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Index No:

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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 reading the questions. After having read the questions, you will be given **one and a half hours** to answer all questions.
2. Write the remaining seven digits of 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 →																

This booklet contains 20 pages.

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 in the question booklet.* [15]

- (i) Pollution in Thimphu can be controlled to a great extent by
- A proper sewage and exit of chemicals from vehicle workshops and factories.
 - B conducting vehicle emission tests to control harmful gas emission.
 - C minimising the use of insecticides and pesticides.
 - D All of the above.

Answer

- (ii) Which of the following is *not* the function of Red Cross?
- A To provide ambulance service in emergencies.
 - B To look after maternal and child welfare centres.
 - C To direct and co-ordinate international health programmes.
 - D To procure and provide blood to the victims of war and other calamities.

Answer:.....

- (iii) The correct course for the sperm from the testes is
- A epididymis → urethra → vas deference.
 - B vas deference → urethra → epididymis.
 - C urethra → vas deference → epididymis.
 - D epididymis → vas deference → urethra.

Answer:.....

- (iv) One of the methods to reduce the rate of transpiration in banyan is the leaves are covered with thick
- A bark.
 - B spines.
 - C cuticle.
 - D epidermis.

Answer:.....

(v) Which of the following shows the significance of meiosis?

- A asexual reproduction
- B sexual reproduction
- C growth
- D repair

Answer:.....

(vi) The tube that carries urine from the kidney to the urinary bladder is the

- A ureter.
- B urethra.
- C renal tubule.
- D uriniferous tubule.

Answer:.....

(vii) All of the following are involved in the synthesis of protein *except*

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

Answer:.....

(viii) The type of WBCs that defend our body by the process of phagocytosis is

- A basophils.
- B eosinophils.
- C neutrophils.
- D lymphocytes.

Answer:.....

(ix) The pressure by which the water molecules cross the semi-permeable membrane is

- A root pressure.
- B wall pressure.
- C turgor pressure.
- D osmotic pressure.

Answer:.....

(x) The cell organelle which initiates and regulates cell division is

- A golgi apparatus.
- B chromosome.
- C centrosome.
- D ribosome.

Answer:.....

(xi) The pace maker which starts the heart beat is located in the walls of the

- A left auricle.
- B right auricle.
- C left ventricle.
- D right ventricle.

Answer:.....

(xii) The gestation period in human beings is

- A 260 days.
- B 270 days.
- C 280 days.
- D 290 days.

Answer:.....

(xiii) The type of contraception which also prevents the transmission of diseases like AIDS is

- A diaphragm.
- B condom.
- C IUD.
- D pill.

Answer:.....

(xiv) The depletion of ozone layer is caused by a chemical called

- A chlorofluoro carbons.
- B chlorofluoro oxides.
- C carbon monoxide.
- D carbon dioxide.

Answer:.....

(xv) The matures red blood cells become more efficient due to the absence of

- A ribosomes.
- B lysosomes.
- C mitochondria.
- D golgi apparatus.

Answer:.....

(b) *Name the following.*

[5]

(i) A non-living layer in a plant cell mostly made up of cellulose.

.....

(ii) The process of conversion of several glucose molecules to produce one molecule of starch.

.....

(iii) The anaerobic part of respiration that takes place in the cytoplasm.

.....

(iv) The part of the brain which regulates the temperature of the body.

.....

(v) The technical term used for the differences between birth rate and death rate in a population.....

(c) *I. State whether the following statements are TRUE or FALSE.*

[3]

(i) **Cochlea** of the ear is concerned with the sense of balance.

.....

(ii) The **pharynx** is also known as ‘Adam’s apple’.

.....

(iii) The rate of transpiration **increases** with the increase in temperature.

.....

(iv) The energy currency of the cell is **DNA**.

.....

(v) The space between the amnion and the embryo is filled with **amniotic fluid**.

.....

- (vi) **Endosmosis** may cause bursting of a cell.

.....

- II. Rewrite ONLY the false statements in their correct form by changing only the word/s given in bold letters.** [3]

.....

- (d) Write down ONE point of difference between each of the following pairs on the basis of what is given in brackets in the table given below.** [4]

- (i) Inspired air and expired air (oxygen content)

Inspired air	Expired air

- (ii) Simple goiter and exophthalmic goiter (causes)

Simple goiter	Exophthalmic goiter

- (iii) Sweat gland and sebaceous gland (functions)

Sweat gland	Sebaceous gland

- (iv) Antiseptic and disinfectant (uses)

Antiseptic	Disinfectant

- (e) **Complete the sentences given below by choosing the correct word/s from the following list.**
diffusion, semi permeable, imbibition, active transport, granum, thylakoids,
biosynthetic, light, capillaries, synapse, veins, effectors, arteries [6]

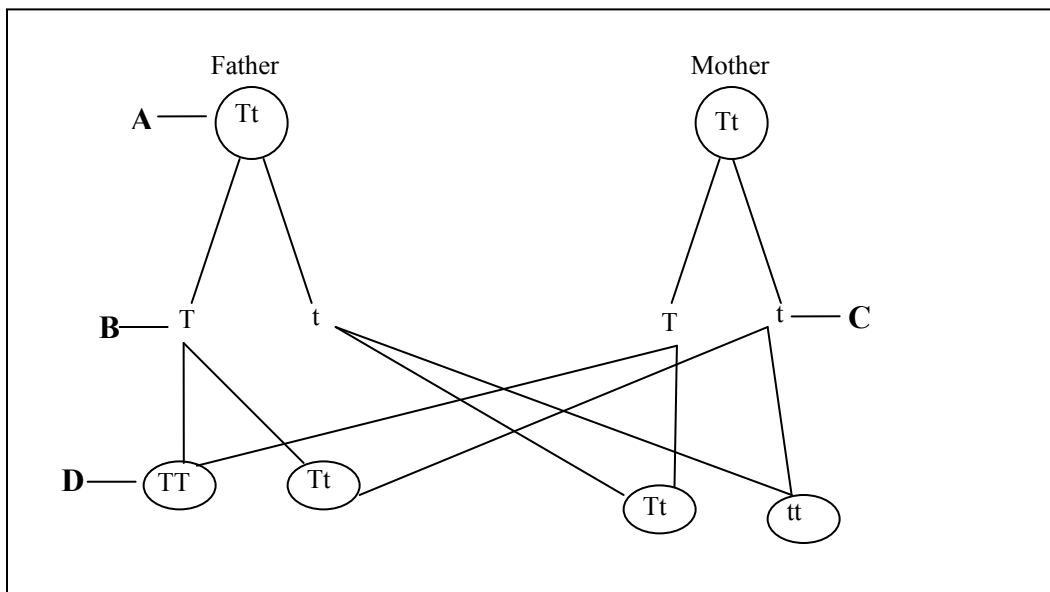
- (i) The cell membrane is called because it allows some substances to pass through while blocking others.
- (ii) Minerals like nitrates are transported from the soil to the root hair by the process called.....
- (iii) In chloroplast the chlorophyll is present on the wall of the
- (iv) The Dark reaction of photosynthesis is also known as phase.
- (v) Blood vessels which carry blood away from the heart are known as
- (vi) The gap between two nerves is called.....

- (f) The diagram given below shows a genetic cross between a tall male and a tall female. Identify A, B, C and D using the words given below. The words maybe used once, more than once or not at all.

[4]

homozygous parent, heterozygous parent, homozygous off-spring,

heterozygous off-spring, recessive allele, dominant allele, homozygous recessive short



- (i) A.....
 (ii) B
 (iii) C.....
 (iv) D.....

SECTION B (40 Marks)

Attempt any four questions

Question 2

- (a) Explain briefly the following terms.

[4]

- (i) Bio-fertilizer

.....

(ii) Immunization

.....

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(iii) Antibiotic

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(iv) Immunity

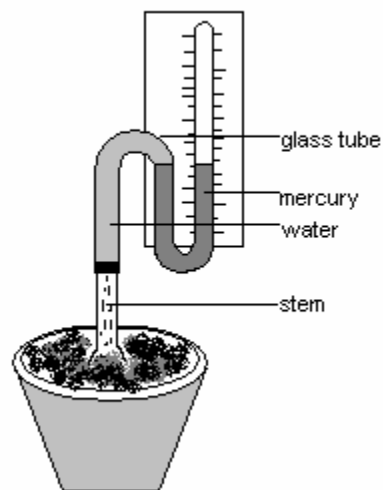
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(b) The diagram given below represents an experiment to prove a certain phenomenon in plants. Observe the same and answer the questions that follow.



(i) What is the aim of the experiment?

[1]

.....

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- (ii) What will happen to the level of mercury after 24 hours? Explain why?

- (iii) Explain how this process is useful to plants. [1]

- (iv) Write *three* uses of water to plants. [1½]

- (c) 'Noise pollution is considered harmful to our health'. Comment on this statement. [1½]

Question 3

- (a) Match each item under column A with that which is most appropriate in column B.
 You must rewrite the correct matching pairs in the space provided. [3]

Column A	Column B
(i) Insulin	a. stimulates contraction of uterus
(ii) Cretinism	b. over secretion of growth hormone
(iii) Oxytocin	c. fight or flight
(iv) Adrenalin	d. under secretion of thyroxin
(v) Gigantism	e. raises blood sugar level
(vi) Glucagon	f. diabetes mellitus
	g. regulates basal metabolism
	h. over secretion of thyroxin

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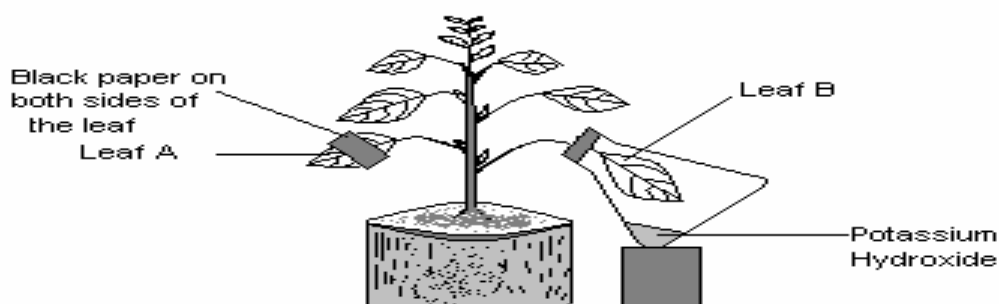
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- (b) The diagram given below represents an experiment to demonstrate two aspects of photosynthesis. The plant was kept in the dark for about 24 hours and the leaves were treated as shown in the diagram. Then the whole set-up was placed in sunlight. The leaves were then tested for the presence of starch.



- (i) 1. What is the aim of the experiment with leaf A? [1]

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.....

.....

2. What is the aim of the experiment with leaf B? [1]

.....

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(ii) What is the function of potassium hydroxide in the flask?

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(iii) Why was the plant kept in the dark for 24 hours before the experiment?

[1]

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(iv) Draw the diagram of leaf A after the starch test.

[1]

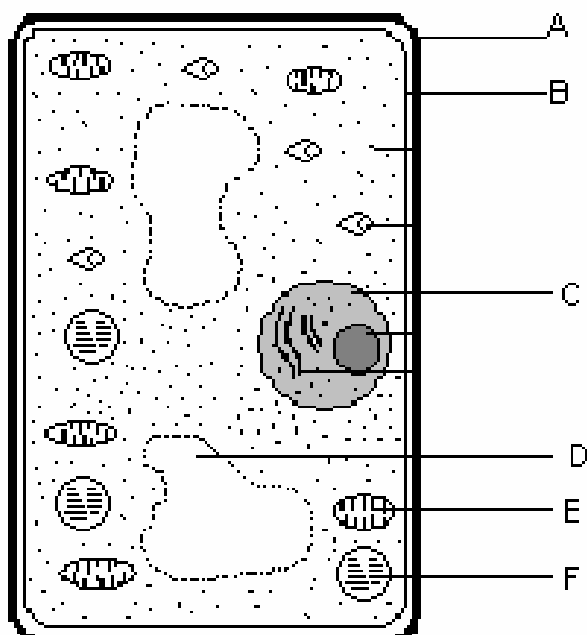
(c) Write *two* impacts of population explosion.

[2]

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Question 4

- (a) Study the diagram of a plant cell given below and answer the questions that follow.



- (i) Label the parts A to F marked in the diagram. Write the answers in the space provided below. [3]

A.....
 B.....
 C.....
 D.....
 E.....
 F.....

- (ii) Complete the table given below. [1]

Description	Name of the organelle
Factories of food production	
Skeleton	

- (b) Read the description and name the cells. [1½]

- (i) biconcave =
 (ii) bean shaped =

- (iii) long and thread like =
- (c) (i) Draw a neat diagram to represent metaphase of mitotic cell division in animal cell and label the following parts. [2]
1. centrosome
 2. spindle fibre

- (ii) 'A gamete (sex cell) must be produced by meiosis'. Give a reason to support this statement. [1]

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- (iii) 'Forests contribute in bringing rains'. Explain this statement. [1½]

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Question 5

- (a) The diagram given below shows a part of a blood vessel and lymphatic system. The arrows show the direction of blood flow. Study the diagram and answer the questions that follow.

- (i) Label the parts marked A to D. [2]

A.....

B.....

C.....

D.....

- (ii) Name the type of blood flowing in blood vessel A. [½]

.....

.....

- (iii) Write *two* structural differences between blood vessel A and C in the table given below. [2]

Blood vessel A	Blood vessel C

- (b) (i) Write *two* functions of WHO. [1]

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- (ii) 'The skin is an organ with the largest number of functions in our body'.

Justify this statement giving *two* reasons.

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- (c) (i) List down *three* secondary sexual characteristics in human females. [1½]

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- (ii) 'A large number of sperm cells are produced to fertilize an ovum'. Why? [1]

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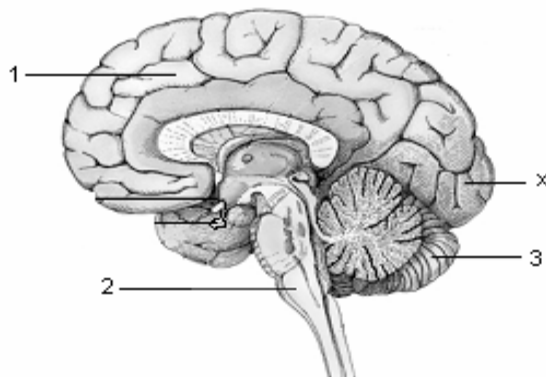
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Question 6

- (a) The figure given below shows the longitudinal section of the human brain. Study the diagram and answer the questions that follow.



- (i) Label the parts 1, 2 and 3. Write your answer in the space provided below. [1½]

1.....
 2.....
 3.....

- (ii) Write down *one* function for parts 2 and 3 in the table given below. [1]

Part 2	Part 3

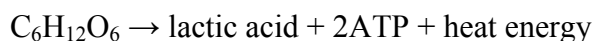
- (iii) What will happen if the part marked X is damaged? [1]

.....

- (iv) Why is the part labelled 1 highly convoluted? [1]

.....

(b) Study the chemical equation given below and answer the questions which follow.



(i) Name the process represented by the equation.

[1]

.....

.....

(ii) Name the part of the body where such reactions take place.

[½]

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(iii) What problem is caused due to the production of lactic acid in our body?

[1]

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(c) (ii) Mention *three* methods used by plants to reduce excessive transpiration.

[3]

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Question 7

(a) Give suitable explanations for the following:

(i) It is better to rest under a tree during a hot summer day.

[1]

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- (ii) It is difficult to demonstrate respiration in green plants in the presence of light. [2]
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- (iii) It is always healthier to breathe through the nose than through the mouth. [2]
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- (iv) The glomerular filtrate entering the renal tubule is not considered as urine. [2]
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-
- (v) Cholera patients may die due to poisoning by high concentration of urea in their bodies. [2]
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