SECTION A (50 Marks)

*Compulsory: Attempt **all** questions.*

Question 1.

(a) Directions: ***For each question, there are four alternatives A, B, C and D. Choose the correct alternative and circle it. Do not circle more than ONE alternative. If there are more than one circled, NO score will be awarded.*** **[25]**

i. In a particular animal cell, ribosomes were missing. We can confirm that this cell also lacks

A divisions of the cell.
B rigidity of the cell.
C Intercellular digestion.
D Protein synthesis.

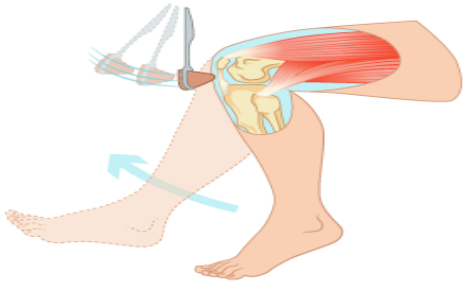
ii. The gaseous product formed during photosynthesis is

A O_2.
B CO.
C H_2O.
D CO_2.

iii. Histamine is released during inflammation by

A lymphocyte.
B neutrophil.
C esinophil.
D basophil.

iv.



The above movement is controlled by

A brain.
B spinal cord.
C peripheral nervous system.
D autonomous nervous system.

v. Bacillus is a group of bacteria and belong to

A

B

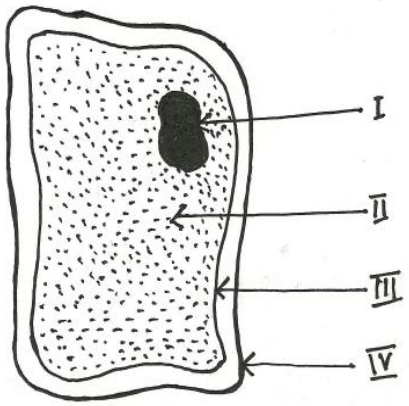
C

D

vi. Thorns in cactus is a mechanism to avoid

A Predation.
B Parasitism.
C Competition.
D Commensalism.

vii. Which of the following represents plasma membrane in the plant cell below?

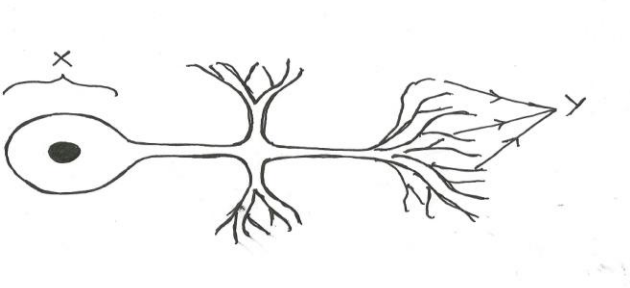


A I
B II
C III
D IV

viii. Vigorous exercises sometimes leads to muscle cramps. This is due to formation of

A lactic acid.
B citric acid.
C ethyl alcohol.
D pyretic acid.

ix.



The parts labelled x and y are (CBQ)

	X	Y
A	cyton	Axon
B	cyton	Nucleus
C	nucleus	Axon
D	cyton	Dendrite

x. All of the following are plant growth promoters **EXCEPT**

A auxin.
B ethylene.
C cytokines.
D gibberellins.

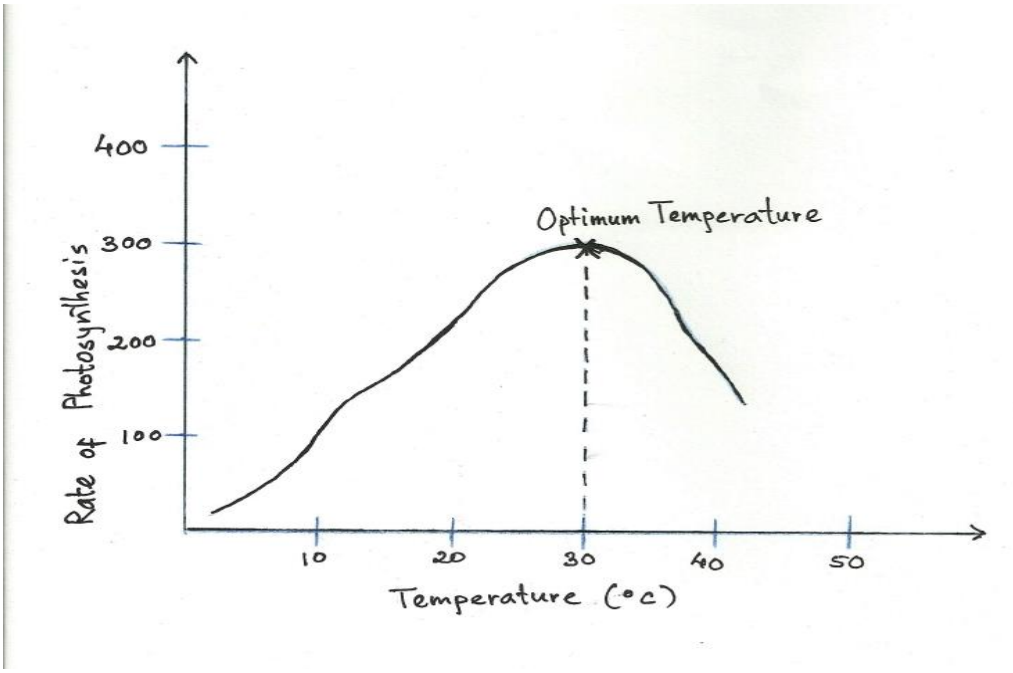
xi. Choose the correct match of the characteristics of a virus.

A	Protein Coat	Without membrane
B	Simple cells	No true nucleus
C	Long thread like structure	With cytoplasm
D	No cell wall	Moves independently

xii. The probability of occurrence of mutation is NOT increased by

A toxic chemicals.
B UV-rays.
C X-rays.
D genes.

xiii. Study the graph given below and state what happens to the rate of photosynthesis when it exceeds the optimum temperature ?



The rate of photosynthesis when it exceeds the optimum temperature, it will

A decrease.
B increase.
C remain same.
D increase and then decrease.

xiv. Pema conducted an experiment and the observations he made is given in the table below:

Experiment	**Observation**
Added few drops of biuret reagent to a food sample in a test tube	The solution changed to violet colour

The food sample contains

A carbohydrate.
B vitamin.
C protein.
D fat.

xv. Select the correct matching pair of hormonal methods of contraception given below:

A	Birth control pill	DMPA
B	Birth control shot	Impanon
C	Birth control implant	I-pill
D	Birth control patch	Ortho-evra

xvi. A child is born to parents with fingers attached together as shown below:

What kind of mutation is this?

A Gene
B Somatic
C Germ Cell
D Chromosomal

xvii. Dema is facing a problem to become a mother even after five years of marriage. The treatment advised by her gynaecologist is

A FSH.
B HPV.
C IVF.
D DMPA.

xviii. How does RSPN helps in Ex-Situ conservation of plants and animals in Bhutan ?

A maintains the Red Data Book of animals and plants.
B provides grants to government and non governmental organisations to support environmental initiatives.
C works on environmental education, advocacy, research, conservation of nvironment.
D Supports and helps in protecting National parks, sanctuaries, Ransar sites and Biological corridors.

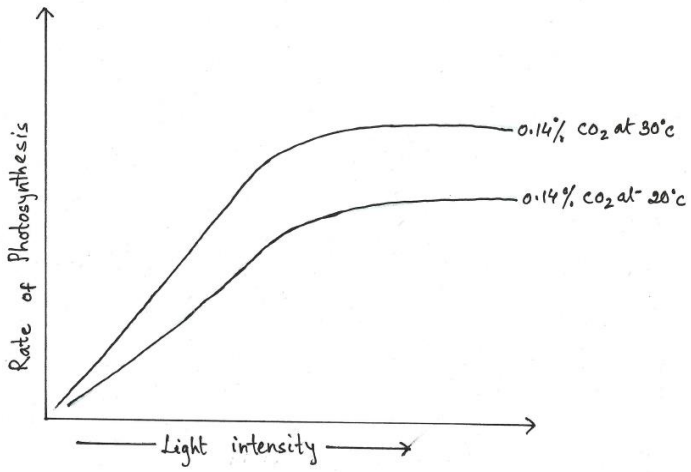
xix. People use salt to remove the leech from the body parts during monsoon. The above phenomenon explains

A de-plasmolysis.
B plasmolysis.
C flaccidity.
D turgidity.

xx. Why do you think sex cells needs to undergo reduction divisions? They need to

A produce 2 daughters cells.
B produce 4 daughters cells.
C have diploid number of chromosomes in daughter cells.
D have haploid number of chromosomes in daughter cells.

xxi. The two lines in the graph best describes



A The rate of photosynthesis increases with increase in light intensity and temperature, CO_2 concentration remaining constant.
B The rate of photosynthesis decreases with increases in light intensity and temperature, CO_2 concentration remaining constant.
C The rate of photosynthesis increases with increases in CO_2 concentration and temperature, light intensity remaining constant.
D The rate of photosynthesis decreases with increase in CO_2 concentration and temperature, light intensity remaining constant.

xxii. Sonam tested her blood and found out that she is O^- (negative). This shows that her blood lacks

A Rh plasma.
B Rh factor.
C Rh antigen.
D Rh antibodies.

xxiii. The school sweeper uses phenol to clean the toilets because it is

A Antibiotics.
B Antiseptic.
C Analgesics.
D Disinfectants.

xxiv. The children of Rose Pry School were suffering from a particular diseases marked by the following characteristics

- ✓ Contagious
- ✓ Swelling of salivary gland
- ✓ Last for around a week

What could be the disease ?

A Chicken Pox
B Small Pox
C Measles
D Mumps

xxv. Chencho and Sonam have three children out of which two are brown eyed and one is blue eyed. What would be the genotype of Chencho and Sonam if the alleles from brown eyes is B and the blue eyes is b?

A BB x BB
B bb x bb
C Bb x Bb
D Bb x bb

b. Match the items of **Column A** with the most appropriate items in **Column B**. Rewrite the correct matching pairs in the space provided. **[5]**

Column A	Column B
i. Change in the structure and number of chromosome.	**a.** variation
ii. Small differences between a group of organism of any species.	**b.** Heredity
iii. Transfer of characteristics from parent to offspring.	**c.** Mutation
iv. Change in the characteristics of species.	**d.** Genome
v. The formation of new species due to changes in adaption.	**e.** Evolution
	f. Genetics
	g. speciation

c. **Fill in the blanks by writing suitable word.** **[5]**

i. The source of oxygen in photosynthesis is _____

_____

ii. Pepsinogen is converted into active form by _____

_____

iii. Genetic disorder characterised by delay in blood clotting is known as _____

_____

iv. The disappearance of a species from the earth is called _____

_____

v. The resemblance of animals to protect themselves from their enemies is _____

_____

d. Rewrite the following statement in the correct form by changing the **only** word written in bold and underlined. **[5]**

i. **Prokaryotic** cell have true nucleus with proper nuclear membrane.

ii. The phase of respiration that takes place in **cytoplasm** in kreb's cycle.

iii. **Effectprs** are groups of specialised cell sensitive to specific stimulus.

iv. **BCG** vaccine is given to girls under the age of 12.

v. Genes present on **sex chromosome** controls the somatic characters of an organism.

_____

_____

_____

_____

_____

_____

_____

e. **Answer the following questions:**

1. Classify the following essential elements into micronutrient and macronutrient in the table given below: **[2]**
k^+, NO_3^-, Mn, Cu

Micronutrients	Macronutrients

2. **Give reasons.** **[4]**

i. Chlorosis reduces the rate of photosynthesis.

ii. Reflex actions are necessary.

3. **Name the following.** **[2]**

i. Substance that carries nerve impulse from one end point of neuron to another.

_____

ii. A section of DNA on a chromosome.

_____

4. **Explain the function of the following:** **[2]**

i. Biological Corridor

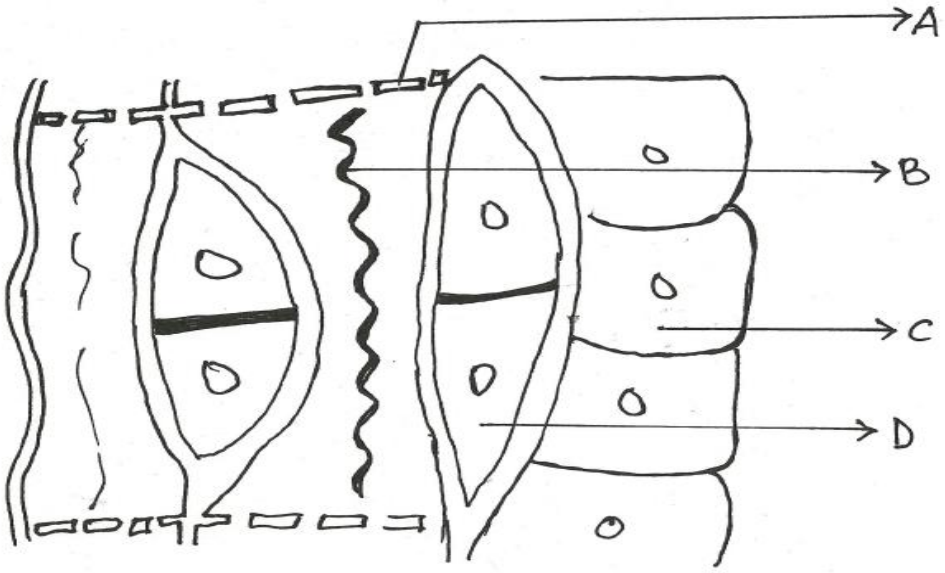
ii. Gene bank

SECTION B [50 Marks]

*Attempt only **FIVE** Questions*

Question 2.

a. Study the diagram below carefully and answer the questions that follow:



i. Name the tissue given above. **[1]**

_____

ii. Identify and label the part A, B, C & D. **[2]**

_____

_____

_____

_____

_____

_____

_____

_____

iii. What will happen to the plant if the above tissue is removed in the form of ring from the bark of stem ? **[2]**

b i. What is sexual reproduction? **[1]**

ii. Differentiate between the following pairs. **[1]**

1. Allopathic and sympatric species.

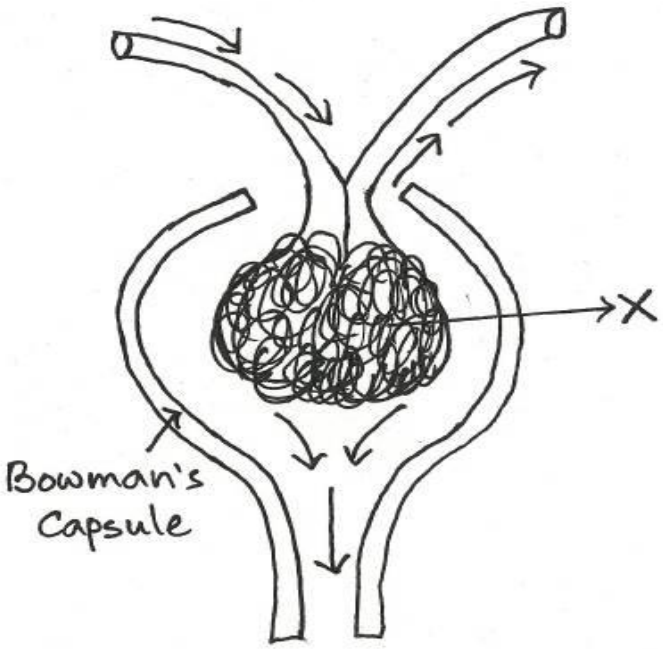
Allopathic Species	Sympatric Species

2. Continuous and discontinuous variation. **[1]**

Continuous Variation	Discontinuous Variation

iii. What type of reproduction would you choose for your flowers if you as a florist? Justify. **[2]**

Question 3.



a. i. What is the role of the diagram given above? **[1]**

_____

ii. The blood enters the part labelled X under high pressure. Why? **[2]**

_____

_____

_____

_____

_____

_____

_____

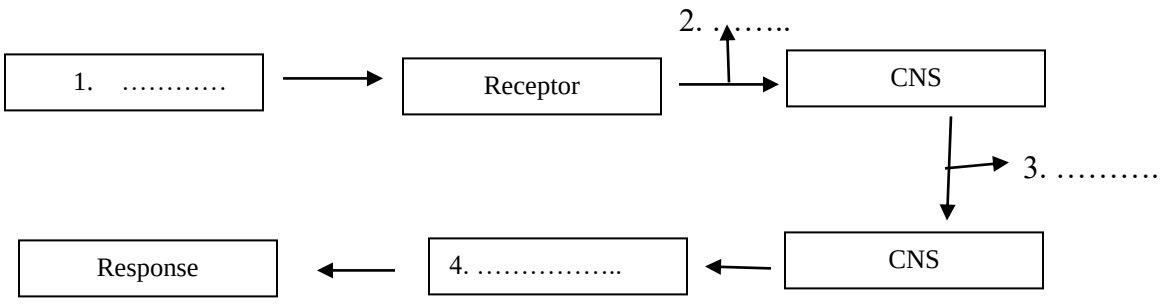
_____

_____

iii. Label the part X and define the process represented by the diagram. **[2]**

b i. What is reflex arc? **[1]**

ii. Complete the flow chart of a reflex actions given below. **[2]**



1. _____

2. _____

3. _____

4. _____

iii. What will happen to the pupil of the eye when you enter a dark room from the bright light outside? **[1]**

iv. Name the part of the eye that adjust the size of the pupil. **[1]**

Question 4.

a. i. Explain what is sex-linked inheritance? **[1]**

ii. Give two examples of sex-linked inheritance. **[1]**

1. _____

2. _____

iii. Work out the genotypic ratio and phenotypic ratio of a cross between pure red flower (RR) and pure white flower (rr) of pea plant in F_2 generation and complete the table below. **[4]**

In F_1 generation		In F_2 generation	
Genotype	Phenotype	Genotypic ratio	Phenotypic ratio

b. i. What is a neuron? **[1]**

ii. Compare three types of neurons with the help of neat diagrams. **[3]**
Answer:

Unipolar	**Bipolar**	**Multipolar**

Question 5.

a. Dema has grown some plants with the roots immersed in a nutrient solution.

i. What is the process called? **[1]**

_____

ii. What can she deduced from the above process? **[1]**

_____

_____

_____

_____

_____

iii. Write the commercial application of the following plant hormones. **[3]**

1. Ethylene gas.

_____

_____

_____

_____

2. Synthetic auxin.

_____

_____

_____

_____

3. Gibberellins.

_____

_____

_____

_____

b. i. How do the following blood cells help maintain our body? **[3]**

1. Red Blood Cells.

2. White Blood Cells.

3. Platelets.

ii. What judgement would you make if a person has **[2]**

1. Very high blood count of WBC.

2. Very low blood count of WBC.

Question 6.

a. i. There is genetic variation in meiosis. Justify. **[2]**

ii. Osmosis plays a vital role in the absorption of water and minerals in plants. Explain? **[2]**

b. i. As a new mother, what vaccine will you give your baby at the age of **[2]**

1. At birth?

_____.

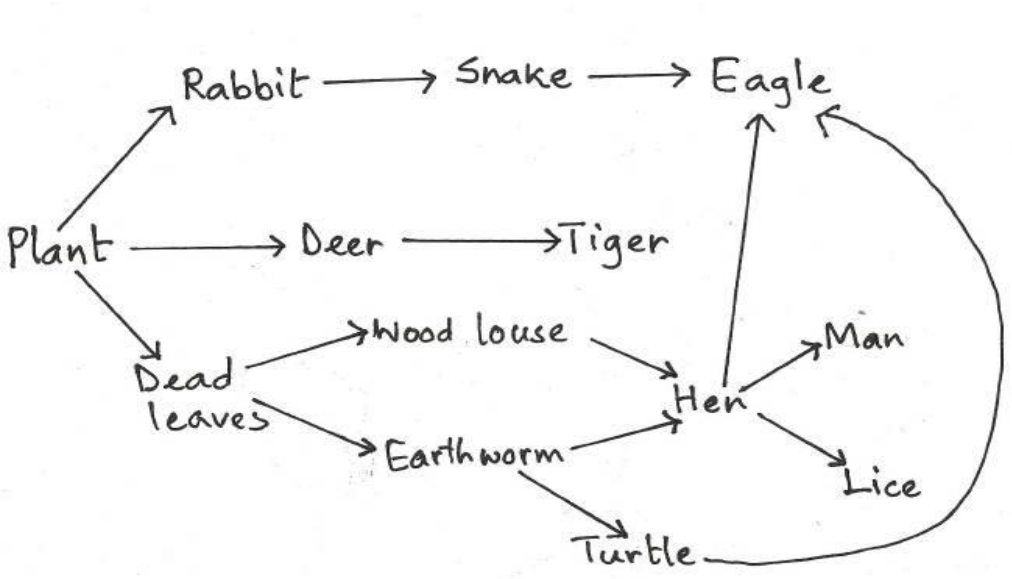
2. 9 months?

_____.

ii. What type of immunity is acquired after the above vaccinations? **[1]**

_____.

c. Study the food web and answer the questions that follows:



i. Derive a complete detritus food chain from the above food web. **[1]**

_____

_____

_____

_____

_____

ii. Identify **two** detritus feeders from the web. **[1]**

iii. What critical role does a food web play in the food chain? **[1]**

Question 7.

a. i. What is the relationship between karyokinesis and cytokinesis in cell division? **[1]**

ii. How is cytokinesis different in plant and animal cells ? **[1]**

b. i. Give **one** advantage each for the following with an example: **[2]**

1. Antacid.

2. Analgesics.

ii. What would happen if there were no micro-organisms? **[1]**

b. i. What are plants referred to as in the tropic levels in a food chain ? **[1]**

ii. How do plants help in maintaining balance of tropic levels in an ecosystem? **[2]**

iii. Do you agree with the Bhutan's pledge to maintain 60% of land as forest for all times to come. Support your answer with two reasons. **[2]**

for Rough Work

for Rough Work

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