

S.4 COORDINATION TEST JIPRA BIOLOGY DEPART. 2023

SECTION A (70 MARKS)

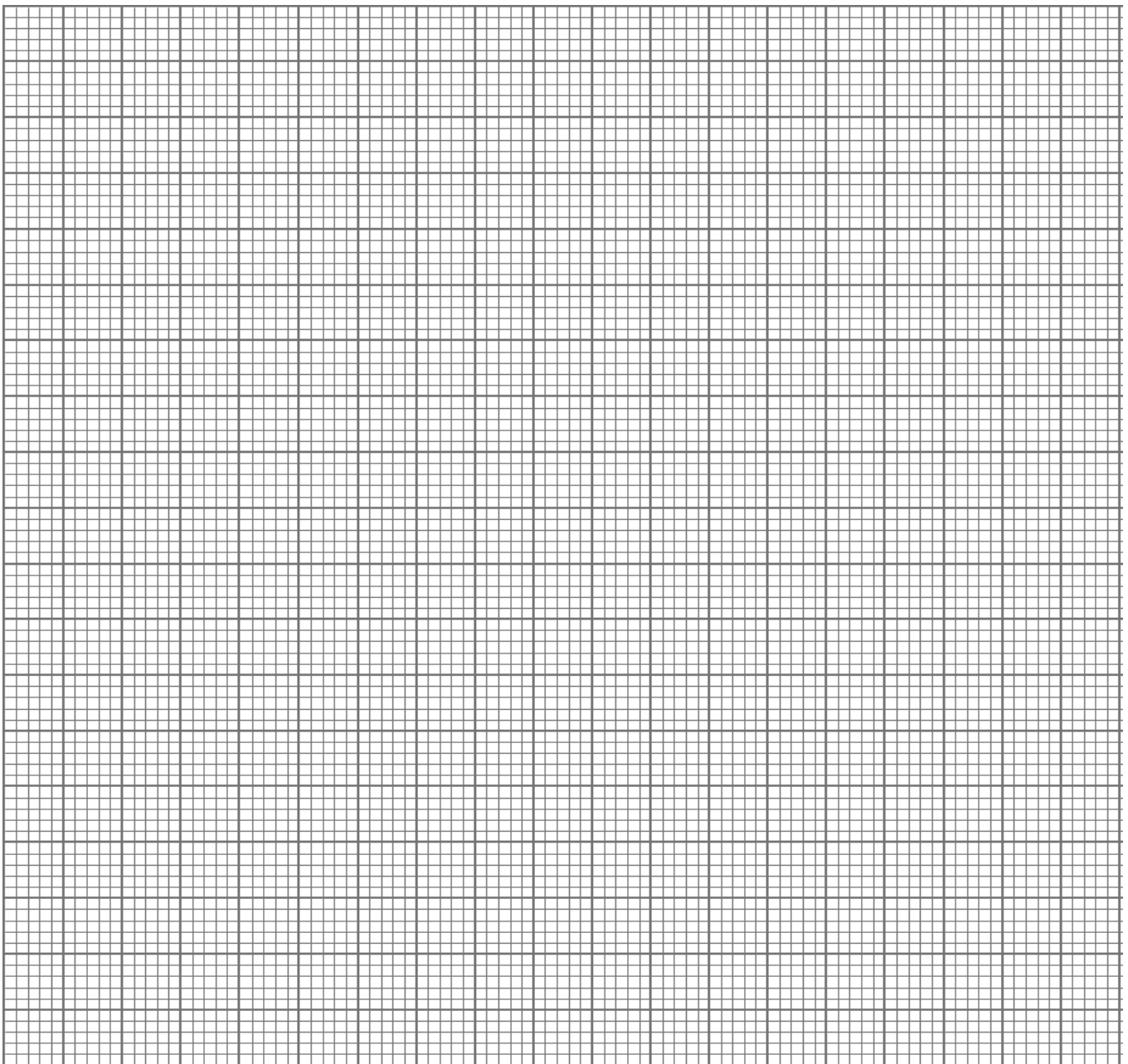
Attempt *all questions* in this section in the spaces provided.

1. The table below shows the changes in the diameter of the pupil of the eye in different light intensities.

Light intensity in a.u.	0	5	10	15	20	25
Diameter of pupil in mm	8.9	8.0	7.1	6.3	5.4	4.5

- (a) Plot a graph to represent the information in the table.

(06 marks)



(b) Describe the effect of increasing light intensity on the diameter of the pupil. *(02 marks)*

.....

.....

.....

.....

(c) Explain what happens to the diameter of the pupil:

(i) at 0 a.u. light intensity. *(03 marks)*

.....

.....

.....

.....

.....

(ii) when light intensity is increased from 0 a.u. to 25 a.u. *(03 marks)*

.....

.....

.....

.....

.....

(d) The changes in the diameter of the pupil are because of a nervous response.

(i) State the type of nervous response to which the pupil responds. *(01 mark)*

.....

(ii) State two features of the nervous response to which the pupil responds. *(02 marks)*

.....

.....

.....

(iii) State three benefits to the organism, of eyes responding to light. *(03 marks)*

.....

.....

.....

.....

2. (a) A climbing plant twines around the stem of a tall tree.

(i) Name the type of response exhibited by the climbing plant. (01 mark)

(ii) Explain how the response named in (a) (i) above takes place. (03 marks)

(b) An experiment was carried out to investigate the response of white termites to a certain stimulus. Ten termites were placed at the center of the glass tubing. Anhydrous calcium chloride was placed at one end of the tubing and moist cotton wool at the other end as illustrated in **figure 1** below.

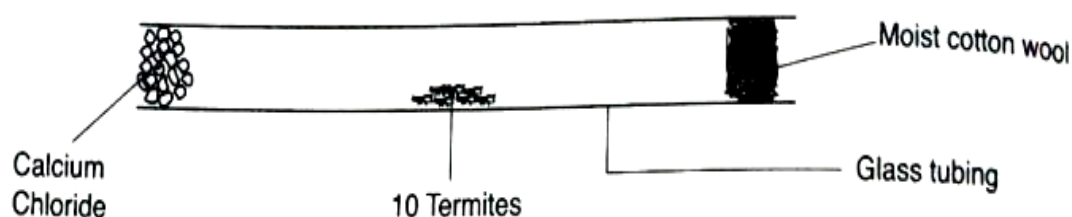


Figure 1

(i) What observations are made after 20 minutes? (01 mark)

(ii) What type of response is exhibited by the termites? (01 mark)

(iii) What is the survival value of the above response? (01 mark)

(iv) Draw an experiment setup that would act as control for the above experiment in the space below, and state what is observed, (03 marks)

3. **Figure 2** is an experimental setup used by a student to investigate the effect of auxin distribution on growth in coleoptiles. The experiment was carried out in the dark.

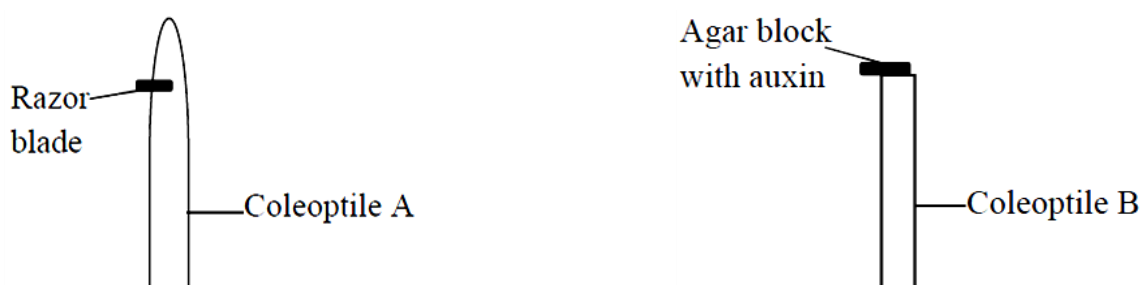


Figure 2

- (a) On the right hand of each coleoptile in **figure 2**, draw an illustration to show the response by shoots after 3 days. **(02 marks)**

- (b) Explain the response shown by:

- (i) coleoptile A

(03 marks)

.....

.....

.....

.....

.....

- (ii) coleoptile B

(03 marks)

.....

.....

.....

.....

.....

- (c) Why was the experiment carried out in the dark?

(02 marks)

.....

.....

.....

.....

.....

4. **Figure 3** below is an eye defect, study it carefully and answer the questions that follow

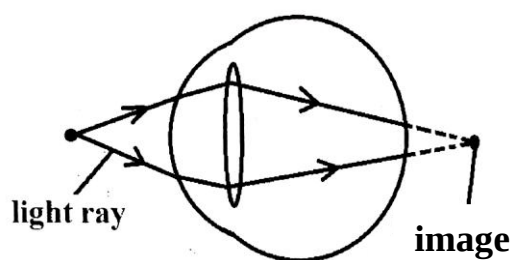


Figure 3

(a) Identify the eye defect **(01mark)**

.....

(b) What are the causes of the above defect **(2mks)**

.....

- (c)** With the aid of a well labelled diagram, describe how the above defect can be corrected. **(03marks)**

- (d)** Describe the changes in each of the following parts of the eye when a girl who has been reading her book in a well lit room comes out to look at an aeroplane in the sky in dim moon light.

(i) Pupil. **(02marks)**

.....

(ii) Lens. **(02marks)**

.....

5. (a) Differentiate between:

(i) nastic response and tactic response

(03 marks)

.....

.....

.....

.....

(ii) hormones and enzymes?

(03 marks)

.....

.....

.....

.....

(c) How are hormones and enzymes similar?

(02 marks)

.....

.....

.....

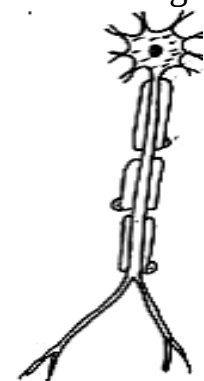
(d) Why should the growth hormone be released in only required amounts? (02 marks)

.....

.....

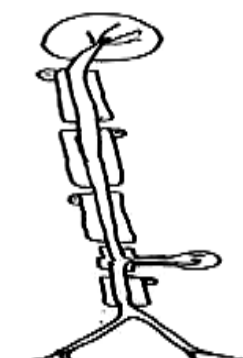
.....

6. The diagrams in **figure 4** below shows two types of neurons



Neuron X

Figure 4



Neuron Y

(a) (i) Giving a reason in each case, identify the type of neuron represented by:
Neuron X (1½mark)

.....
.....

Neuron Y (1½mark)

.....
.....

(ii) State the function of each neuron in the body.
Neuron X (01 mark)

.....
.....

Neuron Y (01 mark)

.....
.....

(b) By means of an arrow, show the direction of impulse on each neuron (02 marks)

(c) In which ways is neuron X structurally different from neuron Y? (03 marks)

.....
.....
.....
.....
.....

SECTION (30 MARKS)

*Attempt **any two questions** from this section in the answer sheets provided.*

7. (a) Distinguish between **endocrine glands** and **exocrine glands**. (04 marks)
(b) Describe the **different roles** of exocrine and endocrine glands in the pancreas. (07 marks)
(c) Why is **under secretion** of insulin by the islets of Langerhans **fatal** to human life? (04marks)

8. (a) Describe an experiment which can be set up to investigate the **response of plant shoots to light** coming from one direction. *(10 marks)*
- (b) How do plants **benefit** from responding to light? *(05 marks)*
9. Describe how each of the following parts of the mammalian eye is **adapted** to perform its function. *(15marks)*
- (a) Lens
- (b) Retina
- (c) Choroid
10. (a) What is **accommodation**? *(01 marks)*
- (b) State the events that occur in mammalian eye when **focusing a far object in bright light**. *(09 marks)*
- (c) (i) State the eye defect in an individual who **cannot clearly focus far objects**. *(01 marks)*
- (ii) State the **causes of the eye defect** stated in (c) (i) above. *(02 marks)*
- (iii) Describe how the eye defect stated in (c) (i) above can be **corrected**. *(02marks)*
- 11.(a) Briefly describe **Pavlov's experiment** on a conditioned reflex action. *(06 marks)*
- (b) A boy hears a loud sound of a gunshot. Describe the events leading to the **perception of the sound**. *(09 marks)*

END.