

GENERAL SCIENCE PAPER - II

BIOLOGICAL SCIENCE

MODEL PAPER - I

Class : X Max.Marks : 50

Time : 2hrs.15min.

Instructions :

1. Question paper consists of 4 sections and 17 questions.
2. Internal choice is available only for Q.No.12 in section III and for all the questions in section IV.
3. In the duration of 2 hours, 15 minutes of time is allotted to read the question paper.
4. All answers shall be written in the answer booklet only.
5. Answers shall be written neatly and legibly.

SECTION - I

6 × 1 = 6 M

1. Answer all the questions.
2. Each question carries 1 marks.
1. What is the main purpose of valves in the heart?
2. $O_2 \rightarrow O+O$ $O+O_2 \rightarrow O_3$ (O zone)
 - i. How many oxygen atoms are there in one molecule of Ozone?
3. Arrange the following in the correct order of the food chain.



4. Observe the checker board

$\frac{1}{2}$	$\frac{1}{2}$	T	t
T	TT	Tt	
t	Tt	tt	

- Q) What is the genotypic ratio in the f_2 generation in the Above checker board
5. What is the purpose of variations? Please provide a brief answer.
6. What are the functional units of the human kidney?

SECTION - II

4 × 2 = 8 M

1. Answer all the questions.
2. Each question carries 4 marks.
7. What questions will you ask, if you have a chance to meet a Cardiologist?

8. What is the role of saliva in the Digestion of food?
9. Read the paragraph.

Substances that are broken down by biological processes are said to be biodegradable. Substances that are not broken down in this manner are said to be non bio-degradable. These Substances may be inert and Simply persist in the environment for a long time or may harm the various members of the Eco-system.

Answer the following questions

- I) What do you mean by biodegradable substances?
 - II) Why are non-bio-degradable substances are harmful to the environment?
10. What will happen, if we kill all the organisms in one trophic level?

SECTION - III

5 × 4 = 20 M

1. Answer all the questions.
2. Each question carries 4 marks.

11. Read the following table & answer the questions

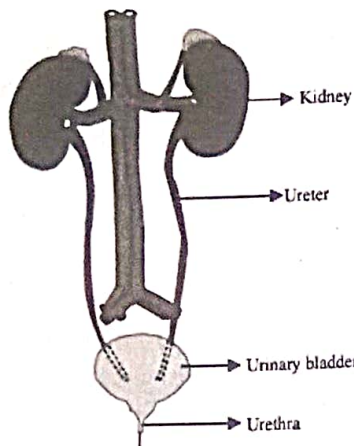
Sl. No	Hormone	Endocrine Gland	Function
1	Growth Hormone	Pituitary Gland	Stimulates growth in all organs
2	Thyroxin	Thyroid	Regulates metabolism
3	Testosterone	Testes	Development of male sex organs, beard, moustaches
4	Progesterone & Estrogens	Ovaries	Development of female sex organs, regulates menstrual cycle
5	Adrenaline	Adrenal	Increases heart beat, rate of breathing, emotions
6	Insulin	Pancreas	Regulates blood sugar level

- I) Name the hormone that regulates blood sugar level?
- II) Which hormone is responsible for development of secondary Sexual Characters in males?
- III) Which hormone is responsible for human growth & increase in height?
- IV) Which gland produces the hormone "Thyroxin"?

- 12 A. Draw a neat labelled diagram of L.S of flower.

(Or)

- 12 B. Observe the Diagram & Answer the following questions



- What is the main function of the kidneys in the human body?
 - Which part of the excretory system connects Kidneys to the urinary bladder?
 - Where is urine stored in the human excretory system?
 - What is the name of the opening through which urine is expelled from the urinary bladder?
- How can you help in reducing the problem of waste disposal? Give any two methods.
 - Write any four differences between xylem & phloem.
 - Why does menstruation happen each month in the female body?
 - A) How do you demonstrate the presence of starch in various areas of a leaf?

(OR)

B) What are the different methods of contraception?

SECTION - IV

2 × 8 = 16 M

- Answer all the questions.
 - Each question carries 8 marks.
 - Each question has internal choice.
- A) Explain tropic movements with suitable examples.

(OR)

B) How is the sex of the child determined in human beings?

ANSWERS

SECTION - I

- Heart Valves keep blood flowing in one direction only and prevent backward flow.
- One molecule of ozone contains three oxygen atoms.
- Grass → Grass Hopper → Frog → Snake → Hawk
- The genotypic Ratio
i.e. TT : Tt : tt is 1 : 2 : 1
- i) Variations provide a better adaptation of an organism to the changing environmental Conditions.
ii) Variations create diversity within a Species to develop disease resistant Varieties.
- Nephrons/ uriniferous tubules are the functional units of the human kidney.

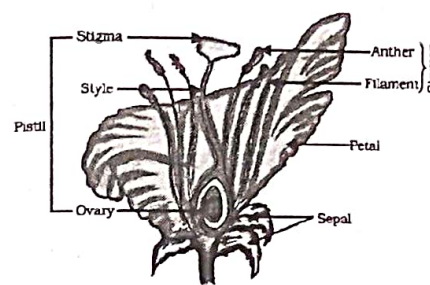
SECTION - II

- Any two from the following:
 - How Can I keep my heart healthy for a longer period?
 - What are the main signs of heart disease? How can we recognise them early?
 - How does stress affect the heart?
 - How does walking & exercise influence the heart?
 - What is the difference between heart attack and Cardiac arrest?
- Saliva Contains a digestive enzyme Called Salivary amylase/ Ptyalin, which breaks down starch into Sugars.
- It is thoroughly mixed with the food to form food bolus. & helps in swallowing the food.
- A substance is biodegradable, if it can be broken down by natural or biological processes.
- Non-biodegradable Substances can harm the environment, by persisting for a long time.
- If we kill all the organisms in one trophic level
 - The transfer of food energy to the next trophic level will stop.
 - The population in the previous trophic level will increase.
 - Similarly the organisms of higher trophic level will also die of starvation.
 - Hence, it will result in imbalance in the Ecosystem.

For example: If we remove frogs from the food chain, the population of grass hoppers will increase, on the other hand the population of Snakes which depend on frogs will decrease. Resulting in ecological imbalance

SECTION - III

- The hormone - **Insulin**, regulates the Blood Sugar level
 - Testosterone** is the hormone, responsible for secondary Sexual Characters in males
 - Growth hormone** is responsible for human growth & increase in height
 - Thyroxin is produced by the **thyroid gland**.
- A.



Longitudinal section of flower
OR

- B
 - The main function of the Kidneys is excretion of nitrogenous waste such as urea and uric acid.
 - The Ureters Connect the kidneys to the urinary bladder.
 - Urine is stored in the urinary bladder.
 - Urine is expelled through the urethra.
- The following are few methods to help reduce the problem of waste disposal:
 - Composting:** Turn organic waste into nutrient rich Compost
 - Recycling:** Encourage recycling of materials like paper, plastic and metal to conserve resources and decrease their use
 - Use reusable bottles, cups
 - Avoid Single use plastic.

- Reduce Paper usage by opting alternatives like e-books, e-receipts, e-magazines etc...
- Purchase wisely & recycle.
- Buy Second hand items to limit demand for new products.
- Donate used goods to extend their life and benefit others.

14.

Sl. No.		XYLEM	PHLOEM
1	Function:	Transports water and minerals from roots to the rest of the plant.	Transports food (sugars) made in the leaves to other parts of the plant.
2	Direction of Flow:	Moves mostly upward from roots to leaves	Moves both upward and downward, depending on where the food is needed
3	Structure:	Made of thick-walled cells, providing support to the plant	Made of thin-walled cells, which are more flexible
4	Dead or Alive:	Cells are mostly dead at maturity, helping to form strong tubes	Cells are alive, allowing for active transport of food

- i) Menstruation is a part of the body's monthly cycle for pregnancy preparation.
 - Each month an egg is released from an ovary & travels through the fallopian tube to the uterus.
 - The inner lining of the uterus thickens to support a possible pregnancy.
 - If the egg is not fertilized by the sperm, pregnancy does not occur.
 - Without pregnancy, the thickened lining of uterus is not needed and the body sheds it
 - This shedding is released through the vagina as menstrual bleeding, marking the start of new cycle

SECTION - IV

16. A. **Aim:** To prove the presence of starch in various areas of a leaf

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

Procedure:

- Take a potted plant with variegated leaves. For example money plant or Crotons.
- Keep the plant in a dark room for three to four days, so that all the starch gets used up.
- Now keep the plant in sunlight for about 6 hours.

- Pluck a leaf from the plant. Mark the green areas in it and trace them on a sheet of paper.
- Dip the leaf in boiling water for a few minutes.
- After that, place it in a beaker with alcohol.
- Carefully place the above beaker in a water bath and heat, till the alcohol begins to boil.

Observation:

The leaf turns colourless. Chlorophyll dissolves in alcohol, making the alcohol turn green. If we dip the leaf in a weak iodine solution for a few minutes, the green parts turn dark blue. This shows that starch is present in those areas. The colorless parts of the leaf show no starch.

Result:

The green areas of the leaf, which have chlorophyll, are able to perform photosynthesis. We can use iodine solution to confirm that starch is produced during this process.



Variegated leaf
(a) before and (b) after starch test
(OR)

16 B. Contraception is a way to prevent pregnancy during or after sex.

It's important because it helps people plan, if and when they want to have children.

The following are some important methods of contraception:

Barrier Methods:

- Condoms:** A thin cover is put on the penis during sex to stop sperm from getting to the egg.
- Diaphragms:** A small cup is placed inside the vagina to block sperm.
- Hormonal Methods:**
 - Birth Control Pills:** Pills taken by the females every day to stop the body from releasing eggs.
 - Patch:** A sticker is placed on the skin that releases hormones to prevent pregnancy.
 - Injection:** A shot is given every few months that stops ovulation.
- IUDs (Intra Uterine Devices):**
 - Small devices are put inside the uterus by a doctor or a qualified person to stop pregnancy. Some of these IUDs use hormones, and others use copper.
- Natural Methods:**
 - Fertility Awareness:** Keeping the track of the menstrual cycle to avoid sex on fertile days.
 - Withdrawal:** The man pulls out his penis before ejaculation to prevent sperm from entering the vagina.
- Permanent/ Surgical Methods:**
 - Sterilization:** A surgical procedure that makes it impossible to have children. This is permanent.
 - Vasectomy for males and Tubectomy for females** are surgical methods.
- Emergency Contraception:**
 - These pills are taken immediately after a rape or an unprotected sex to help prevent pregnancy.

17 A. Tropic Movements are the ways plants grow or move in response to different environmental factors. Here are the main types with examples:

- Phototropism:** Response of a plant to light is called phototropism.
 - Plants grow towards light.
 - Example:** A sunflower turns to face the sun as it moves across the sky.
- Geotropism (or Gravitropism):** Response of a plant to gravitational force is called Geotropism.

- Plants respond to gravity. Roots grow down (positive gravitropism), while stems grow up (negative gravitropism).
- Example:** A seedling's roots grow downward into the soil, while its stem grows upward toward the light.
- Hydrotropism:** Response of a plant to water availability in the soil is called Hydrotropism.
 - Plants grow towards water.
 - Example:** Roots of a plant will grow in the direction where there is more moisture in the soil.
- Thigmotropism:** Response of a plant to touch is called Thigmotropism.
 - Plants respond to touch.
 - Example:** Climbing plants, like vines, wrap around nearby objects, when they touch them.
- Chemotropism:** Response of a plant to chemical is called Chemotropism.
 - Plants grow towards or away from chemicals.
 - Example:** Roots may grow toward nutrients in the soil, like fertilizers.

These movements help plants adapt and survive better in their environments

(OR)

17 B. Sex determination in humans refers to how our biological sex is established at the moment of conception. This process involves both genetic and chromosomal factors.

1. Chromosomes:

- Humans have 23 pairs of chromosomes, totalling 46.
- Among these, one pair is known as the sex chromosomes, which are either X or Y. They are also called as Allosomes.
- Females typically have two X-chromosomes (XX), while males have one X and one Y-chromosome (XY). - (XX-XY type of sex determination)

2. Fertilization:

- When a sperm fertilizes an egg, the combination of sex chromosomes from both parents determines the biological sex of the offspring.
 - Eggs always carry an X-chromosome, while sperm can carry either an X or a Y chromosome (50% of the sperms with X-chromosome and remaining 50% with Y chromosome).
 - If the sperm carrying an X-chromosome fertilizes the egg, the result is a female (XX).
 - If the sperm carrying a Y chromosome fertilizes the egg, the result is a male (XY).
3. **Development:** After fertilization, the embryo begins to develop. Around the 6th week of gestation, the presence of the Y-chromosome triggers the development of male characteristics. If the Y-chromosome is absent (as in XX embryos), the default development leads to female characteristics.

4. Hormonal Influence:

- The sex hormones produced by the developing testes or ovaries further influence sexual development.
- In males, testosterone promotes the development of male reproductive structures.
- In females, the absence of testosterone allows for the development of female reproductive structures.

Sex Determination in Humans

