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Supervising Examiner's/Invigilator's initial:

**Paper 3 (Biology)**

**Writing Time: 1  $\frac{1}{2}$  Hours**

**Total Marks : 80**

**READ THE FOLLOWING DIRECTIONS CAREFULLY:**

1. Do **not** write for the first **fifteen minutes**. This time is to be spent on reading the questions. After having read the questions, you will be given **one and a half hours** to answer all questions.
2. Write your **index number** in the space provided on the **top right hand corner of this cover page only**.
3. In this paper, there are **two** sections: **A** and **B**. Section **A** is compulsory. You are expected to attempt **any four** questions from Section **B**.
4. The intended marks for questions or parts of questions, are given in brackets [ ].
5. Read the directions to each question carefully and write **all** your answers in the space provided in the **question booklet** itself.
6. Remember to write **quickly** but **neatly**.
7. **Do not** remove or tear off any pages from the question booklet.
8. **Do not** draw lines or pictures **on** or **in** the question booklet to beautify it.
9. **Do not** leave the examination hall before you have made sure that you have answered all the questions.

*For Chief Marker's and Markers' Use Only*

Question Number																		Total	Chief Marker's Signature ↓	
Award																				
Markers' initial →																				



**SECTION A (40 Marks)**

*Compulsory: To be attempted by all candidates.*

**Question 1**

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

[15]

(i) The cell organelle responsible for synthesis and transport of protein and fats is

- A ribosome.
- B lysosome.
- C mitochondria.
- D endoplasmic reticulum.

Answer:.....

(ii) The alternative form of gene occupying the same place on the chromosome is known as

- A autosome.
- B histone.
- C allele.
- D DNA.

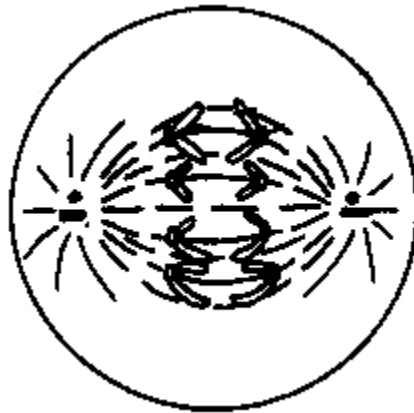
Answer:.....

(iii) An international organization which extends relief and help to the victims of any calamity is the

- A WFP.
- B UNO.
- C WHO.
- D Red Cross.

Answer:.....

(iv) Which stage of mitosis in an animal cell is represented in the diagram given below?



- A metaphase
- B telophase
- C anaphase
- D prophase

Answer:.....

(v) Which is the correct statement of osmosis?

- A Movement of solute from higher to lower concentrated region.
- B Movement of solvent from higher to lower concentrated region.
- C Movement of solute from lower to higher concentrated region.
- D Movement of solvent from lower to higher concentrated region.

Answer:.....

(vi) Which one of the following is **NOT** an adaptive measure in plants to reduce excessive transpiration?

- A numerous stomata
- B sunken stomata
- C narrow leaves
- D thick cuticle

Answer:.....

(vii) The site of photochemical reaction in the chloroplast is the

- A fret.
- B grana.
- C stroma.
- D cytoplasm.

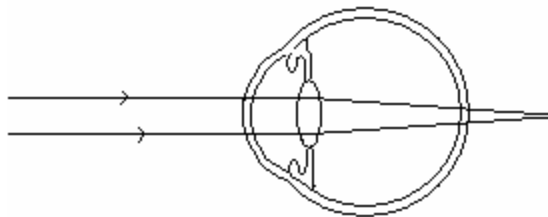
Answer:.....

(viii) All of the following are the reasons for the sharp rise in human population **EXCEPT**

- A better education.
- B better health care.
- C improved nutrition.
- D large scale immunization.

Answer:.....

(ix) The defect of the eye shown in the diagram below is



- A hypermetropia.
- B astigmatism.
- C myopia.
- D cataract.

Answer:.....

(x) Hyposecretion of thyroxine in a child causes

- A cretinism.
- B myxoedema.
- C simple goiter.
- D exophthalmic goiter.

Answer:.....

(xi) A homozygous recessive wrinkled pea seed was crossed with a heterozygous dominant round pea seed. The probability to produce round pea seed will be

- A 100%.
- B 75%.
- C 50%.
- D 25%.

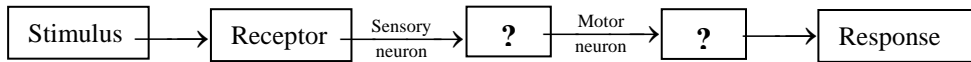
Answer:.....

(xii) The correct overall balanced chemical equation of photosynthesis is

- A  $6\text{CO}_2 + 12\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$ .
- B  $6\text{CO}_2 + 12\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 + 6\text{H}_2\text{O}$ .
- C  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$ .
- D  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + \text{H}_2\text{O}$ .

Answer:.....

(xiii) The correct pair to complete the flow diagram given below is



- A PNS and spinal cord.
- B CNS and effector.
- C SNS and neuron.
- D ANS and brain.

Answer:.....

(xiv) The only similar characteristic between antiseptics and disinfectants is that both

- A are used in high concentrations.
- B cause no harm to the body.
- C are applied on the spot.
- D kill germs.

Answer:.....

- (xv) The following are air borne diseases **EXCEPT**
- A whooping cough.
  - B dengue fever.
  - C tuberculosis.
  - D pneumonia.

Answer:.....

- (b) **Complete the sentences given below by choosing the correct word/s from the following list.** [5]

*(dominant gene, wall pressure, chlorophyll, inborn reflex, starch, conditional reflex, WBC, recessive gene, turgor pressure, RBC)*

- (i) ..... is amoeboid and can squeeze out through capillary walls.
- (ii) A gene which cannot express its character in presence of contrasting allele is called .....
- (iii) The pressure of the cell wall on the cell contents is known as .....
- (iv) During starch test, the leaf is boiled in methylated spirit to remove .....
- (v) Blinking of eyes is an example of .....

- (c) **Match the item under Column A with the most appropriate item in Column B. Rewrite the correct matching pairs in the spaces provided.** [5]

Column A	Column B
1. Brain	(a) nephron
2. Meiosis	(b) somatic cell
3. Diploid	(c) stomata
4. Guard cell	(d) lenticel
5. WHO	(e) pharmaceutical standard
	(f) sex cell
	(g) neuron
	(h) blood supply

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(d) State whether the following statements are **TRUE** or **FALSE**. If false, rewrite the false statements in the correct form by changing only the words printed in **BOLD** letters.

(i) **ENDOLYMPH** is the fluid which fills the central canal of the spinal cord.

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(ii) The fertilization of a human egg occurs in the **OVIDUCT**.

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(iii) The number of population rises by **GEOMETRICAL** progression.

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(iv) The embryo inside the uterus is protected from mechanical shocks by the **UTERINE WALL**.

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(v) **ASTIGMATISM** is an eye defect due to irregularities in the shape of lens and cornea.

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(vi) The number of individuals eliminated from a population by death in a year per thousand population is known as **NATALITY**.

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(e) Give reasons for the following statements.

[4]

(i) We gargle with salt solution to cure throat infection.

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(ii) A person having suffered from measles once will not suffer from it again.

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(iii) Pancreas is known as a duct gland as well as a ductless gland.

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(iv) Active immunity is better than passive immunity.

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(f) *Answer the following questions.*

(i) In the table given below, write any **two** differences between prostate gland and cowper's gland.

[2]

Prostate gland	Cowper's gland

(ii) 'Placenta is often known as the friend of a foetus'. Give **one** reason.

[1]

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(iii) 'Forest brings rain, transpiration is the secret.' Explain.

[1]

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- (iv) Why is diabetes one of the common diseases amongst the people of the world?  
Give **one** reason.

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**SECTION B (40 Marks)**

*Attempt any four questions*

**Question 2**

- (a) (i) Write **two** differences between the significance of mitosis and meiosis in the table given below.

[2]

Mitosis	Meiosis

(ii) Draw a neat diagram of a chromosome and label the following parts.

1. centromere
2. chromatid

(iii) 'Higher the number of convolutions in the human brain, greater the intelligence.'

Support the statement.

[2]

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(b) (i) State **two** advantages of a small family.

[2]

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(ii) List down **four** reasons for the sharp rise in the world human population.

[2]

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**Question 3**

- (a) (i) With the help of a diagram, describe an experiment to show that oxygen is produced during photosynthesis.

[3]

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- (ii) 'Solar energy is available abundantly but animals cannot use it.' Why? [1]

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(b) Differentiate between the following pairs on the basis of what is given in brackets.

(i) Myopia and Hypermetropia (cause)

Myopia	Hypermetropia

(ii) Thalamus and Hypothalamus (function)

[1]

Thalamus	Hypothalamus

(c) (i) What happens to the cell of a fleshy scale of an onion when put in a strong sugar solution and then in water after some time?

[2]

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(ii) Define power of accommodation.

[1]

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- (iii) Arrange the following terms correctly to show the course of sperms.  
*urethra, efferent duct, epididymis, testicles, network of tubules, seminiferous tubules*

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**Question 4**

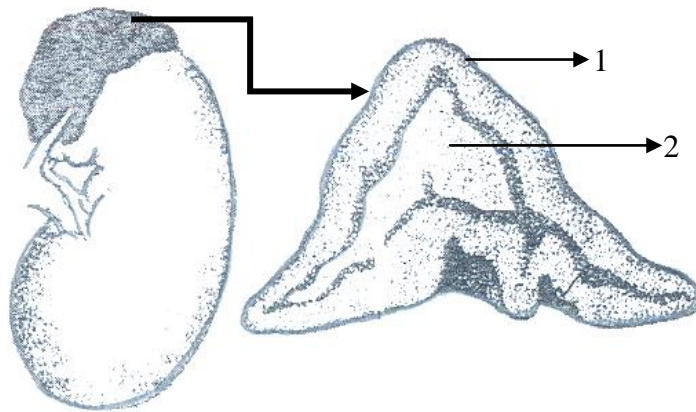
- (a) (i) In the table given below, write any **two** differences between antiseptic and disinfectant. [2]

Antiseptic	Disinfectant

- (ii) Which part of the day is the best time to transplant vegetables saplings?  
 Why? [2]

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(b) The diagram given below represents adrenal gland. Study the diagram and answer the questions that follow.



(i) Where is the adrenal gland located in our body? [½]

(ii) Name the parts numbered 1 and 2. [1]

(iii) Name the hormone secreted by the part numbered 2. [½]

(iv) Write the effect of the hormone mentioned in (iii) above. [1]

(c) (i) How does our skin and mucus secretion act as a local defence system of our body? Explain. [2]



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(ii) What are the end products of light reaction and dark reaction? [1]

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**Question 5**

(a) (i) In the table given below, write **two** differences between osmosis and diffusion. [2]

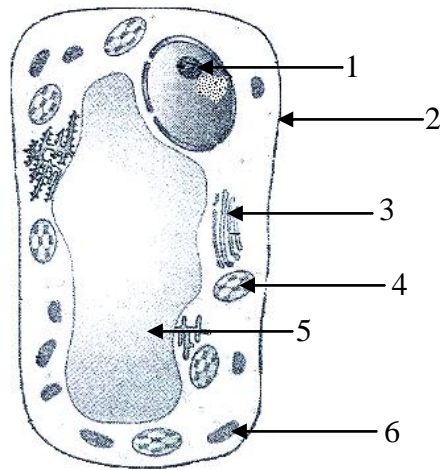
Osmosis	Diffusion

(ii) Rearrange the following terms in the correct sequence to show the feedback mechanism of hormone secretion. [1]

*thyroxine → pituitary gland → chemical activities in body → thyroid gland → hypothalamus → TSH → blood*

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- (b) (i) Study the following diagram of a plant cell and label the parts numbered 1, 2, 3, 4, 5 and 6 in the space provided below.



- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....

- (ii) Mention **two** functions of the Municipal Corporation. [1]

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- (c) (i) What is adrenal virilism? Give **one** example. [1]

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(ii) What do you understand by synapse?

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(ii) 'There are no plants or trees without roots'. Why? [1]

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**Question 6**

(a) (i) Why does a full grown human embryo respire instead of breathing?

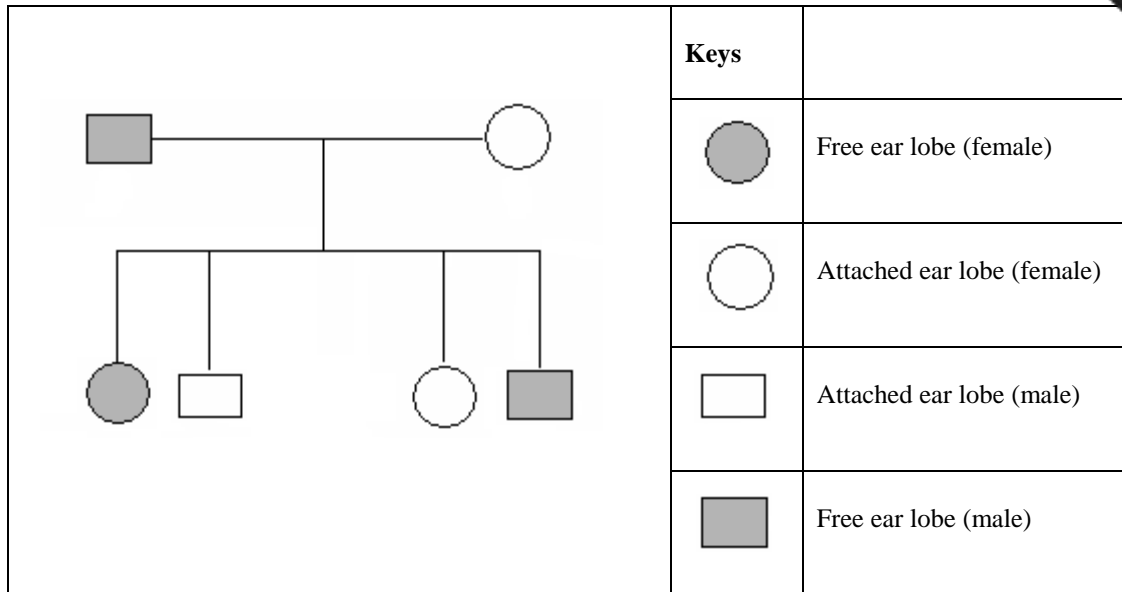
Give **two** reasons. [2]

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(ii) In the table given below, write any **two** differences between transpiration and guttation. [2]

Transpiration	Guttation

(b) Study the pedigree chart given below and answer the questions that follow.



(i) Which character is dominant? [1]

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(ii) Determine the genotype of the offsprings. [1]

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(iii) How many generations have been represented? [1]

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(c) (i) What is the difference in the urine between a pregnant woman and a normal woman? [2]

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(ii) Explain imbibition with an example. [1]

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**Question 7**

(a) Differentiate between the following pairs in the tables given below.

(i) Sympathetic and parasympathetic nervous system [1]

Sympathetic nervous system	Parasympathetic nervous system

(ii) Menarche and menopause [1]

Menarche	Menopause

(b) (i) Explain the exponential growth of population with the help of a graph.

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(ii) When you spin round and round, you feel dizzy. Why? [1]

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(iii) A woman gave birth to only daughters. Give a reason. [1]

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(c) (i) Discuss **one** major health problem in Bhutan and state **one** measure to overcome it. [1]

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(ii) 'The pupil of the eye dilates in dim light and constricts in bright light'. Why?

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(iii) What first aid is provided to a victim who has drowned? [2]

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