BIOLOGY

(SCIENCE PAPER – 3)

Maximum Marks: 80

Time allowed: Two hours

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will **not** be 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.***

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 [ ].*

Instruction for the Supervising Examiner

Kindly read aloud the Instructions given above to all the candidates present in the Examination Hall.

This paper consists of 15 printed pages and 1 blank page.

SECTION A (40 Marks)

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

Question 1

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

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

(i) _____ is the result of inward movement of water molecules.

(a) Plasmolysis

(b) Flaccidity

(c) Exosmosis

(d) Deplasmolysis

(ii) Which of the following is an example of a natural reflex?

(a) Sneezing

(b) Applying brakes

(c) Giving a hand signal

(d) Playing an instrument

(iii) A newly married couple are expecting their first child. What is the probability of them having a daughter?

(a) 10%

(b) 50%

(c) 75%

(d) 100%

(iv) **Assertion (A):** Veins starting from the intestines do not open directly into the inferior vena cava.

Reason (R): They unite and enter the liver as hepatic portal vein.

(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.

(v) The structure absent in a nerve cell is:

(a) Nucleus

(b) Centrosome

(c) Cytoplasm

(d) Neurilemma

(vi) The number of chromosomes in the somatic cells of a human body **before** mitosis and **after** mitosis is:

(a) 23, 23

(b) 26, 46

(c) 23, 46

(d) 46, 46

(vii) The inorganic constituent of urine is:

(a) Ammonia

(b) Urea

(c) Creatinine

(d) Uric acid

(viii) **Assertion (A):** Darwin preferred pea plants for his experiments on genetics as it is a unisexual plant.

Reason (R): Pea plants are normally self-pollinated.

(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.

(ix) Anup participated in a marathon race and felt dehydrated by the end of the race. The human body has mechanisms to conserve water and prevent dehydration. Which part of the *nephron* is primarily responsible for the reabsorption of water to prevent dehydration?

1. Glomerulus
2. Proximal Convoluted Tubule
3. Loop of Henle
4. Distal Convoluted Tubule

(a) 3

(b) 2 and 3

(c) 1, 2 and 3

(d) 2, 3 and 4

(x) Which of the following process occurs only in meiosis and **NOT** in mitosis:

(a) Chromosome duplication

(b) Crossing over

(c) Cytokinesis

(d) Chromosome alignment

(xi) **Assertion (A):** Blood flows from the left atrium to the left ventricle of the heart.

Reason (R): The tricuspid valve separates the left atrium from the left ventricle.

(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.

(xii) Which adaptation is **NOT** associated with desert plants to minimise water loss through transpiration?

(a) Reduced number of stomata

(b) Thick, waxy cuticle

(c) Deep root systems

(d) Increased leaf surface area

(xiii) **Assertion (A):** Spraying of pesticides and insecticides can cause water pollution.

Reason (R): Pesticides and insecticides are non-biodegradable agricultural wastes.

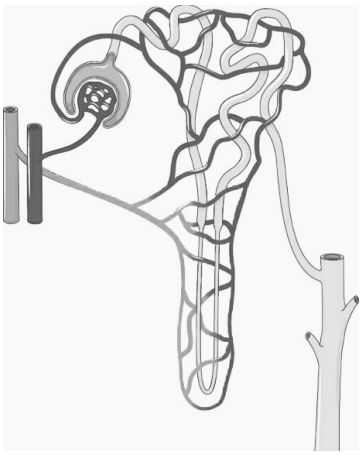
(a) (A) is true and (R) is false.

(b) (A) is false and (R) is true.

(c) Both (A) and (R) are true.

(d) Both (A) and (R) are false.

(xiv) The diagram given below represents a nephron. Ultrafiltration of blood occurs in:



(a) Bowman's capsule

(b) Glomerulus

(c) Proximal Convoluted Tubule

(d) Loop of Henle

(xv) Which of the following statements are correct?

P. Night blindness is caused by the deficiency of Vitamin A.

Q. Utriculus gives dynamic balance to the body.

R. Neuron is a single cell.

S. Fossil fuels are inexhaustible sources of energy.

(a) Q and S

(b) R and S

(c) P and Q

(d) P and R

Question 2

(i) Name the following: [5]

(a) The endocrinal cells which secrete testosterone.

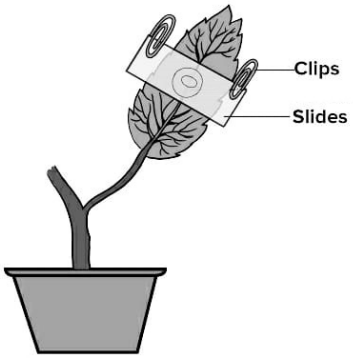
(b) The fluid which surrounds the developing embryo.

(c) A national campaign in India which aims to eliminate open defecation.

(d) Hormone responsible for the bending of a plant shoot towards light.

(e) The sensory organ present in the Cochlea for hearing.

(ii) Given below is an experiment to demonstrate the magnitude of transpiration in a dicot leaf. Read the information given below and fill in the blanks. [5]



Transpiration is the process of loss of water as water vapour from the aerial parts of the plant. It is the essential driving force for the ascent of sap. Less than 1% of the water absorbed by the roots is used in photosynthesis and plant growth. The rest of the water is lost during transpiration.

Pieces of dried (a) _____ paper are fixed to the two surfaces of a leaf. The leaf should remain attached to the plant. The plant is exposed to bright sunlight for a few hours. The colour of the paper on the lower surface of the leaf turns (b) _____ faster than the one on the upper surface. This proves that more (c) _____ occurs from the (d) _____ surface of the leaf as it has a greater number of (e) _____.

(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) Follicular phase, Luteal phase, <u>Menstrual phase</u>, Ovulatory phase

(b) Oval window, <u>Auditory canal</u>, Cochlea, Ear ossicles

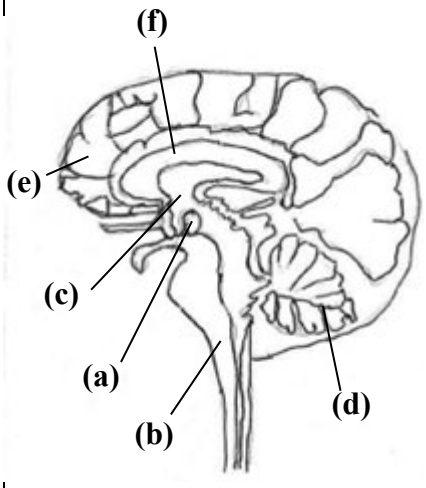
(c) Retina, <u>Eyeball</u>, Sclera, Choroid

(d) Arterioles, Vein, <u>Artery</u>, Capillaries

(e) Parturition, Implantation, <u>Ovulation</u>, Fertilisation

(iv) Given below is a vertical section of the human brain. Match the structures marked (a) to (e) with their correct functions. [5]

Example: *(f) – 6. Transfer information from one cerebral hemisphere to another.*

Vertical section of Human Brain	**Functions**
	1. Seat of intelligence. 2. Maintain body balance. 3. Controls the activities of the internal organs. 4. Relays pain and pressure impulse to cerebrum 5. Controls body temperature and pituitary. 6. Transfer information from one cerebral hemisphere to another.

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

Example: *A cord that connects the placenta with the foetus.*

Answer: *Umbilical cord*

(a) The fibres which hold the lens of the eye in position.

(b) The cells of the islets of Langerhans that secrete the hormone glucagon.

(c) The part of the chloroplast where the light independent phase occurs.

(d) Cap like structure seen around the head of the human sperm.

(e) The glands located at the upper sideward portion of the orbit of eye.

SECTION B (40 Marks)

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

Question 3

(i) *Ram has protruding eyes and a high metabolic rate.* [1]
Name the hormone responsible for this condition.

(ii) What are the two hormones secreted by corpus luteum? [2]

(iii) What are phytohormones? Give an example of the growth retarding hormone. [2]

(iv) Distinguish between *stoma* and *stroma*. [2]

(v) Navya is a high school biology student who recently visited a local farm as part of a school project. She observed water droplets on the leaves of certain plants early in the morning as shown in the figure. [3]

(a) Name the process observed.

(b) Explain the process mentioned in (a).

(c) Give the reason for the occurrence of the above-mentioned process.

Question 4

(i) Explain the term Gestation. [1]

(ii) Expand the following abbreviations: [2]

(a) ACTH

(b) ABA

(iii) A basement godown is stocked with bags of food grains. It is observed that the walls of the godown cracked after being flooded with rain water. Explain the phenomenon. [2]

(iv) Name the compound formed when Haemoglobin combines with: [2]

(a) Carbon monoxide

(b) Oxygen

(v) The Amazon rain forest is referred to as the 'Lungs of the Earth'. It plays an important role in climate regulation through photosynthesis. However, this delicate ecosystem is facing threats from deforestation, climate change and human encroachment which can lead to irreversible environmental consequences. [3]

(a) How does photosynthesis contribute to the Amazon rain forests' reputation as the 'Lungs of the Earth'?

(b) In what way is the environment affected by deforestation?

(c) Name the pigment that captures the light energy during photosynthesis.

Question 5

(i) Ravi cuts his finger while chopping vegetables. The bleeding from the injury did not stop immediately. What kind of genetic disorder is he suffering from? [1]

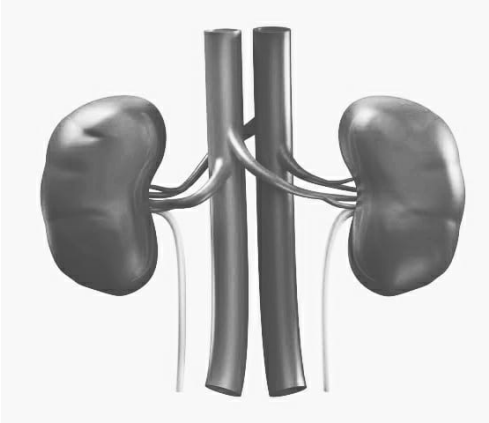
(ii) Given below is a set of terms. [2]

Medullary Sheath, Myelin Sheath, Dendron, Meninges, Nissl's granules

(a) Choose the odd term from the above list.

(b) Mention the category to which the other terms belong.

(iii) Human kidney is a complex organ. Kidneys receive blood through blood vessels which directly branch from the Aorta. Inside each kidney are tiny functional units which filter the blood. [2]



(a) Name the blood vessels that supply blood to the kidneys.

(b) Which are the functional units that filter the blood?

(iv) Divya performed an experiment on photosynthesis. At the end of the experiment, she tested the experimental leaf for the presence of starch. During the starch test she first boiled the leaf in water and then in methylated spirit. [2]

(a) Why did she boil the leaf in water?

(b) Mention the reason why she then boiled the leaf in methylated spirit.

(v) Draw a neat, labelled diagram of a stomatal apparatus. [3]

Question 6

(i) State the overall chemical equation for photosynthesis. [1]

(ii) Name the structure responsible for each of the following: [2]

(a) conversion of mechanical sound waves to sound vibrations in the human ear.

(b) maintaining equal air pressure on either side of the tympanum.

(iii) Given below are two statements which are incorrect. Rewrite the correct statements. [2]

(a) Mendel proposed the theory of 'Use and Disuse' of organs.

(b) Meningitis is the inflammation of pericardium.

(iv) A colourblind child is born to a normal couple. [2]

(a) Work out a cross to show how it is possible.

(b) Mention the sex of this child.

(v) *Mrs. Lata Mohan delivered twins – Lalit and Leela in the year 2014. The twins were not of the same gender but were born on the same day and around the same time.* [3]

(a) What kind of twins are Lalit and Leela?

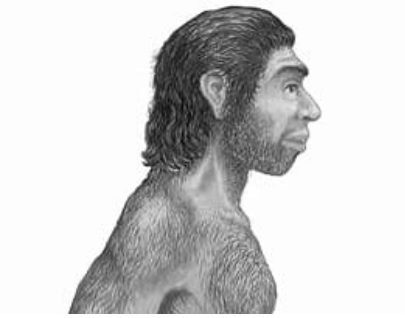
(b) Are they monozygotic or dizygotic twins?

(c) Mention the sex chromosomes in each of the body cells of Lalit and Leela.

Question 7

(i) Name the inner lining of the uterus. [1]

(ii) Based on the image of the Neanderthal Man given below, describe *any two* characteristic features of this human species. [2]



(iii) State the **location** and **function** of the **prostate gland** present in the male reproductive system. [2]

(iv) Viplav is a photographer. He finds that his vision gets blurred. This happens when he goes from taking pictures of faraway objects to reading text on his camera screen. He recalls learning about certain defects of the eyes during his school days. [2]

(a) Name the defect of the eyes which Viplav is suffering from.

(b) Mention the type of lens that can be used to correct the above defect.

(v) Draw a neat labelled diagram of a nucleotide. [3]

Question 8

(i) Explain the process of Phagocytosis. [1]

(ii) Give *two* examples of radiation pollutants. [2]

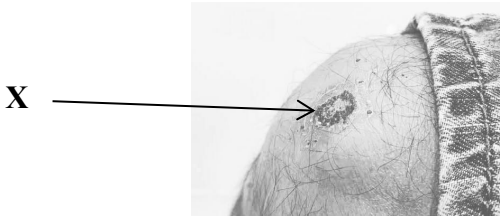
(iii) The need to limit the size of the family is more vital today than ever before. Give *two* reasons. [2]

(iv) The picture given below shows the athletes lined up at the starting line. The countdown begins and all are focused and alert waiting for the gunshot. [2]

(a) Which hormone prepares the body in such a situation given above?

(b) Name the endocrine gland that secretes the hormone mentioned in (a).

(v) *Madhu fell down while playing in the school playground and injured her knee. There was bleeding from the injured part but after some time a brown thick layer was formed on the injury to stop the bleeding.* [3]



(a) Name the solid structure labelled **X** that is formed on the injury.

(b) What is the enzyme that initiates the formation of **X**?

(c) Which mineral element is essential for the formation of **X**?