hrs.

BIOLOGY

Max. Marks: 80

(Science Paper 3)

ICSE Board Class X Exam (2025)

Answers & Solutions

GENERAL INSTRUCTIONS

Read the following instructions very carefully and follow them:

- (i) Duration for the Test is 2 hours.
- (ii) Maximum Marks for Section-A and B is 40 each.
- (iii) The intended marks for questions or parts of questions are given in brackets [].
- (iv) **Section A** is compulsory. Attempt all questions from this section.
- (v) Attempt **any four** questions from **Section B**.
- (vi) Use of calculator is not permitted.
- (vii) It is mandatory to use Blue/Black ballpoint pen to write the answer.

SECTION-A (40 Marks)

(Attempt **all** questions from this Section.)

1. Select the correct answers to the questions from the given options. [15]

(Do not copy the questions, write the correct answer only).

(i) The number of live births per thousand people per year is called:

- | | |
|----------------------------|------------------------|
| (a) Mortality | (b) Population density |
| (c) Population growth rate | (d) Natality |

Answer (d) [1]

(ii) The structure that lies at the junction of the choroid and the iris and is itself a part of the choroid is called:

- | | |
|------------------|-------------------------|
| (a) Ciliary body | (b) Suspensory ligament |
| (c) Pupil | (d) Lens |

Answer (a) [1]

(iii) **Assertion (A):** Seminal vesicles pour an alkaline secretion into the semen as it passes through the ureter.

Reason (R): The female vagina is acidic and needs to be neutralized for sperm survival.

- | | |
|----------------------------------|----------------------------------|
| (a) (A) is true and (R) is false | (b) (A) is false and (R) is true |
| (c) Both (A) and (R) are true | (d) Both (A) and (R) are false |

Answer (b) [1]

(iv) The hormone that induces vigorous contractions of the uterus in a pregnant mother is

- | | |
|---------------|------------------|
| (a) Oestrogen | (b) Prolactin |
| (c) Oxytocin | (d) Progesterone |

Answer (c) [1]

(v) A scientist wanted to conduct a genetic experiment on mice. He cut the tails of all the mice and made them reproduce. What will be the phenotype of the offsprings?

- | | |
|--|--|
| (a) All the offsprings will be tailless. | (b) There will be a mix of tailed and tailless offsprings. |
| (c) All the offsprings will have tails. | (d) Tail of the offsprings cannot be predicted. |

Answer (c) [1]

(vi) **Assertion (A):** A turgid plant cell is in a balanced state.

Reason (R): In a turgid cell, turgor pressure and wall pressure are equal and in the same direction.

- | | |
|-----------------------------------|-----------------------------------|
| (a) (A) is true and (R) is false. | (b) (A) is false and (R) is true. |
| (c) Both (A) and (R) are true. | (d) Both (A) and (R) are false. |

Answer (a) [1]

(vii) The optimum temperature for photosynthesis is:

- | |
|---------------|
| (a) 10 – 15°C |
| (b) 60 – 65°C |
| (c) 40 – 45°C |
| (d) 25 – 35°C |

Answer (d) [1]

- (viii) Ajay and Vijay are siblings. Ajay can roll his tongue while Vijay cannot. What is the genotype of their parents?
- Both the parents are homozygous dominant.
 - Both the parents are homozygous recessive.
 - One parent is homozygous dominant, and the other is homozygous recessive.
 - Both the parents are heterozygous dominant.

Answer (d)**[1]**

- (ix) **Assertion (A):** Deficiency of Antidiuretic hormone causes an increase in urination.

Reason (R): Antidiuretic hormone acts on the kidney to reabsorb water from the kidney tubules.

- (A) is true and (R) is false.
- (A) is false and (R) is true.
- Both (A) and (R) are true.
- Both (A) and (R) are false.

Answer (c)**[1]**

- (x) A phase of cell division where the spindle fibres disappear is:

- Telophase
- Prophase
- Metaphase
- Anaphase

Answer (a)**[1]**

- (xi) **Assertion(A):** Arachnoid layer helps in speeding up the transmission of nerve impulses along the axons.

Reason(R): Axon endings at the synapse secrete acetylcholine.

- (A) is true and (R) is false.
- (A) is false and (R) is true.
- Both (A) and (R) are true.
- Both (A) and (R) are false.

Answer (d)**[1]**

- (xii) Many nuclear power plants are constructed near water sources. They use water for cooling their machinery and release it back into the water stream, Identify the kind of pollution caused.

- Radiation pollution
- Water pollution
- Industrial pollution
- Thermal pollution

Answer (d)**[1]**

- (xiii)



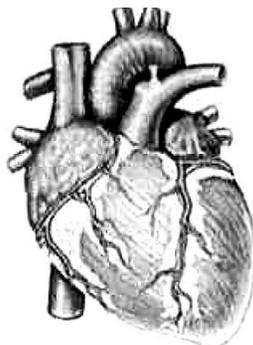
Owls are nocturnal animals. They are active at night and hunt small animals for food. Owls have large eyes and can see well at night. This is due to:

- Cones and Rhodopsin
- Rods and Iodopsin
- Rods and Rhodopsin
- Cones and Iodopsin

Answer (c)**[1]**

(ii) Given below is the diagram of a human heart. Read the information below the diagram and fill in the blanks:

[5]



The human heart pumps blood throughout the body. It is the size of a large fist. The heart is located between the lungs in the thoracic cavity. It has four chambers. The heart functions all through the lifespan of a person and is responsible for the survival of the person.

The heart is enclosed by a membrane called (a) _____. The ventricles give rise to two large blood vessels called (b) _____ and (c) _____. The flaps of the cuspid valves are kept in position by (d) _____.

(e) _____ arteries supply oxygenated blood to the walls of the heart.

(iii) Arrange the terms in each group in the correct order. Write them in a logical sequence beginning with the term that is **underlined**. [5]

- (a) Palisade cells, Cuticle, Upper epidermis, Spongy cells.
- (b) Hepatic portal vein, Stomach, Hepatic vein, Liver.
- (c) Cyton, Dendrites, Synaptic cleft, Axon endings.
- (d) Insulin release, High blood sugar, Lowers blood sugar, Stimulates glucose uptake from blood.
- (e) Sperm duct, Seminiferous tubule, Epididymis, Efferent ducts.

(iv) Read the explanations given below and name the structures: [5]

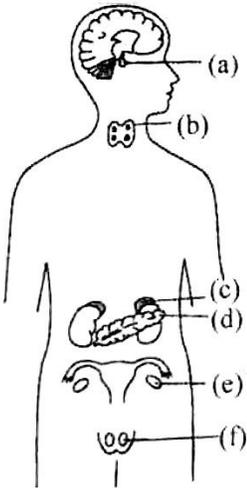
Example: The tubules which produce sperms.

Answer: Seminiferous tubules

- (a) The canal through which the testes descend down into the scrotum just before the birth of a male baby.
- (b) The part of the brain that regulates the peristaltic movement of the alimentary canal.
- (c) A structure that collects the soundwaves and conducts them through the external auditory canal.
- (d) The point of attachment of two chromatids of a chromosome.
- (e) Regulation of the opening and closing of stomata.

- (v) Given below is an outline of the human body showing the important endocrine glands. Match the glands marked (a) to (e) with their correct functions: [5]

Example: (f)-6. Secretes Testosterone.

Endocrine glands	Functions
	1. Prepares the body to face stress.
	2. Secretes tropic hormones
	3. Secretes Oestrogens
	4. Maintains blood sugar level
	5. Regulates basal metabolism
	6. Secretes Testosterone.

Sol. (i) (a) Graafian follicle.

(b) Cuticle

(c) Stapes

(d) Photosynthesis

(e) Moth

[5×1=5]

(ii) (a) Pericardium

(b) Pulmonary artery

(c) Aorta

(d) Chordae tendineae

(e) Coronary arteries

[5×1=5]

(iii) (a) Cuticle, Upper epidermis, Palisade cells, Spongy cells.

(b) Stomach, Hepatic portal vein, Liver, Hepatic vein.

(c) Dendrites, Cyton, Axon endings, Synaptic cleft.

(d) High blood sugar, Insulin release, Stimulates glucose uptake from blood, Lowers blood sugar.

(e) Seminiferous tubule, Efferent ducts, Epididymis, Sperm duct.

[5×1=5]

(iv) (a) Inguinal canal

(b) Medulla oblongata

(c) Ear pinna

(d) Centromere

(e) Guard cells

[5×1=5]

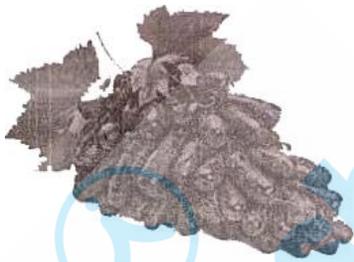
(v)	Endocrine glands	Functions
	(a)	2. Secretes tropic hormones
	(b)	5. Regulates basal metabolism
	(c)	1. Prepares the body to face stress
	(d)	4. Maintains blood sugar level
	(e)	3. Secretes oestrogens

[5×1=5]

SECTION-B (40 Marks)

(Attempt **any four** questions from this Section.)

3. (i) Write the overall chemical equation for photosynthesis. [1]
- (ii) Ramesh is a farmer who has a vineyard and cultivates grapes. To improve the shape of the grapes and make them elongated he sprays a particular *phytohormone* at the time of fruiting. [2]



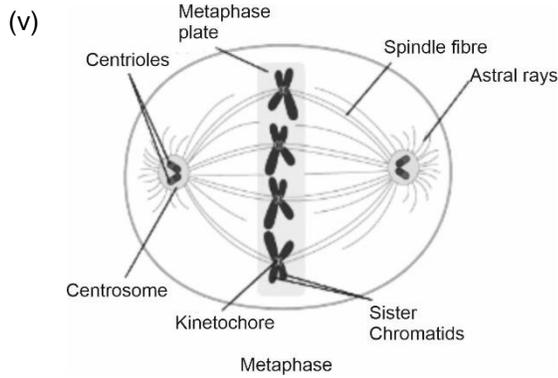
- (a) Name the *phytohormone* that Ramesh sprays on the plant at the time of fruiting.
- (b) These grapes are said to be seedless. What is the technical term for the formation of such fruits?
- (iii) Mention the *two* pairs of nitrogenous bases that are present in a DNA strand and pair with each other by hydrogen bonds. [2]
- (iv) State *any two* disadvantages of living close to an airport. [2]
- (v) Draw a neat, labelled diagram of an animal cell showing Metaphase with four chromosomes. [3]

Sol. (i) Chemical equation for photosynthesis :



- (ii) (a) Gibberellin [1]
- (b) Parthenocarpy [1]
- (iii) Adenine(A) always pairs with thymine(T) through two hydrogen bonds ,while guanine (G) always pairs with cytosine(C) through three hydrogen bonds. [2×1]
- (iv) **Disadvantages of living close to an airport are**
- (a) It interferes in communication.
- (b) It interrupts concentration of thought and disturbs peace of mind.
- (c) It lowers efficiency of work.
- (d) It disturbs sleep and leads to nervous irritability.
- (e) A sudden loud sound can damage eardrum and prolonged noise can even lead to deafness.
- (f) Life of animals like birds gets disturbed by aircrafts landing or taking off from the airports.

(Any two) [2×1]



[3]

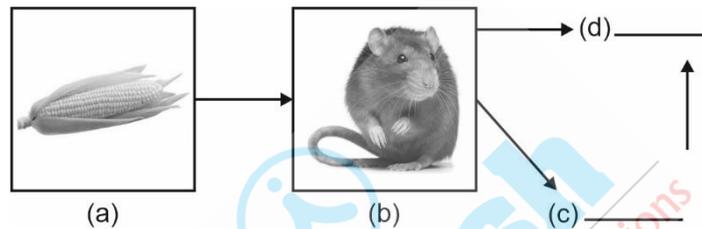
4. (i) What is the structure of DNA as proposed by Watson and Crick? [1]

(ii) Name the white blood cells that: [2]

(a) show phagocytosis

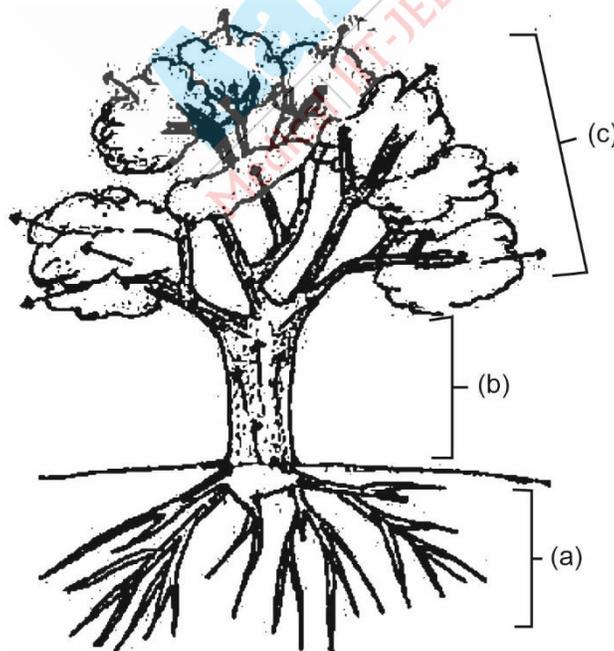
(b) produce antibodies

(iii) Complete the food chain by mentioning the names of the organisms in (c) and (d): [2]



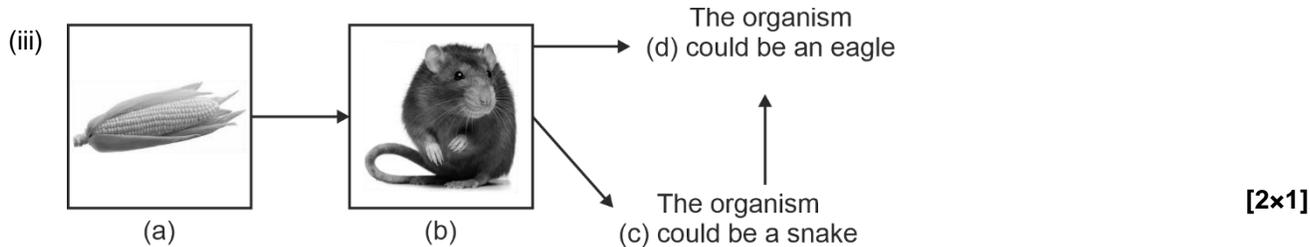
(iv) State *any two* harmful effects of acid rain. [2]

(v) Given below is a picture of a tree. Mention the scientific phenomena occurring in the parts labelled (a), (b) and (c). [3]



Sol. (i) J.D. Watson and F.H.C. Crick proposed a double helical model of DNA. DNA molecule consists of two polynucleotide strands coiled around a common axis, forming a double helix. Each helical turn has a length of 3.4 nm in which ten nucleotides are present. [1]

- (ii) (a) Neutrophils or monocytes. (Any one) [1]
 (b) Lymphocytes [1]



- (iv) • Acid rain causes damage to crops, buildings and many others things. [1]
 • Acid rain water accumulates in river causing death of aquatic life. [1]
- (v) • The scientific phenomena occurring in the part labelled (a) is absorption. [1]
 • The scientific phenomena occurring in the part labelled (b) is transpirational pull. [1]
 • The scientific phenomena occurring in the part labelled (c) is transpiration. [1]
5. (i) What is Micturition? Explain. [1]
 (ii) What are biomedical wastes? Give an example. [2]
 (iii) Differentiate between the functions of Urethra and Uterus. [2]
 (iv) Rachna is an expert gymnast on the balance beam. She has been vigorously practising for the Olympic Games. Lately, she has been experiencing dizziness and losing her balance during the practise sessions. [2]



- (a) Which part of the membranous labyrinth is responsible for maintaining the body balance on the beam?
 (b) Which type of balance is maintained by the structure mentioned in (a)?
- (v) Draw a neat, labelled diagram to show that oxygen is released during photosynthesis. [3]
- Sol.** (i) The process of expelling urine from the urinary bladder through the urethra is called micturition. [1]
 (ii) The wastes generated by hospitals, clinics, laboratories, nursing homes, etc. are referred to as biomedical wastes. [1]

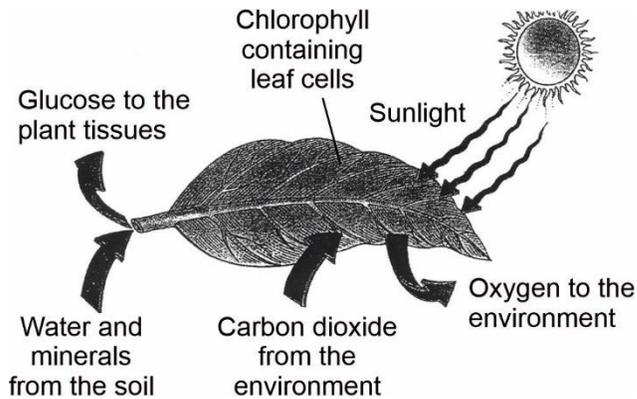
Examples : Needles, syringes, dirty dressing, gloves, surgery wastes, etc. (Any one) [1]

(iii) **Differences between urethra and uterus are :**

	Urethra		Uterus
1.	It is a part of male and female excretory systems.	1.	It is a part of female reproductive system.
2.	It is a tube that carries urine from urinary bladder to outside of the body.	2.	It is a hollow muscular organ where a fertilised egg implants and a fetus develops.

[2×1]

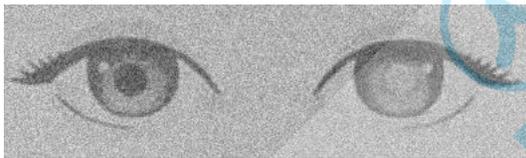
- (iv) (a) The vestibular apparatus is concerned with the maintenance of body balance. [1]
 (b) Both static as well as the dynamic balances are maintained by the vestibular apparatus. [1]
 (v)



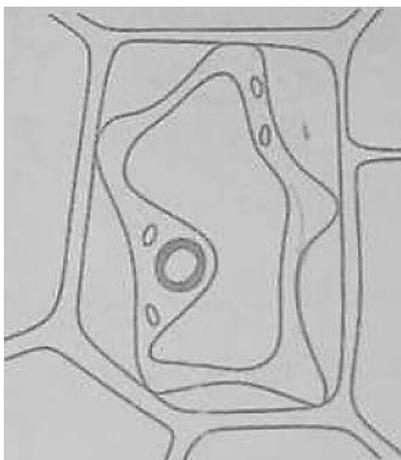
[3]

Fig. : Photosynthesis in a green leaf

6. (i) Where are Hydathodes located? [1]
 (ii) What are Vestigial organs? Give one example of a vestigial structure in the human mouth. [2]
 (iii) Ahmed had a severe throat infection. After a few days he developed an earache too. What could be the reason for the pain in his ears? Explain [2]
 (iv) Mr. Sharma is a 76 year old man. His vision was gradually becoming blurred. He consulted an eye doctor and it was diagnosed as cataract. [2]



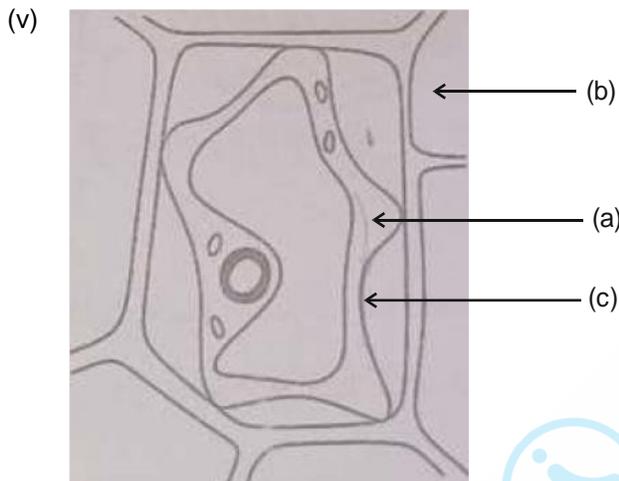
- (a) Which part of the eye does cataract affect?
 (b) Why does the vision become blurred?
 (v) Given below is the diagram of a plasmolysed cortical cell of a root. [3]



Copy the diagram and label the following parts in the diagram:

- (a) Cytoplasm
 (b) Hypertonic solution
 (c) Plasma membrane

- Sol.** (i) Hydathodes are present at the tips of veins in leaves. [1]
- (ii) Vestigial organs – Those organs which are non-functional in the possessor but were functional in the ancestors are known as vestigial organs. [1]
- Wisdom tooth is an example of vestigial organ in human body. [1]
- (iii) Ahmed is suffering from tonsillitis. [1]
- The ear pain occurs due to irritation in nerves that are connected to both throat and ears. [1]
- (iv) (a) Eye lens. [1]
- (b) It occurs because the eye lens turns opaque. [1]



[3×1]

7. (i) Define the term Allele. [1]
- (ii) In the last century, the human population has increased tremendously. Death rate has reduced and life expectancy has increased. This rapid growth has placed significant pressure on resources. Global cooperation is needed for environmental preservation. [2]



- (a) Mention *any one* reason for reduction in the death rate.
- (b) Name *any one* resource that is under pressure due to population explosion.
- (iii) Mention *any two* functions of amniotic fluid. [2]
- (iv) Expand the following abbreviations : [2]
- (a) CFC
- (b) CNG

- (v) Vineet's day begins with a cup of piping hot coffee. Caffeine is a stimulant present in coffee which increases the circulation of Adrenaline in the body. Vineet feels refreshed, alert and focussed. [3]



- (a) Name the organ that is stimulated by caffeine which makes Vineet alert and focussed.
 (b) Give the collective term for the protective membranes of the organ mentioned in (a).
 (c) Which part of the autonomic nervous system increases the secretion of Adrenaline?

Sol. (i) Allele represents the two alternative forms of a unit factor (or a gene). [1]

- (ii) (a) The main factors that contribute to the decline in death rate in a population are as :
- **Protection from natural risks** : Living in houses protected man from wild animals, heat, cold, rain, etc.
 - **Advancement in agriculture** : Improved agricultural techniques increased food output for the rising population.
 - **Storage facility** : Better storage facility made food available all the year round. It has also minimised the loss of grain by pests.
 - **Control of diseases** : Control of communicable diseases with antibiotics, elimination of epidemics and sound public health measures reduced the death rate.

(Any one) [1]

- (b) A population explosion puts immense pressure on resources like water, land, food, energy, etc.

(Any one) [1]

(iii) **Functions of amniotic fluid are :**

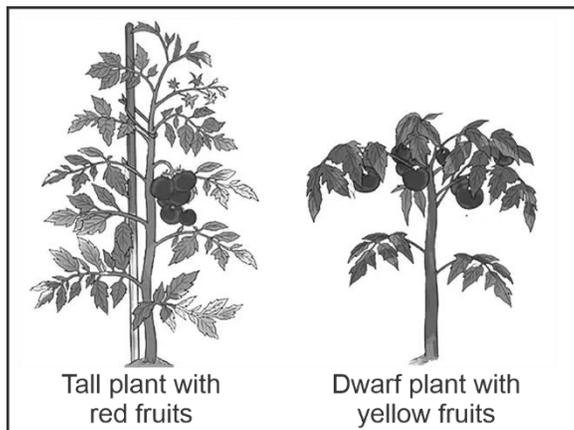
- It prevents desiccation of the embryo.
- It supports fetal movement.
- It maintains stable temperature.

(Any two) [2×1]

- (iv) (a) CFC – Chlorofluorocarbon [1]
 (b) CNG – Compressed natural gas [1]
- (v) (a) Brain [1]
 (b) Meninges [1]
 (c) Sympathetic nervous system. [1]

8. (i) Explain the term Excretion. [1]
 (ii) State the difference between *Nephron* and *Neuron*. [2]
 (iii) Mention *any two* objectives of Swachh Bharat Abhiyan. [2]
 (iv) Give *any two* characteristic features of a Cro-Magnon man. [2]

- (v) A farmer cultivates a unique species of tomato plants. The two traits selected for breeding were: Colour of the fruits and height of the plants. The farmer initially crosses a homozygous tall plant bearing red fruit (**TTRR**) with a dwarf plant bearing yellow fruit (**ttrr**) and the genotype of all the offspring of the **F₁** generation was **TtRr**. Next, he crosses two **F₁** generation plants (**TtRr**). [3]



- (a) Explain the phenotype of the offsprings of the **F₁** generation obtained from the initial cross.
 (b) Mention the phenotypic ratio of the **F₂** generation offsprings.
 (c) State Mendel's Law of Independent Assortment.

Sol. (i) The process by which harmful metabolic waste products are eliminated from the body is called excretion. [1]

- (ii) **Differences between nephron and neuron are :**

	Nephron	Neuron	
(a)	It is the structural and functional unit of the kidneys.	It is the structural and functional unit of neural system.	[1]
(b)	It is responsible for filtration of blood and urine production.	It is responsible for transmitting electrical signals (impulses) within the body.	[1]

- (iii) **Objectives of Swachh Bharat Abhiyan are :**

- (a) Eliminating open defecation through the construction of household-owned and community-owned toilets.
 (b) Establishing an accountable mechanism of monitoring toilet use. [2×1]

- (iv) **Characteristics of a Cro-Magnon man are :**

- The Cro-Magnon man had, like us, about 1.8 metres tall, well-built body.
- His face was perfectly orthognathous with an arrow, elevated nose, broad and arched forehead, moderate brow-ridges, strong jaws with man-like dentition, and a well developed chin.
- His cranial capacity was, however, somewhat more than ours, being about 1650 c.c. It is, therefore, believed that Cro-Magnon man was somewhat more intelligent and cultured than the man of today.
- It could walk and run faster and lived with families in caves.
- It made excellent tools and even ornaments, not only of stones and bones, but also of elephant tusks.
- Its tools included spears, bows and arrows, as he was omnivorous.
- Use of the skin clothes by this man is also confirmed. (Any two) [2×1]

