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| C:\Users\s.kanakis\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\ACC Logo_L_rgb_lrg.jpg | **Aranmore Catholic College**  **Semester 1 Examination, 2013**  **Question/Answer Booklet** |

Please place your student identification label in this box

HUMAN BIOLOGICAL SCIENCE

**Stage 3A/3B**

Student Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student’s Teacher \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Time allowed for this paper

Reading time before commencing work: ten minutes

Working time for paper: three hours

**Materials required/recommended for this paper**

To be provided by the supervisor

This Question/Answer Booklet

Multiple-choice Answer Sheet

***To be provided by the candidate***

Standard items: pens, pencils, eraser, correction fluid, ruler, highlighters.

Special items: non-programmable calculators satisfying the conditions set by the Curriculum Council for this course.

**Important note to candidates**

No other items may be taken into the examination room. It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non‑personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor before reading any further.

**Structure of this paper**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section | Number of questions available | Number of questions to be answered | Suggested working time  (minutes) | Marks available | Percentage of exam |
| Section One:  [Multiple-choice] | 20 | 20 | 20 | 20 | 20 |
| Section Two:  [Short answer] | 16 | 16 | 100 | 100 | 50 |
| Section Three:  [Extended answer] | 3 | **2** | 60 | 60 | 30 |
|  | | | | | 100 |

**Instructions to candidates**

1. The rules for the conduct of examinations at Aranmore are detailed in the *Examination Information Handbook 2013.* Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions according to the following instructions.

Section One: Answer all questions on the separate Multiple-choice Answer Sheet provided. For each question shade the letter to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, do not erase or use correction fluid, and shade your new answer. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Sections Two and Three: Write your answers in this Question/Answer Booklet.

3. You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.

4. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

* + Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
  + Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question(s) that you are continuing to answer at the top of the page.

MULTIPLE CHOICE QUESTIONS

1. When the membrane of a neurone’s axon is not transmitting an impulse it is said to be:
2. depolarised.
3. bipolarised.
4. polarised.
5. omnipolar.

2. The adrenal cortex secretes both:

a) adrenocorticotrophic hormone and cortisol.

b) adrenaline and luteinizing hormone.

c) noradrenaline and oestrogen.

d) aldosterone and cortisol.

3. Which ONE of the following would be brought about

by the sympathetic nervous system?

a) Decreased heart rate.

b) Decreased sweat secretion.

c) Increased peristalsis.

d) Increased release of glucose from the liver.

4. Fred suffers from diabetes mellitus (sugar diabetes). Three times each day, he

must inject insulin into his body to ensure that the concentration of glucose in

his blood stays at a relatively constant level. Sometimes Fred’s blood glucose

levels fall, causing him to feel weak and dizzy.

Which of the following could cause a drop in blood glucose level?

1. Injection of too much insulin.

2. Injection of too little insulin.

3. Too much exercise.

4. Too little exercise.

5. Eating too much carbohydrate.

6. Eating too little carbohydrate.

a) 1, 3 and 5.

b) 1, 3 and 6.

c) 2, 4 and 5.

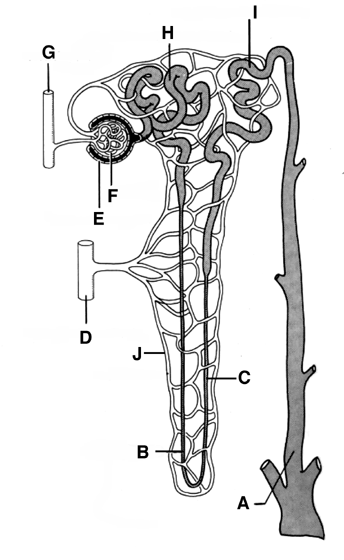
d) 2, 4 and 6.

5. At the synapses, the impulses are always passed from the:

1. axon to the dendrites
2. dendrites to the axon
3. either way is possible
4. cyton to the dendrites

6. Which one of the following statements is correct?

|  |  |
| --- | --- |
| a | The heart rate is slowed by the parasympathetic nervous system via the acceleratory nerves. In periods of stress the heart is sped up through sympathetic input. The Vagus nerve, of the sympathetic nervous system carries the impulse to the heart**.** |
| b | The heart rate is sped by the parasympathetic nervous system via the Vagus nerve. In periods of rest the heart is slowed down through sympathetic input. The postganglionic axons of the sympathetic nervous system arrive at the heart**.** |
| c | The heart rate is slowed by the sympathetic nervous system via the Vagus nerve. In periods of stress the heart is sped up through parasympathetic input. The postganglionic axons of the parasympathetic nervous system carry this impulse to the heart**.** |
| d | The heart rate is slowed by the parasympathetic nervous system via the Vagus nerve. In periods of stress the heart is sped up through sympathetic input. The postganglionic axons of the sympathetic nervous system arrive at the heart**.** |

Use the diagram below to answer question 7

.

7. In the diagram to the left which structure does the active reabsorption of amino acids occur in?

1. E
2. I
3. C
4. H

8. In myelinated neurons:

1. The action potential is seen all along the axon.
2. The action potential is seen nowhere along the axon.
3. The action potential is seen at the nodes of Ranvier.
4. There is never a resting potential.

9. Mandy is blood type A(IAIA). This means that she can accept blood donated by

people who are blood type:

a) AB and O.

b) O and A type.

c) A type or B type.

d) Any blood type.

10. Myelin for peripheral neurons is provide by:

a) Soma

b) Neurone axons

c) Acetylcholine

d) Schwann cells

.

11. The autonomic nervous system:

a) Regulates the activities of skeletal muscles and glands.

b) Is consciously controlled by the cerebral cortex.

c) Is primarily an afferent system.

d) Is made up of two neurone pathways.

12. Rejection of blood form a donor to a recipient can be due to:

a) the recipient’s immune system recognising the antigens on the surface of the donor blood cells as foreign.

b) The donor’s immune system recognising antigens on the surface of the recipient’s blood cells as foreign

c) The donor’s white blood cells attacking the recipient’s white blood cells.

d) both answers a) and b).

13. Solutions having a lower concentration of solutes than the surrounding

environment are \_\_\_\_\_\_\_ to the environment.

1. isotonic
2. hypotonic
3. hypertonic
4. polar

14. The white matter of the brain gets its colour from:

a) Myelinated axons.

b) Unmylinated axons.

c) Myelinated dendrites

d) Unmylinated dentrites.

15. Which of the following hormones are used in Hormone Replacement

Therapy medications used with post menopausal women?

a) Oestrogen and progesterone.

b) Oestrogen and Follicle stimulation hormone.

c) Follicle stimulating hormone and luteinising hormone.

d) Progesterone and follicle stimulating hormone.

16. When the [action potential](http://en.wikipedia.org/wiki/Action_potential) reaches the presynaptic neuron terminal of the neuromuscular junction, special ion channels open and [ions](http://en.wikipedia.org/wiki/Ions) flow from the extracellular fluid(outside of the Neuron) into the neuron's cytoplasm. The ion involved here is:

a) sodium.

b) potassium.

c) calcium.

d) negatively charged organic ions.

17. Damage to part \_\_\_\_\_\_A\_\_\_\_\_\_of the brain will cause dizziness, ataxia (which is an inability to coordinate voluntary muscle movements), unsteady movements and staggering walk. Other symptoms of damage to this part, include poor motor control and the inability to engage in rapidly alternating movements. This part is most likely the:

a) Cerebellum.

b) Cerebrum.

c) Brain stem.

d) Hypothalamus.

18. Experiments were carried out on three groups of laboratory animals to determine the changes in blood calcium levels over a 24 hour period after the administration of hormones. At the beginning of the experiment, Group A was given calcitonin and Group B was given an equivalent amount of parathyroid hormone. Group C was the control group. Blood samples were taken over the next 24 hours and the blood calcium levels were determined.

The table below shows the average blood calcium levels for the three groups.

|  |  |  |  |
| --- | --- | --- | --- |
| **Time**  **(hours)** | **Blood Calcium Level**  **(mg/100mL of blood)** | | |
|  | *Group A (calcitonin)* | *Group B (parathyroid hormone)* | *Group C (control)* |
| *0* | 12 | 12 | 12 |
| *2* | 8 | 17 | 12 |
| *4* | 7 | 14 | 12 |
| *8* | 4 | 12 | 12 |
| *12* | 3 | 12 | 12 |
| *24* | 1 | 12 | 12 |

A logical interpretation of this data would be:

a) parathyroid hormone decreases blood calcium levels.

b) calcitonin has no effect on blood calcium levels.

c) calcitonin has a longer-lasting effect than parathyroid hormone.

d) parathyroid hormone cause the same change.

19. Which of the following **can** diffuse directly through the phospholipid bilayer of the plasma membrane?

a) Bacteria.

b) Water.

c) Large protein molecules.

d) Lipids such as organic oils.

20. An example of a hormonal disruption to homeostasis is:

a) emphysema.

b) diabetes.

c) fever.

d) eating habits such as bulimia.

**Section Two: Short Answer**

1. **Marks**
2. Complete the table below, describing key differences between how the endocrine and nervous system work to maintain homeostasis in the body.

|  |  |  |
| --- | --- | --- |
| Function | Endocrine | Nervous |
| Mode of Transmission |  |  |
| Speed of reaction time |  |  |
| Duration time of changes caused |  |  |

* + 1. marks)

2. An B(IBIB) blood group man marries an A(IAIO) blood group woman.

What proportion of their probable offspring could donate blood to their father?

Show all working that allowed you to make your prediction.

(5 marks)

3.

One of the major risk factors in cardiovascular disease is hypertension (high blood pressure). It has been controlled by the use of various drugs and by the maintenance of a healthy lifestyle. A method of prevention has now been trialled using a new drug called CYT006-AngQb. A clinical trial was carried out with 72 patients suffering from hypertension. Half of the patients were injected with 300μg of the new drug and half were injected with 300μg of a placebo. Three months after the injection, the blood pressure of the patients was taken over a 24-hour period, from 8am one day to 8am the next day.

Below is a table comparing the average systolic blood pressure for both groups of patients over the 24-hour period.

|  |  |  |
| --- | --- | --- |
|  | Systolic Blood Pressure (mmHg) | |
| Time (24 hours) | Patients treated with the new drug | Patients treated with the placebo |
| 8 am | 145 | 160 |
| 12pm (midday) | 138 | 150 |
| 4pm | 142 | 150 |
| 8pm | 140 | 150 |
| 12 am (midnight) | 125 | 130 |
| 4am | 132 | 135 |
| 8am | 140 | 160 |

1. Suggest a hypothesis for this experiment.

(1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Describe two (2) variables that were controlled in this experiment.

(2 marks)

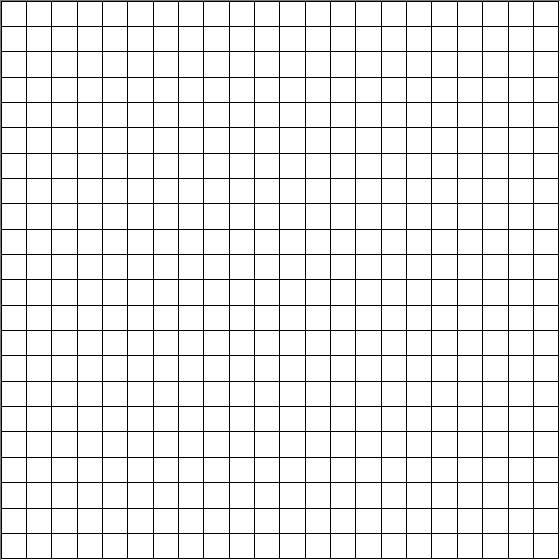
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1. What is the purpose of the placebo?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(1 mark)

1. Graph the results in the table onto the graph provide below. If you need to redraw your graph, there is a spare graph grid at the end of the exam.
   * 1. marks)



1. What was the dependent variable in this experiment?

(1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What was the independent variable in this experiment?

(1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. For those taking the new drug, what might their systolic blood pressure be at 6pm?

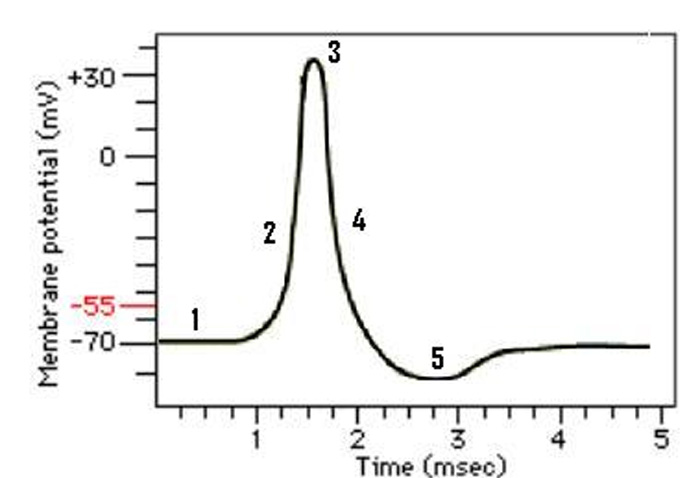
(1mark) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. In your answer for question 3 g, did you use extrapolation or interpolation? Give a reason for your choice of answer.

(2 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. The graph below refers to change in charge at the membrane of a neurone axon during transmission of a nerve impulse. Use it to answer the questions that follow.



a) What is the name of the process that is happening at point number 2 on the line on the line on the graph?

(1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Describe the changes that would be happening at the membrane of the axon during the process occurring at point 4.

(3 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. There has been much debate about the benefits and potential dangers of Hormone Replacement Therapy. List some of these benefits and potential dangers.

(4 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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6. Into the space below draw a feedback loop to show the body’s response to a sudden **drop** in blood glucose levels.

(6 marks)

1. Candice and Jenny are jogging in the park. Candice has a heart rate of 110(beats/min) and her stroke volume is 90(mL/beat). Jenny has a heart rate of 120(beats/min) and her stroke volume is 75(mL/beat). Who has the greatest cardiac output. Show all the working you used to calculate your answer.

(5 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Emphysema is a disorder affecting some people. Describe the possible causes, the effects on body organs and any possible treatment.

(6 marks)

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Define endocytosis, then name and describe the two types of endocytosis.

* + 1. Marks)

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10. Why are Recognition(cell-identification marker) proteins important?

(4 marks)

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11. What is the name of the structure that attaches the pituitary gland to the hypothalamus?

(1 mark)

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12. Use the diagram below to answer question 12.

a) Structures C and D make up most of the membrane. What are they and how do they prevent water moving through the membrane?

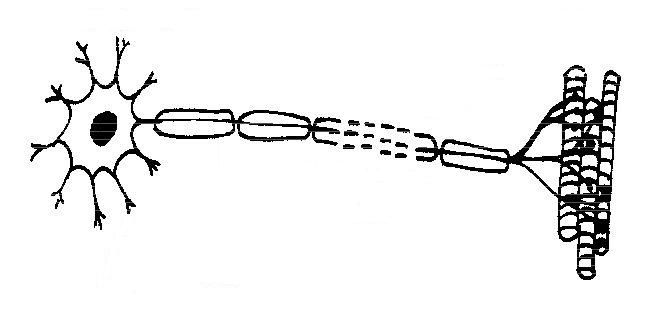
(3 marks)

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b) Structure E can sometimes carry out passive transport and sometime it can carry out active transport. How do these two types of transport differ?

(4 marks)

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13. Use the diagram below to answer the questions that follow.

a) Onto this page label the major structures of the neuron above.

(4 marks)

b) By function, name the type of neurone and state what it does.

(2 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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14. The Autonomic nervous system has two main divisions.

a) Name the two divisions of the autonomic nervous system and state their respective functions into the table below.

(4 marks)

|  |  |
| --- | --- |
| Name of division | Function of division |
|  |  |
|  |  |

b) For each division state the effect it has on the body function or body part listed in the table below.

|  |  |  |
| --- | --- | --- |
|  | Name of Divison | |
| \_\_\_\_\_\_\_\_\_\_\_\_ system | \_\_\_\_\_\_\_\_\_\_\_\_ system |
| Body part or function |  | |
| Saliva production |  |  |
| Iris |  |  |
| Heart rate |  |  |
| Rate and depth of breath |  |  |
| Rate of peristalsis |  |  |

1. marks)

15. **Gluconeogenesis** is an important process in the human body. Answer the questions that follow on the process of gluconeogenesis**.**

a) Where does it occur and what does it produce?

(2 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

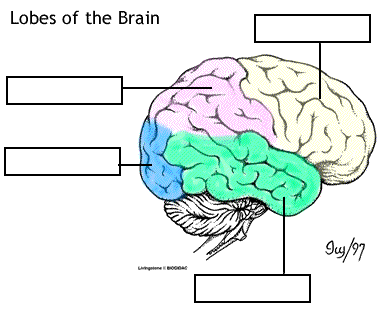
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b) Under what conditions does it occur?

(2 mark)

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16. Label the diagram below and use it to complete the table that follows.



|  |  |
| --- | --- |
| Name of Lobe | Function |
|  |  |
|  |  |
|  |  |
|  |  |

(8 marks**)**

**End of Section 2**

**Section 3: Extended Answer Questions. 60 Marks**

This section contains three (3) questions. Select and **attempt any two (2) questions** from questions 1, 2 and 3. Write your answers on the lined pages provided. Answers should be written in a blue or black pen.

Responses could, if appropriate, include clearly labelled diagrams with explanatory notes; lists of points with linking sentences; clearly labelled tables and graphs; and annotated flow diagrams with introductory notes.

Suggested working time for this section is 60 minutes.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question 1**

(30 marks)

a) Using a simple labelled diagram, with supporting notes, explain how a nerve impulse is transmitted at a synapse.

(13 marks)

b) Fly sprays sometimes contain chemicals, that stop the enzyme cholinesterase functioning. In the body of a fly, the enzyme Cholinesterase breaks down acetylcholine after a nerve impulse has been sent. When a pesticide is introduced at a lethal dosage for a fly, the cholinesterase is affected, keeping it from binding with the acetylcholine. Why would this kill the fly?

(2 marks)

c) Botox is used by some people to make themselves look younger. When Botox is injected into the muscles of the forehead it weakens the muscles that cause frowning. Botox contains the toxin Botulinum. Botulinum toxin works to block the release of acetylcholine at the neuromuscular junction. So why are these muscles weakened?

(2 marks)

d) The neurotransmitter dopamine is part of the brain's system of motivation. Some drugs stimulate the production of dopamine, leading to increased dopamine levels and a corresponding euphoric feeling or “high”. Cocaine stops the re-uptake of dopamine after its release. What would happen as a result?

1. marks)
2. Neurones can be classified according to function and morphology. Using 3 simple diagrams show the 3 main types of Neuron classified by morphology.

(10 marks)

**Question 2**

1. The hypothalamus is an important control centre in the brain. The Pituitary gland is often referred to as the “Master gland” and is essential for the functioning of the endocrine system.

Describe the relationship between the hypothalamus and the anterior and posterior lobes of the pituitary gland.

(6 marks)

1. Choose five (5) pituitary hormones, including those from both lobes, and describe their effects and respective target cells or organs.

(15 marks)

1. Oestrogen is a steroid hormone. State how oestrogen brings about a change in the cells of the target organs when it reaches them. Also explain what would happen when a target organ cell becomes saturated with Oestrogen.

(9 marks)

**Question 3**

1. Thomas places his foot on a sharp pin. Before he has realised what has happened, his foot is pulled away from the pin. Use a labelled diagram and supporting notes to explain what has happened and why.

(10 marks)

1. If a person’s core body temperature increases slightly due to an increase in air temperature, a number of changes will occur to bring the core temperature back within acceptable limits. Describe these changes.

(10 marks)

1. The brain stem has 3 main parts. Where is the brain stem located in the body. List the 3 parts of the brain stem and state their function.

(10 Marks)

**End of questions.**

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**Spare graph grid**

