

ICSE Solved Paper 2020

Biology

Class-X

(Maximum Marks : 80)

(Time allowed : Two hours)

Answers to this Paper must be written on the paper provided separately.

You will **not** be allowed to write during the first 15 minutes.

This time is to be spent in reading the Question Paper.

The time given at the head of this Paper is the time allowed for writing the answers.

Attempt **all** questions from **Section I** and **any four** questions from **Section II**.

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

SECTION-I

(40 marks)

Attempt all questions from this Section

1. (a) Name the following: [5]
- (i) The process of transformation of several glucose molecules into one molecule of starch.
 - (ii) The point of attachment of two chromatids.
 - (iii) The iron containing pigment in erythrocytes.
 - (iv) The duct which transports urine from the kidney to the urinary bladder.
 - (v) The part of the brain which is concerned with memory.

- Ans. (i) Polymerization
(ii) Centromere
(iii) Haemoglobin
(iv) Ureter
(v) cerebrum

- (b) Explain the following terms: [5]
- (i) Allele
 - (ii) Diffusion
 - (iii) Photolysis
 - (iv) Phenotype
 - (v) Population density

Ans. Explain the following terms:

- (i) **Allele** : The pair of genes which are responsible for particular trait or characteristics are called alleles.
- (ii) **Diffusion**: The movement of liquid and gases from higher concentration to the lower concentration is called diffusion.
- (iii) **Photolysis**: The splitting of water into Hydrogen (H^+) and electron (e^-) during photosynthesis in presence of sun Light is called photolysis.

(iv) **Phenotype**: The visible or morphological traits or characters which are the result of interaction between genes are called phenotypic characteristics.

(v) **Population density**: The measurement of individual or people per unit area is called population density.

(c) Given below are certain groups of terms. In each group the first pair indicates a relationship between the two terms. Rewrite and complete the second pair on a similar basis. [5]

Example: Cytoplasm : Cytokinesis :: Nucleus : Karyokinesis.

(i) Widening of hips: Oestrogen :: Deepening of voice in males : _____.

(ii) Brain : Meninges :: Heart : _____.

(iii) Insulin : Beta-cells :: Glucagon : _____.

(iv) Kidney: Renal artery :: Liver : _____.

(v) Uterus : Implantation :: Fallopian tube : _____.

Ans. (i) Widening of hips: Oestrogen :: Deepening of voice in males : Testosterone.

(ii) Brain : Meninges :: Heart : Pericardium.

(iii) Insulin : Beta-cells :: Glucagon : Alpha - cells.

(iv) Kidney: Renal artery :: Liver : Hepatic artery.

(v) Uterus : Implantation :: Fallopian tube : Fertilization

(d) Given below are sets of five terms each. Rewrite the terms in correct order in a logical sequence beginning with the first word that is underlined:

- (i) Stimulus, Response, Receptor, Effector, Spinal cord.
- (ii) Root hair, Endodermis, Epidermis, Xylem, Cortex.
- (iii) Conjunctiva, Yellow spot, Pupil, Vitreous humor, Aqueous humor.
- (iv) Australopithecus, Cro-Magnon Man, *Homo erectus*, Neanderthal Man, *Homo sapiens*.
- (v) Artery, Capillaries, Venule, Vein, Arteriole.

Ans. (i) Stimulus, Receptor, Spinal cord, Effector, Response.

- (ii) Root hair, Endodermis, Epidermis, Xylem, Cortex.
- (iii) Conjunctiva, Aqueous humor, Pupil, Vitreous humor, Yellow spot.
- (iv) *Australopithecus*, *Homo erectus*, Neanderthal Man, Cro-Magnon Man, *Homo sapiens*.
- (v) Artery, Arteriole, Capillaries, Venule, Vein.

(e) Choose the correct answer from the four options given below:

(i) The fusion of the sperm and ovum is termed as:

- (a) Reproduction
- (b) Development
- (c) Fertilization
- (d) Embryo

(ii) Agranulocytes are:

- (a) Lymphocytes, Monocytes
- (b) Lymphocytes, Basophils
- (c) Eosinophils, Basophils
- (d) Eosinophils, Monocytes

(iii) Which of the following is not a natural reflex action?

- (a) Knee-jerk
- (b) Blinking of eyes due to strong light
- (c) Salivation at the sight of food
- (d) Sneezing when any irritant enters the nose

(iv) The structural and functional units of excretion in the human kidney is the:

- (a) Ureter
- (b) Bowman's capsule
- (c) Renal pelvis
- (d) Nephron
- (v) In a human female, ovum consists of:

- (a) 23 pairs of autosomes
- (b) 22 pairs of autosomes and 1 pair of sex chromosomes
- (c) 22 autosomes and 1 Y-chromosome
- (d) 22 autosomes and 1 X-chromosome

Ans. (i) Option (c) is correct.
(ii) Option (a) is correct.

(iii) Option (c) is correct.

Explanation: Salivation at the sight of food is not a natural reflex. here food is the stimulus for salivation. Rest are natural reflexes.

(iv) Option (d) is correct.

(v) Option (d) is correct.

Explanation: Ovum is a female gamete so, the chromosomal combination is 22 autosomes and one X chromosome

(f) Identify the ODD term in each set and name the CATEGORY to which the remaining three belong: [5]

- (i) Auxin, Ethylene, Adrenaline, Cytokinin
- (ii) Tympanum, Ear ossicles, Auditory canal, Pinna
- (iii) Syringes, Soiled dressings, Discarded needles, Household detergents
- (iv) Exophthalmic Goitre, Simple Goitre, Cretinism, Myxoedema
- (v) Adenine, Guanine, Creatinine, Cytosine

Ans. (i) Odd one - Adrenaline (Found in humans.)
Rest are Plant hormone- Auxin, Ethylene, Cytokinin

(ii) Odd one- Ear ossicles (Part of middle ear)
Rest are the part of outer ear- Tympanum, Auditory canal, Pinna

(iii) Odd one- Household detergents (It is a cleaning agent)
Rest are medical tools- Syringes, Soiled dressings, Discarded needles.

(iv) Odd one- Simple Goitre (caused due to Iodine deficiency)
Rest are causes due to deficiency of thyroid hormone- Exophthalmic Goitre, Cretinism, Myxoedema

(v) Odd one – Creatinine (It is a waste product excreted through kidney)
Rest are nitrogenous bases- Adenine, Guanine, Cytosine

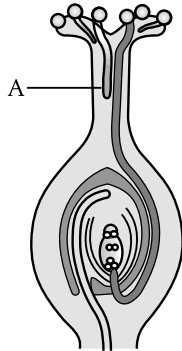
(g) Match the items given in column A with the most appropriate ones in Column B and REWRITE the correct matching pairs: [5]

Column A	Column B
(i) <i>Biston betularia</i>	- Calcium
(ii) Testes	- balance of the body
(iii) Clotting of blood	- Light independent reaction
(iv) Stroma	- diffusion of gases
(v) Stomata	- gonad
	- Peppered moth
	- Light dependent reaction
	- Chlorophyll

Ans. Column A Column B
(i) *Biston betularia* – Peppered moth
(ii) Testes - gonad balance of the body
(iii) Clotting of blood - Calcium

- (iv) Stroma - Light independent reaction
- (v) Stomata - diffusion of gases
- (h) The diagram given below represents a plant movement. [5]

Answer the following questions:

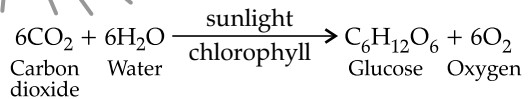
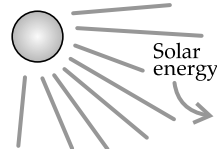
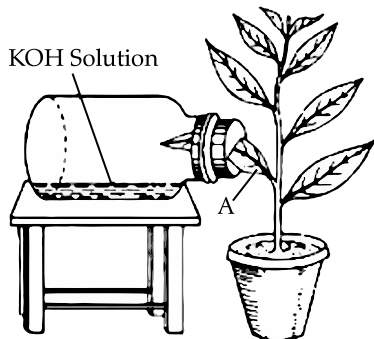


- (i) Name the tropic movement shown in the diagram.
 - (ii) Explain the tropic movement mentioned in (i).
 - (iii) Label the part marked 'A'.
 - (iv) What is part A attracted to?
 - (v) Give an example of a plant which shows Thigmotropism.
- Ans. (i) Chemotropism
 (ii) Chemotropism- This is a type of directional movement which responds towards the chemicals.
 (iii) Pollen tube
 (iv) Pollen tube penetrated through style and reaches towards ovary.
 (v) An example of thigmotropism is *Mimosa pudica* (touch me not plant)

SECTION-II **(40 marks)**

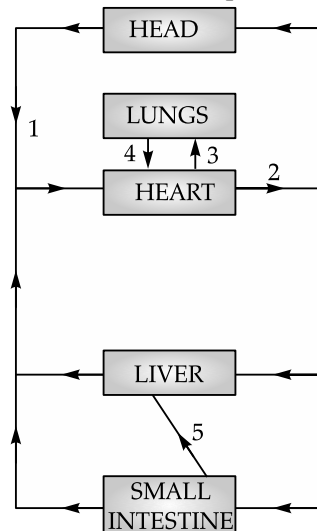
Attempt any four questions from this Section.

2. (a) The diagram given below represents an experiment to prove the importance of a factor in photosynthesis. Answer the questions that follow: [5]



- (i) Which factor is being studied here?
- (ii) What is the purpose of keeping KOH in the flask?
- (iii) Explain the term Photosynthesis.
- (iv) What will you observe when the leaf A is tested for starch?
- (v) Write a well balanced chemical equation for the process of photosynthesis.

- (b) The diagram given below represents the simplified pathway of the circulation of blood. Answer the questions that follow: [5]



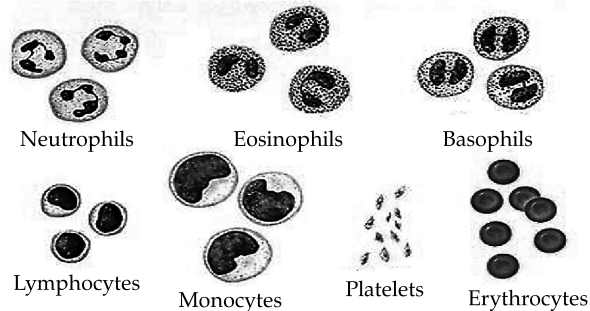
- Ans. (i) Presence of Carbon-dioxide is tested.
 (ii) KOH absorbs all the carbon-dioxide present in the flask for better testing.
 (iii) Photosynthesis is a process by which plant can prepare their own food with the help of inorganic substances such as, carbon-dioxide, water, sunlight, chlorophyll.
 (iv) When leaf A is tested for the presence of starch it is colorless, instead of black in color.
 (v) Chemical equation of photosynthesis-

- (i) Name the blood vessels labelled 1 to 4.
- (ii) Which blood vessel supplies oxygenated blood to the muscles of the heart?
- (iii) What is the importance of blood vessel labelled 5?
- (iv) What is the type of blood circulation that takes place between the heart and the lungs?
- (v) Draw a diagram of the different blood cells as seen in a smear of human blood.

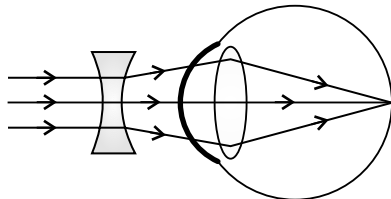
- Ans. (i) 1- Superior vena cava 2- Artery
 3- Pulmonary artery 4- Pulmonary vein
 (ii) Pulmonary veins carry oxygenated blood from lungs to heart
 (iii) Label 5 is hepatic portal vein carrying

deoxygenated blood from small intestine to liver along with nutrients.

- (iv) Pulmonary circulation
 (v) Different types of blood cells-



3. (a) The diagram given below depicts a defect of the human eye which has been corrected by using a suitable lens. [5]



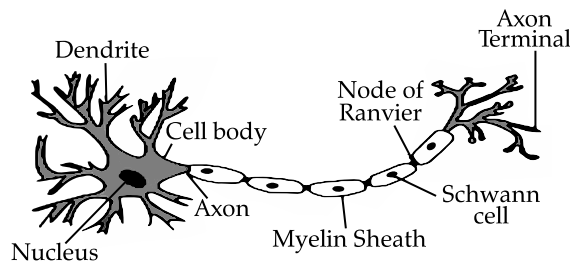
Answer the following questions:

- (i) Name the defect that has been corrected.
 Which type of lens has been used for the correction?
 (ii) Mention one cause for the above defect.

- (iii) Where would the image have formed if the above lens was not used for correction?
 (iv) Name the three concentric layers of the eyeball.
 (v) Draw a neat, labelled diagram of a neuron.

Ans.(a) (i) The defect shown in the figure is Myopia. This can be corrected by concave lens.

- (ii) It can cause due to elongation in eyeball.
 (iii) The image without correcting lens formed before or in front of retina.
 (iv) Three concentric layers of the eyeball as outer sclera, middle one is choroid and innermost is retina.
 (v) Structure of Neuron-



- (b) Give the biological reasons for the following statements: [5]
 (i) It is advisable to keep green plants in an aquarium.
 (ii) Water pollution is a major cause of concern in our country.
 (iii) We cannot distinguish colours in dim light.
 (iv) Medical discoveries such as antibiotics and vaccinations have indirectly contributed to the sharp rise in human population.
 (v) *Homo sapiens sapiens* is the most highly evolved form of man.

reason to keep green plants in an aquarium.

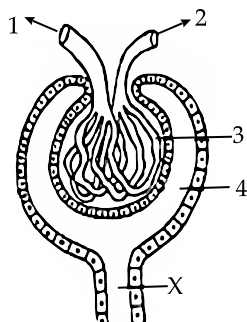
- (ii) Yes, Water pollution is a major concern in our country because as the level of water pollution increases it affects the majority of living beings.
 (iii) As the colors vision is controlled by cone cells, these cell can not be stimulated in dim light. that is why we are unable to distinguish color in dim light.
 (iv) Medical discoveries of antibiotics and vaccination are responsible for decreased death rate. That is why these discoveries contributed to the sharp rise in human population.
 (v) *Homo sapiens* have much larger brains in proportion to their body size than other organisms. This feature is often attributed

- Ans. (i) Green plant provide oxygen to the heterotrophic organism present in the aquarium This is the

to their high level of intelligence and the behavioural characteristics they present such as tool use and even communication through languages.

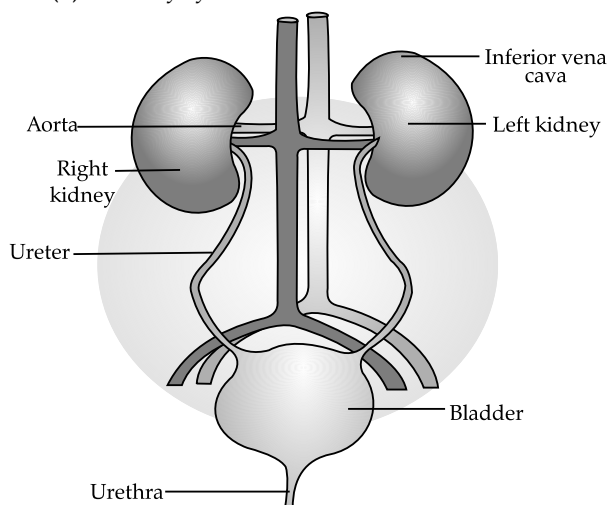
4. (a) The figure given below shows a part of a nephron. [5]

Answer the questions that follow:



- (i) In which region of the kidney is the above structure present?
- (ii) Label the parts numbered 1 to 4.
- (iii) What is the technical term for the process that occurs in part 3?
- (iv) Why is fluid X not called urine? Justify your answer.
- (v) Draw a neat, labelled diagram of the urinary system of man.

- Ans. (i) In a cortex region.
 (ii) 1- Efferent arteriole , 2- Afferent arteriole, 3- Glomerulus, 4- Bowman's capsule
 (iii) Ultrafiltration
 (iv) The fluid X contain a lot of useful material such as glucose and some salts. So it is not a waste and hence, it is not a urine.
 (v) Urinary system of man :

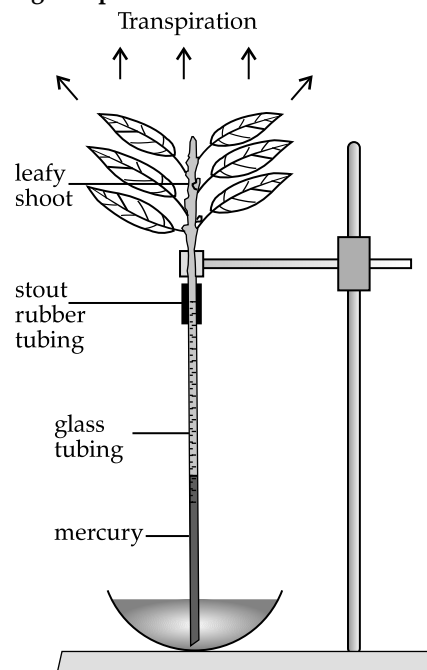


- (b) Differentiate between the following pairs on the basis of what is mentioned in the brackets: [5]

- (i) Transpiration and Guttation (place of occurrence)
- (ii) Biodegradable waste and Non-biodegradable waste (One example)
- (iii) Population control and Swachh Bharat Abhiyan (One objective)
- (iv) Osmosis and Active Transport (Substances undergoing movement)
- (v) Metaphase and Anaphase (Position of chromosomes)

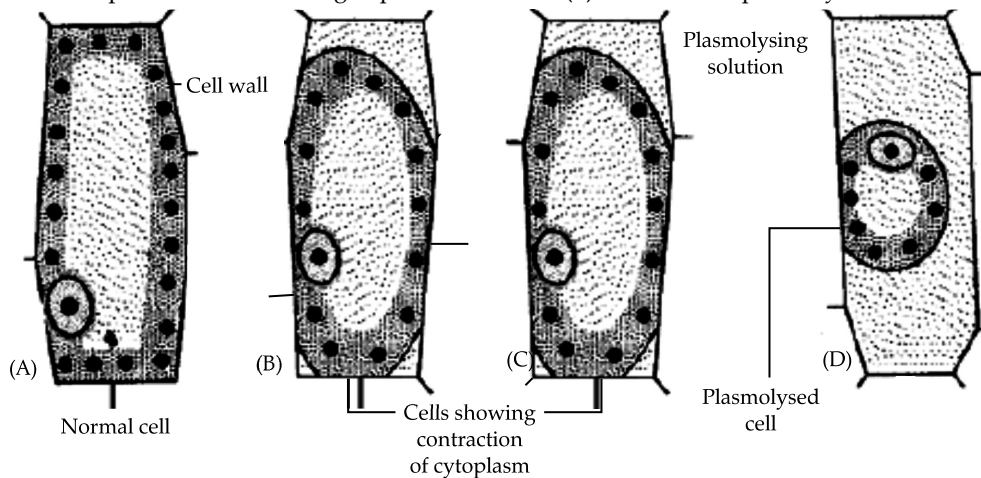
- Ans. (i) Transpiration occurs through the stomata in the leaves and lenticels in stem, whereas guttation occurs through hydathodes.
 (ii) Biodegradable waste- e.g., Fruit peel, vegetable peel, leaves, paper, etc.
 Non-biodegradable wastes e.g., Plastic, polythene, glass, etc.
 (iii) Objective of population control is to achieve stable population with the requirement of sustainable growth, whereas the swachh Bharat Abhiyan is started by the government of India in 2014 to eliminate open defecation and improve solid waste management.
 (iv) Osmosis is the diffusion of water molecules down a concentration gradient through a semi-permeable membrane. Active transport is the movement of a substance against a concentration gradient.
 (v) During metaphase, chromosomes are arranged in the equatorial plane, whereas during anaphase, daughter chromosomes move towards the opposite poles of the spindle.

5. (a) The diagram below represents an experiment to demonstrate a certain phenomenon in a green plant: [5]



- (i) Will the level of mercury in the glass tubing rise or fall?
Which conducting tissue of the plant does the glass-tubing represent?
- (ii) Define Transpiration.
- (iii) How will the rate of the above process differ if the environment of the plant has:
1. Less humidity
 2. High temperature?
- (iv) State any two advantages of transpiration to the plant.
- (v) Draw a neat labelled diagram of a Plasmolysed cell.

Ans. (i) The mercury level rise up due to increasing rate of transpiration. Glass tubing represents



(b) Give appropriate biological/ technical terms for the following: [5]

- (i) The sensory organ in Cochlea.
- (ii) Number of live births per 1000 people per year.
- (iii) The point of contact between two neurons.
- (iv) The accessory gland in human males whose secretion neutralises the acid in the vagina.
- (v) Condition when blood sugar level is lowered in the blood.
- (vi) Structure which helps in the adjustment of the size of the pupil.
- (vii) A surgical method of fertility control in human males.
- (viii) Process by which leucocytes migrate through the walls of capillaries.
- (ix) A sudden inheritable change in one or more genes.
- (x) A non-dividing phase of the cell cycle where more DNA is synthesised.

Ans. (i) The sensory organ in Cochlea -- The organ of corti
 (ii) Number of live births per 1000 people per year- Birth Rate
 (iii) The point of contact between two neurons- Synapse

the xylem tissues because they are the water conducting tissues.

- (ii) Transpiration is a process of loss of water in the form of vapours from the surface tissue or aerial part of the plants.
- (iii) 1. Less humidity in the environment increases the transpiration rate.
2. High temperature will also increase the transpiration rate.
- (iv) Advantages of transpiration-
 - It helps to create a suction pull within the plant.
 - It maintains the coolness of the plant.
 - It helps in the exchange of gases.
- (v) Structure of plasmolysed cell-

- (iv) The accessory gland in human males whose secretion neutralises the acid in the vagina- Bulbourethral glands
- (v) Condition when blood sugar level is lowered in the blood - Hypoglycemia
- (vi) Structure which helps in the adjustment of the size of the pupil- Iris
- (vii) A surgical method of fertility control in human males - Vasectomy
- (viii) Process by which leucocytes migrate through the walls of capillaries - Diapedesis
- (ix) A sudden inheritable change in one or more genes- Mutation
- (x) A non-dividing phase of the cell cycle where more DNA is synthesized- S-phase

6. (a) State two functions of: [5]
 (i) Ear
 (ii) Ethylene
 (iii) Tears
 (iv) Testis
 (v) Cerebellum

Ans. (a) Functions of the following-
 (i) Ear – 1. It is one of the sense organ for hearing.
2. It maintains the sense of balance (equilibrium).

- (ii) Ethylene- 1. It is a phytohormone or plant hormone.
2. It regulate or promote the growth and senescence in the plant parts.
- (iii) Tears- 1. These are the natural cleanser of our eyes as they wipe out all the dust from our eyes and keep them wet.
2. It helps to focus light so, the visibility is clear to us.
- (iv) Testis – 1. This is a male reproductive organ that produces male sex hormone called testosterone.
2. Testes produces sperm, a male gamete.
- (v) Cerebellum –1. It maintains the body posture.
2. It makes the co-ordination and equilibrium of the body.

(b) Complete the table: [5]

Name of the Hormone	Endocrine Gland	Function
(i)	(ii)	Deposits extra glucose of blood as glycogen
Growth Hormone	(iii)	(iv)
(v)	Thyroid	(vi)
(vii)	(viii)	Prepare body for any emergency
Oxytocin	(ix)	(x)

Ans. Complete the table:

Name of the Hormone	Endocrine Gland	Function
(i) Insulin	(ii) Pancreas	Deposits extra glucose of blood as glycogen
Growth Hormone	(iii) Pituitary	(iv) Helps in growth of the body cells, muscles and bones.
(v) Thyroxine	Thyroid	(vi) Helps in brain development and maintenance of bones.
(vii) Adrenaline	(viii) Adrenal	Prepares body for any emergency
Oxytocin	(ix) Posterior pituitary	(x) It stimulate uterine contraction at the time of child birth.

7. (a) A homozygous dominant tall pea plant bearing red flowers (TTRR) is crossed with a homozygous recessive dwarf pea plant bearing white flowers (ttrr). [5]

(i) What is the phenotype and genotype of F₁ individuals?

(ii) Write the possible combination of gametes that are obtained when two F₁ hybrid plants are crossed.

(iii) Mention the phenotypic ratio of the F₂ generation.

(iv) State Mendel's Law of Independent Assortment.

(v) Name two X-linked disorders found in humans.

Ans. (i) Phenotype of F₁ generation are- All are tall and red in color while genotype are heterozygous TtRr

(ii) Possible combination of gametes obtained TR, Tr, tR, tr

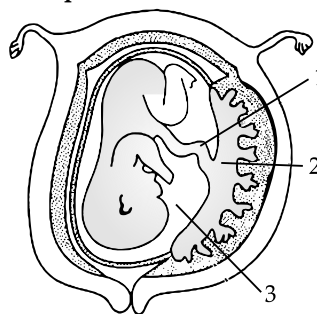
(iii) Ratio obtained in F₂ generation are 9:3:3:1

(iv) Law of independent assortment states that the alleles or factors of two different genes get sorted into gametes independently one another.

(v) X-linked disorders are Colour blindness and haemophilia.

(b) The diagram given below is that of a developing human foetus. [5]

Answer the questions that follows:



(i) Label the parts numbered 1 to 3 in the diagram.

(ii) Mention any two functions of the part labelled 2 in the diagram.

(iii) Explain the significance of the part numbered 3 in the diagram.

(iv) Define the term 'Gestation'.

What is the normal gestational period of the developing embryo?

(v) Mention the sex chromosomes in a male and female embryo.

Ans. (i) Part 1- Umbilical cord

Part 2- Placenta

Part 3 hyphen Amniotic fluid

(ii) a. Placenta provide nutrition and oxygen to the fetus from the mother.

b. Remove the waste produced in the foetus.

- (iii) Significance of amniotic fluid- It helps the foetus in movement inside the mother's womb and protects the foetus from outside pressure and jerks.
- (iv) Gestation – It is a time period from development of the foetus body till birth inside the mother's

womb. The normal gestation period can be 280 days or 40 weeks or 9 months.

- (v) Sex chromosome in male are XY (heterozygous condition) and in females it is XX (a homozygous condition).

□□□