

ICSE QUESTION PAPER

Class X **Biology**

(2015)

General Instructions:

Total Marks: 80

1. Answers to this paper must be written on the paper provided separately.
2. You will **not** be allowed to write during the first **15** minutes.
This time is to be spent in reading the question paper.
3. The time given at the head of the paper is the time allowed for writing the answers.
4. Attempt **all** questions from **Section I** and **any four** questions from **Section II**.
5. The intended marks of questions or parts of questions are given in brackets [].

SECTION I (40 Marks)

*Attempt **all** questions from this Section*

Question 1

(a) Name the following:

- (i) The process of uptake of mineral ions against the concentration gradient using energy from cell.
- (ii) The form in which glucose is stored in liver.
- (iii) The vein that carries oxygenated blood.
- (iv) The cross between two parents having one pair of contrasting characters.
- (v) The structure formed by the villi of the embryo and the uterus of the mother.

[5]

(b) The statements given below are false. Rewrite the correct form of the statement by changing the word which is underlined:

- (i) Alpha cells of pancreas secrete Insulin.
- (ii) Formalin is an example of an Antiseptic.
- (iii) CNG is mainly responsible for the formation of acid rain.
- (iv) Sulphadiazine is an example of an Antiseptic.
- (v) Cretinism is caused due to deficiency of Adrenaline.

[5]

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

- (i) A single highly coiled tube where sperms are stored, gets concentrated and mature as known as:
 - A. Epididymis
 - B. Vas efferentia
 - C. Vas deferens
 - D. Seminiferous tubule

- (ii) Chromosomes get aligned at the centre of the cell during:
- Metaphase
 - Anaphase
 - Prophase
 - Telophase
- (iii) BCG vaccine is effective against
- Cholera
 - Mumps
 - Tuberculosis
 - Measles
- (iv) Which one of the following associated with the maintenance of the posture?
- Cerebrum
 - Cerebellum
 - Thalamus
 - Pons
- (v) An example of non-biodegradable waste is
- Vegetable peels
 - Sewage
 - Livestock waste
 - DDT

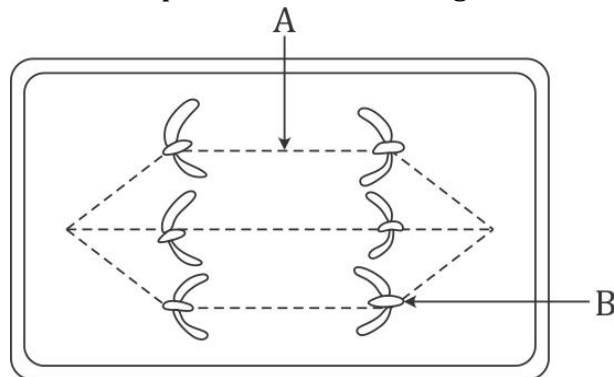
[5]

(d) Mention the exact location of the following structures:

- Thylakoids
- Organ of Corti
- Lenticels
- Bicuspid valve
- Loop of Henle

[5]

(e) The diagram given below represents a certain stage of mitosis:



- Identify the stage of cell division.
- Name the parts labelled A and B
- What is the unique feature observed in this stage?
- How many daughter cells are formed from this type of cell division?

[5]

- (f)** Given below is an example of a certain structure and its special functional activity. On a similar pattern fill in the blanks with suitable functions:

Example: Chloroplast and photosynthesis

- (i) Xylem and _____.
- (ii) Ciliary body and _____.
- (iii) Seminiferous Tubule and _____.
- (iv) Thyroid gland and _____.
- (v) Eustachian Tube and _____.

[5]

- (g)** Rewrite and complete the following sentences by inserting the correct word in the space indicated:

- (i) The phenomenon of loss of water through a cut stem or injured part of plant is called _____.
- (ii) _____ is the scientific name of garden pea, which Mendel used for his experiments.
- (iii) A fluid that occupies the larger cavity of the eye ball behind the lens is _____.
- (iv) Oxygen combines with haemoglobin present in RBC and forms _____.
- (v) _____ causes corrosion of the marble or brick surface.

[5]

- (h)** Match the items in Column 'A' with those which are most appropriate in Column 'B'.

Rewrite the matching pairs as shown in the example:

[5]

Example: Fibrinogen – Clotting of blood.

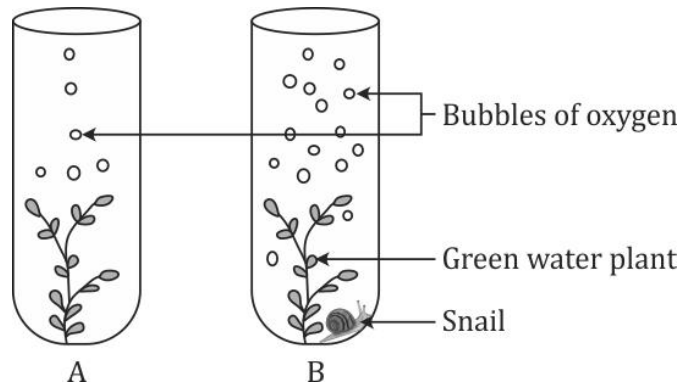
Column A	Column B
(1) Allele	(a) Control of automobile exhaust
(2) Leydig cells	(b) Tourniquet
(3) Utriculus	(c) Alternate forms of genes
(4) Snake bite	(d) Dynamic equilibrium
(5) Euro IV norms	(e) Testosterone
	(f) Sudden change in genes
	(g) Static equilibrium

SECTION II (40 Marks)

Attempt any four questions from this Section

Question 2

- (a) The diagram below shows two test-tubes A and B. Test-tube A contains a green water plant. Test-tube B contains both a green water plant and a snail. Both test-tubes are kept in sunlight. Answer the questions that follow:



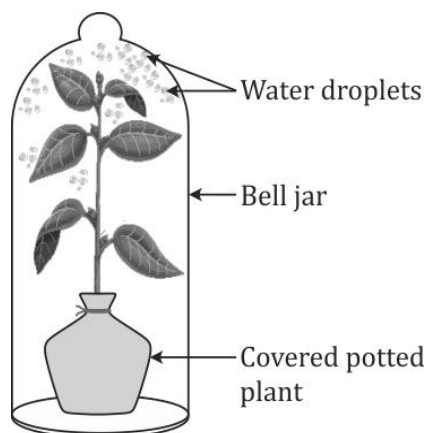
- Name the physiological process that releases the bubbles of oxygen.
- Explain the physiological process as mentioned above in Q.2 (a)(i).
- What is the purpose of keeping a snail in test-tube 'B'?
- Why does test-tube 'B' have more bubbles of oxygen?
- Given an example of a water plant that can be used in the above process.
- Write the overall chemical equation for the above process. [5]

- (b) Give the biological/technical terms for the following:

- A mixture of smoke and fog.
- Capacity of our body to resist disease.
- Fixing of developing zygote on the uterine wall.
- The permanent stoppage of menstruation at about the age of 45 years in a female.
- The hormone increasing reabsorption of water by kidney tubules.
- A thin membrane covering the entire front part of the eye.
- The lens of eye losing flexibility resulting in a kind of long-sightedness in middle aged people.
- The number of persons living per square kilometre at any given time.
- The sound produced when the atrio-ventricular valves close in the heart.
- The process by which white blood cells engulf bacteria. [5]

Question 3

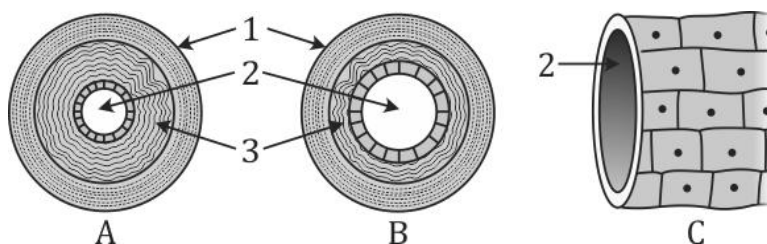
- (a)** An apparatus as shown below was set up to investigate a physiological process in plants. The setup was kept in sunlight for two hours. Droplets of water were then seen inside the bell jar. Answer the questions that follow:



- (i) Name the process being studied.
 - (ii) Explain the process named above in Q.3(a)(i).
 - (iii) Why was the pot covered with a plastic sheet?
 - (iv) Suggest a suitable control for this experiment.
 - (v) Mention two ways in which this process is beneficial to plants.
 - (vi) List three adaptations in plants to reduce the above mentioned process. [5]
- (b)** Briefly answer the following questions:
- (i) State two reasons for the increase of population in India.
 - (ii) What is the significance of amniotic fluid?
 - (iii) What is the function of ear ossicles?
 - (iv) Mention any two activities of the WHO.
 - (v) State Mendel's law of Dominance. [5]

Question 4

(a) The diagrams given below are cross sections of blood vessels:



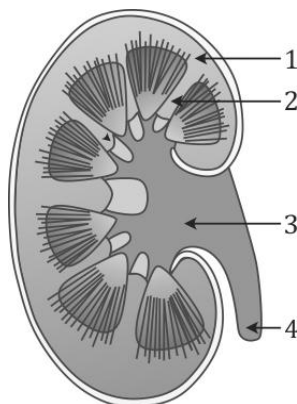
- (i) Identify the blood vessels A, B and C.
- (ii) Name the parts labelled 1 to 3.
- (iii) Name the type of blood that flows through A.
- (iv) Mention one structural difference between A and B.
- (v) In which of the above vessels does exchange of gases actually take place? [5]

(b) Differentiate between the following pairs on the basis of what is mentioned within brackets:

- (i) Diffusion and Osmosis (Definition)
- (ii) RBC and WBC (Shape)
- (iii) Tubectomy and Vasectomy (Part cut and tied)
- (iv) Vasopressin and Insulin (Deficiency disorder)
- (v) Rods and Cones of Retina (Type of pigment) [5]

Question 5

(a) The diagram given below shows a section of human kidney. Study the diagram carefully and answer the questions that follow:



- (i) Label the parts numbered 1 to 4.
- (ii) Why does part '2' have a striped appearance?
- (iii) What is the fluid that passes down part '4'? Name the main nitrogenous waste present in it.
- (iv) Mention the structural and functional units of kidneys.
- (v) Name the two major steps in the formation of the fluid mentioned in Q.5 (a) (iii). [5]

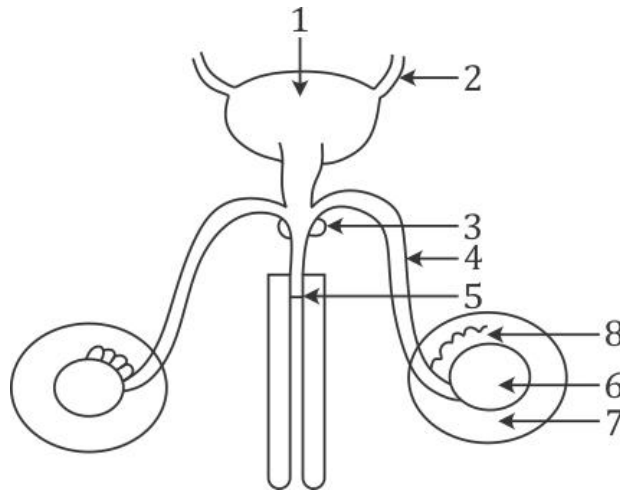
(b) Draw neat and labelled diagrams of the following:

- (i) Malpighian Capsule
- (ii) A Myelinated Neuron

[5]

Question 6

(a) The diagram given below shows the male urinogenital system of a human being. Study the diagram and answer the questions that follow:



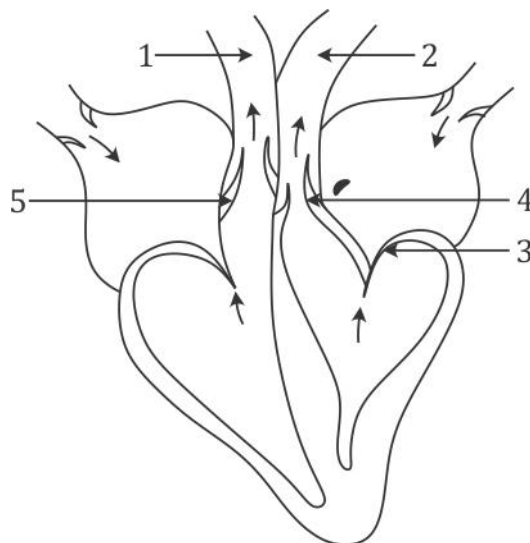
- (i) Label the parts numbered 1 to 8.
- (ii) Name the corresponding structure of part (4) in female reproductive system.
- (iii) What is the role of part 7? [5]

(b) In a homozygous plant round seeds (R) are dominant over wrinkled seeds (r):

- (i) Draw a Punnett square to show the gametes and offspring when both the plants have heterozygous round seeds (Rr).
- (ii) Mention the Phenotype and Genotype ratios of the offspring in F_2 generation.
- (iii) Name the sex chromosomes in human males and females.
- (iv) Briefly explain the term 'Mutation'.
- (v) What is the number of chromosomes in the gametes of human beings? [5]

Question 7

- (a) The diagram below represents the human heart in one phase of its function. Study the diagram carefully and answer the questions that follow:



- (i) Name the phase.
- (ii) Which part of the heart is contracting in this phase? Give a reason to support your answer.
- (iii) Name the parts labelled 1 to 4.
- (iv) What type of blood flows through '2'?
- (v) State the function of the part numbered '5'.
- (vi) Name the membrane that covers the heart.

[5]

- (b) Explain the following terms:

- (i) Greenhouse effect
- (ii) Turgor pressure
- (iii) Selective reabsorption
- (iv) Natality
- (v) Pulse

Class X Biology
Board Paper 2015 (Solution)

SECTION I

Answer 1

(a)

- (i) Active transport
- (ii) Glycogen
- (iii) Pulmonary vein
- (iv) Monohybrid cross
- (v) Placenta

(b)

- (i) Alpha cells of pancreas secrete glucagon.
- (ii) Formalin is an example of a disinfectant.
- (iii) Sulphur dioxide is mainly responsible for the formation of acid rain.
- (iv) Sulphadiazine is an example of a sulphonamide (sulpha drug).
- (v) Cretinism is caused due to deficiency of thyroxine.

(c)

- (i) A. Epididymis
(The epididymis is a single, highly coiled tube about 6 metres long which stores sperms for some days during which they mature and become motile.)
- (ii) A. Metaphase
(During metaphase, each chromosome gets attached to the spindle by its centromere. The chromosomes line up in the centre at the equatorial plane.)
- (iii) C. Tuberculosis
(BCG is a freeze-dried vaccine effective against tuberculosis.)
- (iv) B. Cerebellum
(Cerebellum, a part of the hindbrain, is responsible for maintaining posture, balance and equilibrium of the body.)
- (v) D. DDT
(DDT [Dichlorodiphenyltrichloroethane] is a non-biodegradable pollutant which persists in nature and tends to accumulate in the food chain.)

(d)

- (i) Thylakoids: Located in the inner membrane of the chloroplast.
- (ii) Organ of Corti: Present in the middle canal of the inner ear or membranous labyrinth.
- (iii) Lenticels: Present on the older stems of plants in place of stomata.
- (iv) Bicuspid valve: Located at the aperture between the left auricle and the left ventricle.
- (v) Loop of Henle: Runs in the medulla of the kidneys and connects the proximal convoluted tubule and the distal convoluted tubule.

(e)

- (i) Anaphase
- (ii) A - Spindle fibre
B - Centromere
- (iii) During this stage (anaphase), the two sister chromatids of each chromosome separate and are drawn towards the opposite poles because of shortening of spindle fibres.
- (iv) This type of cell division (mitosis) results in the formation of two daughter cells.

(f)

- (i) Xylem and **Absorption and conduction of water.**
- (ii) Ciliary body and **Alteration of the shape of the eye lens.**
- (iii) Seminiferous tubule and **Spermatogenesis.**
- (iv) Thyroid gland and **Secretion of thyroxine and calcitonin.**
- (v) Eustachian tube and **Equalising air pressure.**

(g)

- (i) The phenomenon of loss of water through a cut stem or injured part of plant is called **bleeding.**
- (ii) **Pisum sativum** is the scientific name of garden pea, which Mendel used for his experiments.
- (iii) A fluid that occupies the larger cavity of the eye ball behind the lens is **vitreous humour.**
- (iv) Oxygen combines with haemoglobin present in RBC and forms **oxyhaemoglobin.**
- (v) **Acid rain** causes corrosion of the marble or brick surface.

(h)

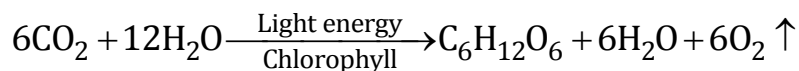
- (1) Allele – Alternate forms of genes
- (2) Leydig cells – Testosterone
- (3) Utriculus – Dynamic equilibrium
- (4) Snake bite – Tourniquet
- (5) Euro IV norms – Control of automobile exhaust

SECTION II

Answer 2

(a)

- (i) Photosynthesis releases the bubbles of oxygen.
- (ii) Photosynthesis is a physiological process by which plant cells containing chlorophyll produce food in the form of carbohydrates by using carbon dioxide, water and light energy. Oxygen is released as a by-product.
- (iii) Carbon dioxide released by the snail during respiration is used by the plant for photosynthesis. This increases the rate of photosynthesis in the plant placed in test tube B. This also suggests that both respiration and photosynthesis are complementary processes to maintain the concentration of oxygen and carbon dioxide in the atmosphere.
- (iv) In test tube B, a plant and a snail are kept. The plant in test tube B has more concentration of CO₂ available because the snail releases CO₂ during respiration. This increases the rate of photosynthesis in the plant placed in test tube B which leads to the release of more amount of oxygen.
- (v) *Hydrilla*
- (vi) Chemical equation for photosynthesis:



(b)

- (i) A mixture of smoke and fog – **Smog**
- (ii) Capacity of our body to resist disease – **Immunity**
- (iii) Fixing of developing zygote on the uterine wall – **Implantation**
- (iv) The permanent stoppage of menstruation at about the age of 45 years in a female – **Menopause**
- (v) The hormone increasing reabsorption of water by kidney tubules – **Anti-diuretic hormone (Vasopressin)**
- (vi) A thin membrane covering the entire front part of the eye – **Conjunctiva**
- (vii) The lens of eye losing flexibility resulting in kind of long-sightedness in middle aged people – **Presbyopia**
- (viii) The number of persons living per square kilometre at any given time – **Population density**
- (ix) The sound produced when atrioventricular valves close in the heart – **Lubb sound**
- (x) The process by which white blood cells engulf bacteria – **Phagocytosis**

Answer 3

(a)

- (i) Transpiration
- (ii) Transpiration is a process during which water is lost in the form of water vapour through the aerial parts of the plant.
- (iii) The pot is covered with a plastic sheet to prevent the evaporation of water from the soil.
- (iv) A control for this experiment will be an empty polythene bag with its mouth tied.
- (v) Transpiration is beneficial to plants in the following ways:
 - It creates a suction force in the stem which enables the roots to absorb water and minerals.
 - It helps in cooling the plant in hot weather.
- (vi) Adaptations in plants to reduce transpiration are
 - Leaves may be modified into spines as in cactus or into needles as in pines.
 - The number of stomata is reduced and they may be sunken in pits.
 - Leaves may be folded or rolled up.

(b)

- (i) Reasons for the increase of population in India:
 - Most Indian families desire to have at least one son. Hence, a couple produces several children till a son is born.
 - Most of the rural population is still illiterate, ignorant and superstitious. Therefore, they do not make any effort to avoid pregnancy.
- (ii) Significance of amniotic fluid:
 - It protects the embryo from physical damage by jerks and mechanical shocks.
 - It also maintains even pressure all around the embryo.
- (iii) Function of ear ossicles:
 - Ear ossicles once set in vibrations transmit the vibration to the oval window which sets the cochlear fluid into vibration.
- (iv) Activities of WHO:
 - Collecting and supplying information about the occurrence of diseases of an epidemic nature.
 - Supplying information on the latest developments about the use of vaccines, cancer research, nutritional discoveries, control of drug addiction and the health hazards of nuclear radiation.
- (v) Mendel's law of dominance:

Out of a pair of contrasting characters present together, only one is able to express itself, while the other remains suppressed.

Answer 4**(a)**

- (i) A – Artery
B – Vein
C – Blood capillary
- (ii) 1 – External layer of connective tissue
2 – Lumen
3 – Middle layer of smooth muscles and elastic fibres
- (iii) Oxygenated blood flow through A
- (iv) Structure difference between A (artery) and B (vein):

A (Artery)	B (Vein)
Valves are not present.	Valves are present.

- (v) In blood capillaries, the exchange of gases takes place.

(b)

(i) Diffusion and Osmosis (Definition):

Diffusion	Osmosis
Diffusion is the free movement of molecules of a substance from the region of its higher concentration to the region of its lower concentration when the two substances are in direct contact.	Osmosis is the diffusion of water molecules across a semi-permeable membrane from a more dilute solution (with a lower solute concentration) to a less dilute solution (with a higher solute concentration).

(ii) RBC and WBC (Shape):

RBC	WBC
RBCs are disc-like, flat at the centre and round at the periphery.	WBCs are amoeboid or irregular in shape.

(iii) Tubectomy and Vasectomy (Part cut and tied):

Tubectomy	Vasectomy
Fallopian tubes are cut and ligated.	Vas deferentia are cut and ligated.

(iv) Vasopressin and Insulin (Deficiency disorder):

Vasopressin	Insulin
Insufficient secretion of vasopressin causes diabetes insipidus.	Insufficient secretion of insulin causes diabetes mellitus.

(v) Rods and Cones of Retina (Type of pigment):

Rods	Cones
Rods produce rhodopsin.	Cones produce iodopsin.

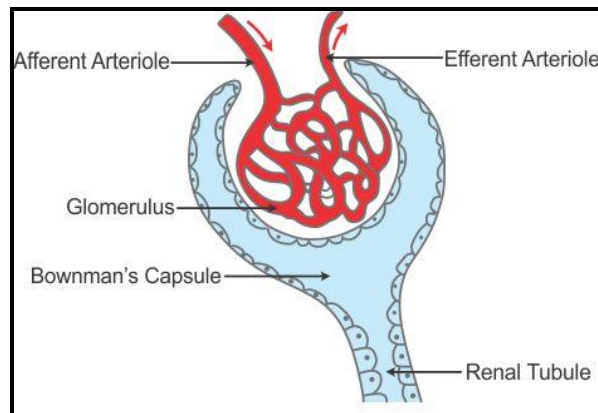
Answer 5

(a)

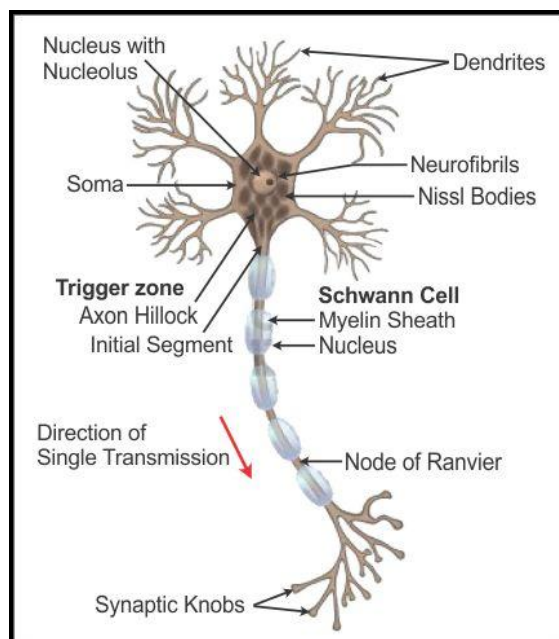
- (i) 1 – Cortex
2 – Medulla
3 – Pelvis
4 – Ureter
- (ii) Medulla is composed of a striped substance arranged in several pyramids. Hence, the medulla (2) has a striped appearance.
- (iii) Urine passes down part '4', i.e. ureter. The main nitrogenous substance present in it is urea.
- (iv) Nephrons are the structural and functional units of the kidneys.
- (v) The two major steps in the formation of urine are ultrafiltration and selective reabsorption.

(b)

- (i) Malpighian capsule



- (ii) A myelinated neuron



Answer 6

(a)

- (i) 1 – Urinary bladder
2 – Ureter
3 – Cowper's gland
4 – Vas deferens
5 – Urethra
6 – Testis
7 – Scrotum
8 – Epididymis
- (ii) Fallopian tube or oviduct
- (iii) Scrotum is a sac-like structure which encloses the testes. Because it is situated outside the body cavity, it maintains the lower temperature favourable for the production of sperms.

(b)

- (i) Punnett square:
Both plants are with heterozygous round seeds (Rr)

Gametes	R	r
R	RR (Homozygous round seeds)	Rr (Heterozygous round seeds)
r	Rr (Heterozygous round seeds)	rr (Homozygous wrinkled seeds)

- (ii) Phenotypic ratio of the offspring in F₂ generation: 3:1
Genotypic ratio of the offspring in F₂ generation: 1:2:1
- (iii) Sex chromosomes in human males are X and Y.
Sex chromosomes in human females are XX.
- (iv) Mutation is the sudden change in one or more genes, or in the number or in the structure of chromosomes.
- (v) The number of chromosomes in the gametes of human beings is 23.

Answer 7

(a)

- (i) Ventricular systole
- (ii) Ventricles are contracting in this phase. In the diagram given, tricuspid valves and bicuspid valves are closed, while the semi-lunar valves are open.
- (iii) 1 – Pulmonary artery
2 – Aorta
3 – Bicuspid valve
4 – Semilunar valve (aortic semilunar valve)
- (iv) Oxygenated blood flows through '2', i.e. aorta.
- (v) '5' is pulmonary semilunar valve. It prevents the backflow of blood into the right ventricle at the time of ventricular diastole.
- (vi) Pericardium covers the heart.

(b)

- (i) Greenhouse effect:
Gases such as CO₂, methane, nitric oxide and nitrous oxide in the atmosphere act as greenhouse gases. Their increased concentration in the atmosphere prevents the escape of heat which warms the air. This is called greenhouse effect.
- (ii) Turgor pressure:
In a turgid plant cell, the pressure of the cell contents on the cell wall is called the turgor pressure.
- (iii) Selective reabsorption:
The glomerular filtrate entering the renal tubule contains many useful substances. Hence, as the filtrate passes down the tubule, water and other substances required by the body are reabsorbed. This reabsorption occurs only to the extent that the normal concentration of the blood is undisturbed. This entire process is called selective reabsorption.
- (iv) Natality:
The number of live births per 1000 people of population per year is called natality.
- (v) Pulse:
The pulse is the alternate expansion and elastic recoil of the wall of the artery during ventricular systole.