**Name……………………………………………**

**Applied Diploma Medical Science: Induction Task**

**Hand in the induction task to your Medical Science tutor during your first lesson in September**

**Task 1.** Fully review all your GCSE Science notes (if you can, also use: text books, revision guides and/or online revision sites), paying particular attention to biology topics. You will need to have thorough knowledge and understanding of GCSE Science to give you a good grounding in this subject.

**Task 2.** Complete **ALL** questions below, you may use a calculator.

a) What is a stem cell? Explain and describe some potential uses of stem cells in medicine?

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**b)** Explain how a vaccination can provide protection from infectious disease.

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c) The diagram shows a cross-section of an artery.



(a)     What type of tissue is in the layer labelled **Y**?

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**(1)**

(b)     Layer **Z** contains a high proportion of elastic tissue.

Describe the advantage of having elastic tissue in the wall of an artery.

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**(2)**

(c)     Calculate the cross-sectional area of the lumen of the artery shown in the diagram. Show your working.

The area of a circle is given by π*r*2, where *r*is the radius of a circle (π = 3.14).

Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mm2

**(3)**

**(Total 6 marks)**

d) Describe and explain how exchange of oxygen and carbon dioxide occurs at the gas exchange surface in the lungs.

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e) A research scientist investigated the effect of caffeine on heart rate in human volunteers.

The scientist divided volunteers into three groups. Each group was given the same volume of fluid.

•   Each member of Group **I** was given a sports drink containing caffeine and sugar.

•   Each member of Group **J** was given a sports drink containing caffeine and no sugar.

•   Each member of Group **K** was given water.

The scientist recorded the volunteers’ heart rate before the drink was given and for 120 minutes after the drink was given.

Her results can be seen in **Figure 2**.

**Figure 2**



(i)  Caffeine affects the autonomic nervous system.

Suggest how caffeine could account for the results of Group **I** in **Figure 2** at 60 minutes.

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(ii)  Before taking the drink, the mean heart rate of Group **J** was 68 beats per minute.

Fifteen minutes after taking the drink, the mean volume of blood leaving the hearts of Group **J** was 4700 cm3 per minute.

Calculate the mean volume of blood leaving the heart at each beat fifteen minutes after taking the drink.

Answer = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm3

**(1)**

**Task 3. Essay:** Read about current health topics on the BBC news website here:

* <https://www.bbc.co.uk/news/health>



* Choose one article and write a report summarizing the details in your own words (hand written please)
* Reference with the article title and web link.