

Answer **three** questions in all; **2** questions from section **A** and the **only** compulsory question in section **B**

Write your answers in ink in your answer booklet

Large labeled diagrams should be used where they make an answer clearer. The names given for a chosen species must be in **English** or **scientific** and not vernacular.

Credit will be given for clarity of expression and orderly presentation of answers.

All questions carry equal marks.

SECTION A

FOR ALL CANDIDATES

Answer **two** questions **only** from this section

1. (a) Explain **briefly** the following directional terms;

(i) *Proximal*;

[2marks]

(ii) *Lateral*;

[2marks]

(b) What is a *pigment*;

[2marks]

(i) State *two* major pigments in plants:

[2marks]

(i) Describe the structure of the *quill* feather;

[4marks]

(c). i Name any two examples of insects that undergo *incomplete metamorphosis*?

[2marks]

(ii) State three ways by which *bees* are of economic importance;

[3marks]

(iii) What are *phytohormones*;

[2 marks]

(iv) Name the phytohormone *responsible* for the following;

(a) Promotes *dormancy* in seeds;

[1mark]

(b) Promotes *ripening* in fruits;

[1mark]

(i) Name *two* hormones secreted by the pancreas;

[2marks]

3. (a) What is *Irritability*;

[2 marks]

(b) Name any two examples of *neurotransmitters* in the human nervous system;

[2 marks]

(i) Define *action potential*;

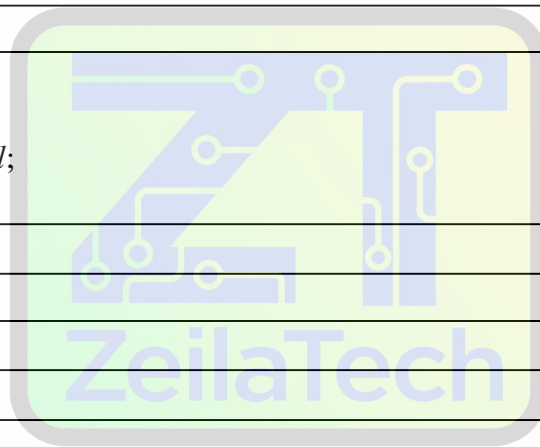
[3marks]

(c) Name the *membrane* that protects the brain and spinal cord;

[1 mark]

(d) List any five components of blood;

[5 marks]



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(i) Name the location of the following endocrine organs;

a. Adrenal gland:

b. Parathyroid gland:

c. Pituitary gland:

[3 marks]

(ii) Briefly explain independent assortment of genes;

[4 marks]

4. (a) Why is it *necessary* for the cell cycle to have *check-points*?

[4 marks]

(b) Explain the importance of *positive phototropism*;

[3 marks]

(i) Define *photoperiodism*;

[2 marks]

(ii). Briefly explain *Osmoregulation*;

[3 marks]

(c) What is the *necessary* condition for gastric juice to convert proteins to *peptones*:

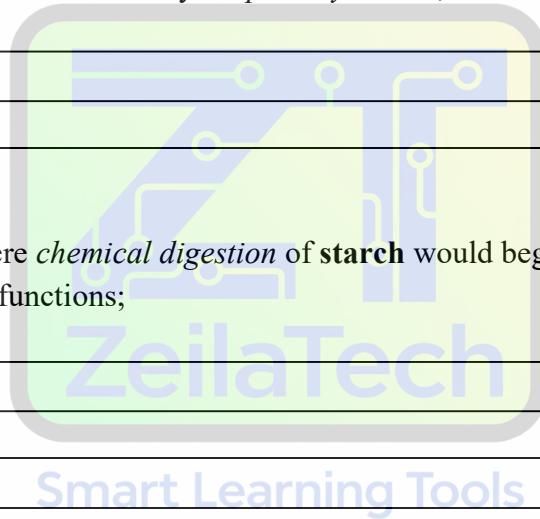
[3 marks]

(i) Give any two conditions necessary for *photosynthesis*;

[2 marks]

(ii) Explain briefly where *chemical digestion* of **starch** would begin in the *gut system*, if the salivary glands malfunction;

[3 marks]



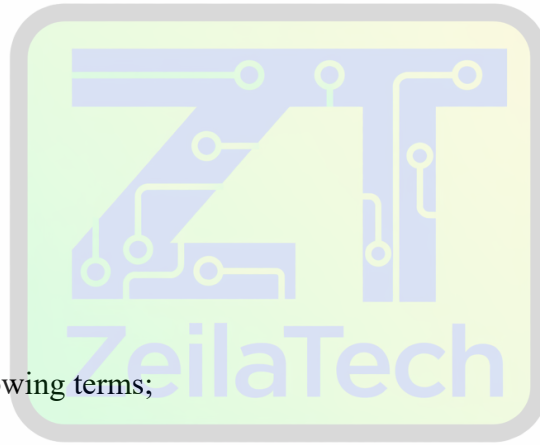
SECTION B

Answer all the questions in this section

5. (a) The gene segment below represents a **DNA** sequence for the enzyme *Amylase*.
The stand represents the *coding* strand?

5' ATTGCCAAATCGAGAATTACCGATATGCAACGA 3'

- i. Write the mRNA sequence that would be *transcribed* from the DNA sequence?



[5marks]

(b) Explain the following terms;

- (i) *Gene*;

[2marks]

- (ii) *Pure breed*;

[2marks]

- (iii) *Allele*

[2marks]

(c) For a trait/character in plants the letter **T** represents the gene or allele for tall and the letter **t** represents the gene/allele for dwarf. Using the preamble above;

What is the possible genotype for a plant that is:

- (i) Homozygous dominant
- (ii) Homozygous recessive
- (iii) Heterozygous

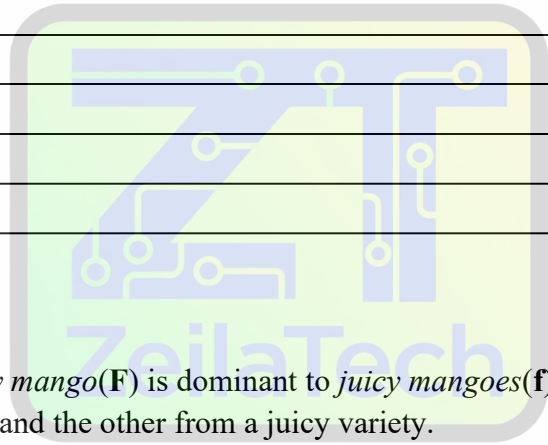
[3marks]

(d) Briefly describe the **type** of joint located in the *knee* of humans;

[5marks]

(e) In a mango specie *fleshy mango*(**F**) is dominant to *juicy mangoes*(**f**) two pure mango breeds were crossed; one from a fleshy variety and the other from a juicy variety.

- (i) With the aid of a *genetic* diagram determine the phenotypes of the F₁ mangoes;



[5marks]

- (ii) If the F_1 mangoes mature and are allowed to cross-pollinate, what would be the expected ratio of fleshy to juicy mangoes on the F_2 plant;

[4 marks]

- (i) If the total of F_2 mangoes collected is 8460 how many of these would be expected to be; α juicy;

[2marks]

END OF PAPER

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