

**SECTION A (40 Marks)**  
*Compulsory: Attempt all questions.*

**Question 1**

(a) **Directions:** Each question in this part is followed by four possible choices of answers. Choose the correct answer with key and write it in the space provided. [15]

(i) Which one of the following pairs of cell organelle is involved in cell division?

- A** nucleus and ribosome
- B** nucleus and centrosome
- C** centrosome and ribosome
- D** centrosome and lysosome

Answer:.....

(ii) Dorji and Dema are both heterozygous tall. The ratio of inheritance in their children will be

- A** 2:2.
- B** 2:3.
- C** 3:1.
- D** 3:2.

Answer:.....

(iii) During stomatal transpiration, water is lost through the process of

- A** imbibition.
- B** diffusion.
- C** cohesion.
- D** osmosis.

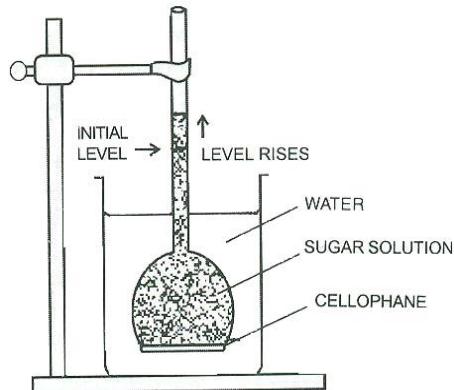
Answer:.....

(iv) The light dependent phase of photosynthesis involves the

- A** activation of chlorophyll + reduction of CO<sub>2</sub>
- B** activation of chlorophyll + splitting of water
- C** splitting of water + reduction of CO<sub>2</sub>
- D** trapping of light + absorption of water

Answer:.....

(v) The physiological process in plants demonstrated by the experimental set-up is



- A** plasmolysis.
- B** endosmosis.
- C** exosmosis.
- D** diffusion.

Answer:.....

(vi) Which of the following is correct?

- A** entry of light rays → focusing of image → nerve impulse from retina transferred to brain → brain interprets
- B** entry of light rays → brain interprets → nerve impulse from retina transferred to brain → focusing of image
- C** entry of light rays → nerve impulse from retina transferred to brain → focusing of image → brain interprets
- D** entry of light rays → brain interprets → focusing of image → nerve impulse from retina transferred to brain

Answer:.....

(vii) Which of the following is related to hormonal control?

- A** does not regulate metabolism
- B** effect is short lived
- C** affects the growth
- D** action is instant

Answer:.....

(viii) The correct course of change that occurs in a female ovary is

- A** follicle → graafian follicle → ova.
- B** graafian follicle → follicle → ova.
- C** follicle → ova → graafian follicle.
- D** ova → follicle → graafian follicle.

Answer:.....

(ix) Tenzing has a large family. Which of the following would be a disadvantage for his children?

- A** comfortable shelter
- B** better education
- C** proper guidance
- D** malnutrition

Answer:.....

(x) When baby Thinley Lhamo was nine months, she was given a measles vaccine. She would develop

- A** specific innate immunity.
- B** actively acquired immunity.
- C** passively acquired immunity.
- D** non-specific innate immunity.

Answer:.....

(xi) Which one of the following is the function of local bodies?

- A** Extend relief help to victims of any natural calamities.
- B** Look after the health problems of people of the world.
- C** Look after the economic development of the world.
- D** Removal and proper disposal of waste.

Answer:.....

(xii) The functions of internal organs is under the control of

- A** medulla oblongata.
- B** cerebellum.
- C** cerebrum.
- D** thalamus.

Answer:.....

(xiii) People who live in places which do not have proper water supply may suffer from

- A** tuberculosis.
- B** typhoid.
- C** leprosy.
- D** cancer.

Answer:.....

(xiv) Durga was advised to 'immediately wash with sufficient cold water and apply prescribed ointments on the point of injury' to treat her

- A** insect bite.
- B** snake bite.
- C** bleeding.
- D** burns.

Answer:.....

(xv) If the acrosome in a sperm is absent, it would not have the

- A** energy to swim.
- B** thrust to move forward.
- C** enzyme to enter the ovum.
- D** genetic materials to pass on to off-spring.

Answer:.....

**(b) Name the following:**

**[4]**

- (i) The solution in which the water entering the cell exceeds the water leaving the cell.
- (ii) The passing of characters from generation to generation.
- (iii) The cell division where only two daughter cells are produced.
- (iv) The surgical method of sterilization of a female.

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(c) **Fill in the blanks by using the words given in the bracket.** [4]

(progesterone, white matter, thylakoids, testosterone, gray matter, stroma, antibodies, antibiotics)

- (i) .....is a hormone produced by interstitial cells of testis.
- (ii) The convolutions in cerebrum is the layer of.....
- (iii) Chloroplast contain.....arranged in piles.
- (iv) On exposure to antigens.....are produced.

(d) **State whether the following statements are true or false. If false, rewrite the correct form of the statement by changing the underlined word/s only.**

[6]

(i) Hypersecretion of hormone from adrenal cortex causes Addison's disease.

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(ii) Cells that have lost their water content are said to be plasmolysed.

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(iii) Adrenalin is a hormone which prepares the body to meet emergency situations.

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(iv) Playing a guitar is an example of simple reflex.

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(v) Phloem is the water conducting tissue in plants.

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(vi) Car sickness is due to stimulation of fluid in cochlea.

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(e) **Match each item under Column A against the most appropriate item in Column B.  
Rewrite the correct matching pairs in the spaces provided.**

[5]

Column A	Column B
(i) Guttation	a. death rate
(ii) Natality	b. DDT
(iii) Antiseptic	c. shock absorber
(iv) Histone	d. hydathode
(v) Amniotic fluid	e. birth rate
	f. lenticel
	g. lysol
	h. nucleosome

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(f) **Differentiate between each of the following pairs based on what is given in the bracket in each table that follows:**

[4]

(i) Cell wall and plasma membrane (*composition*)

Cell wall	Plasma membrane

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(ii) Character and trait (*definition*)

Character	Trait

(iii) Stomatal transpiration and cuticular transpiration (*site of transpiration*)

Stomatal transpiration	Cuticular transpiration

(iv) Testis and ovary (*gamete formation*)

Testis	Ovary

(g) **Answer the following questions:**

(i) If there were only non-green plants, all life on earth would come to an end. Justify. [1]

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(ii) Very poor literacy rate has led to population explosion in Shangrila. How does illiteracy contribute to increase in population? [1]

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## **SECTION B (40 Marks)**

*Attempt any four questions*

### **Question 2**

(a) ***Answer the following questions:*** [5]

(i) What is a cell organelle?

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(ii) How does transpiration help in developing the suction force in plants?

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(iii) Explain the formation of chiasmata during cell division.

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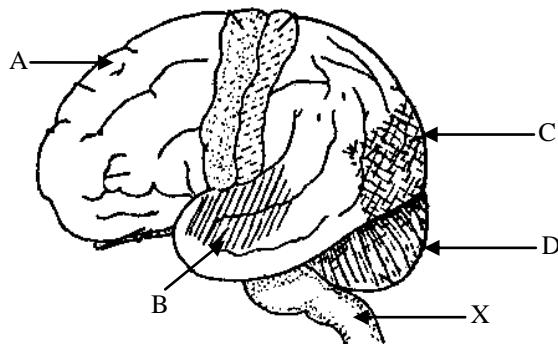
(iv) Why is the blind spot in human eye also known as an area of no vision?

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(v) New discoveries in medical science led to a rapid growth in population during the twentieth century. Do you agree?

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(b) Study the diagram given below and answer the questions that follow:



(i) Write the functions of the parts A, B, C, D.

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(ii) What are the *two* important functions of the part marked X.

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(iii) A person is believed to be intelligent, if he or she has higher number of convolutions in the brain. Justify the statement.

[1]

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### Question 3

(a) A pure breeding tall pea plant is cross pollinated with a pure breeding dwarf pea plant.

(i) Give the genotype and phenotype of F1 generation.

[1]

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(ii) Find the phenotypic and genotypic ratio of F2 generation obtained by self pollination from F1 generation.

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(iii) Draw a pedigree chart to support your answer.

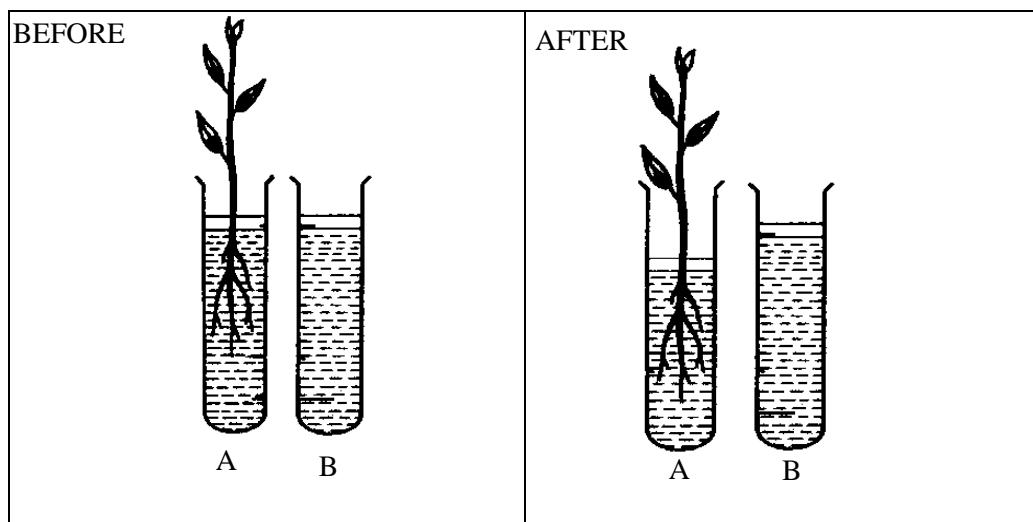
[1]

(b) State **one** difference between cell division in an animal cell and a plant cell in the table given below:

[1]

Animal cell	Plant cell

(c) The experiment below shows a certain phenomenon occurring in plants.



(i) What is the aim of the experiment?

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(ii) What difference will you observe in test tubes A and B after 1-2 hours?

[1]

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(iii) Write a suitable explanation for the observation concluded in question (ii). [2]

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(iv) Why is the water covered with oil? [1]

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#### Question 4

(a) With references to the human reproductive system, answer the following questions:

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

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(ii) Why does a full grown human embryo respire instead of breathing? [2]

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(iii) Which part of the female reproductive organ is the main site for fertilization? [1]

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(iv) List any *two* changes which occur in a male during puberty.

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(b) (i) How does the skin protect our body from infections?

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(ii) What is cytokinesis?

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(iii) Why is the mitochondria known as the power house of a cell?

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(iv) Briefly explain population density.

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(v) When should a casualty be provided with the first aid?

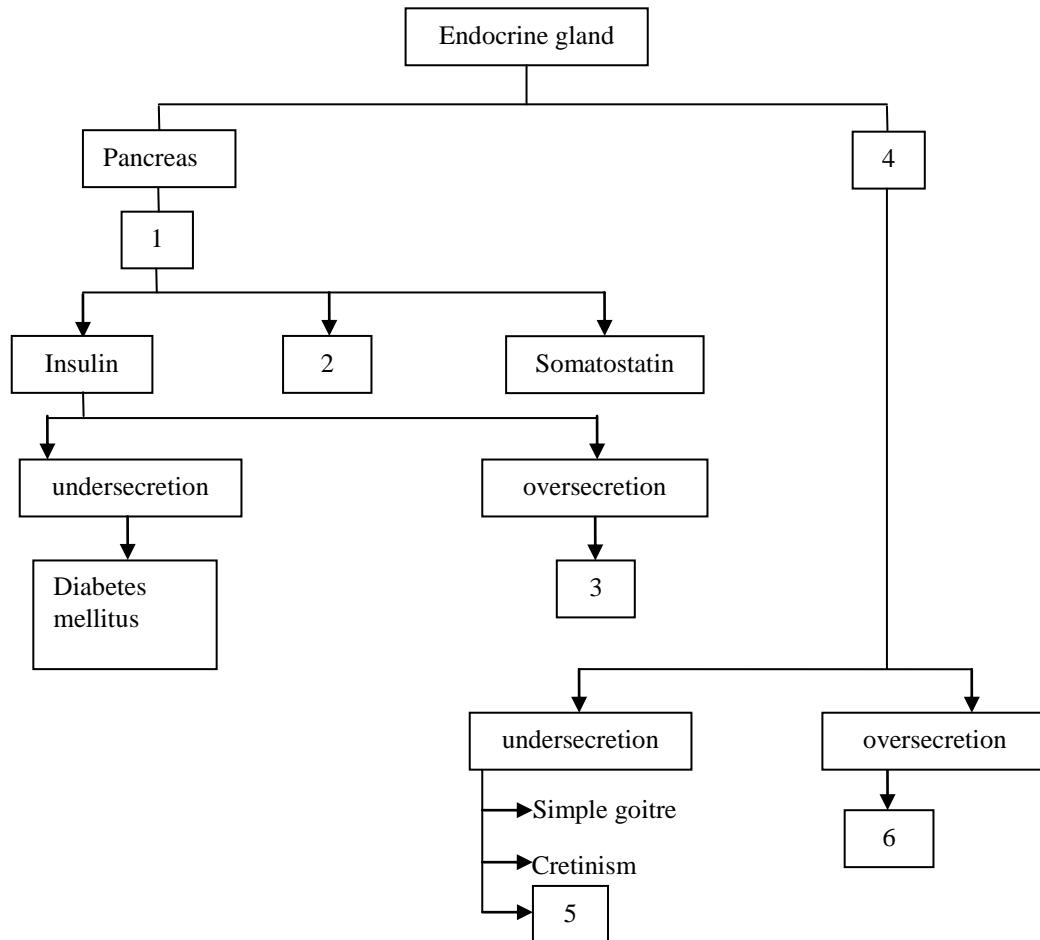
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**Question 5**

(a) (i) Complete the following flow chart. Write the appropriate terms for the parts numbered 1 to 5 in the space provided below.

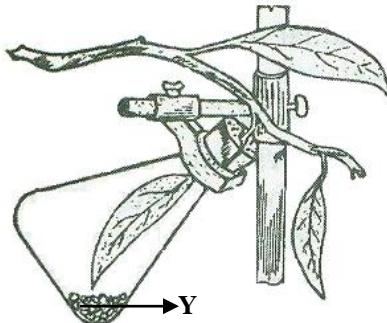
[3]



(ii) Before making a speech to a large audience, your mouth dries up and heart rate increases. What causes these changes?

[2]

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(b) Given below is the diagram of an experimental set-up.



(i) What is the purpose of this experiment?

[1]

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(ii) Define de-starching.

[1]

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(iii) Identify the substance marked 'Y' and mention its function.

[2]

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(iv) What conclusion would be drawn if water is used instead of substance 'Y'?

[1]

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### Question 6

(a) Draw a neat diagram of a stoma and label the following parts: [3]

- (i) chloroplast
- (ii) nucleus
- (iii) guard cell
- (iv) cell wall

(b) Between the two international bodies, Red Cross and WHO, which is more important to our country? Support your answer. [2]

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(c) Give reasons for the following: [5]

- (i) Cells are generally small in size.

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(ii) Meiosis produces gametes for sexual reproduction.

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(iii) If you touch a *mimosa pudica* plant, its leaves will rapidly droop.

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(iv) The blood of the embryo comes in close contact but never mingles with the blood of the mother.

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(v) The green revolution contributed to the sharp rise in population in the recent past.

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### Question 7

(a) (i) Explain **two** advantages for having a central canal in the spinal cord.

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(ii) Voluntary and involuntary are the two types of actions which occur in our body. Choose one and state why it is important.

[2]

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(iii) Explain the following disadvantages of large families.

[1]

1. Insufficient education
2. Children neglected socially

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(iv) Explain any **one** category of vaccines.

[1]

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(b) Write **one** difference between the following pairs in each of the given tables:

[5]

(i) Vaccination and immunization

Vaccination	Immunization

(ii) Birth rate and death rate

Birth rate	Death rate

(iii) Penicillin and streptomycin

Penicillin	Streptomycin

(iv) Renewable resources and non-renewable resources

Renewable resources	Non-renewable resources

(v) Acquired immunity and innate immunity

Acquired immunity	Innate immunity

# *Roughwork*