ASIC200 Final Exam 2016 - Science

EasyQ

6 questions, 4 marks each. Consider how I might mark to get to 4 marks. Point form and even diagrams are o.k. in fact, sometimes, they provide the answer in the clearest way.

LessEasyQ

1. If the basic code exists in DNA form, and yet proteins (which the DNA codes for) are usually the molecules with actual tangible functions; why does RNA need to exist as a mediator between the two? Two reasons with a brief explanation for each will suffice.

2. Briefly explain the concept of RADIATIVE FORCING, and then please provide one example of negative radiative forcing, and one example of positive radiative forcing.

3. During the replication process, a multiple protein complex is formed that is composed of 4 proteins. List the 4 proteins, and provide a single explanatory sentence that explains its function for each.

4. Climate models can be produced because one can utilize physical laws (such as the first law of thermodynamics) to set parameters for the projections to follow. However, any climate model produced must be subjected to a process of validation. The course listed three such means of validation: Can you briefly explain two of them?

5. According to the CENTRAL DOGMA, there is a flow of information from DNA to RNA to proteins. In terms of molecular stability (i.e. how tough or long-lived the molecules are), DNA is actually a very robust stable molecule, whereas the stability of proteins will tend to vary according their function and chemistry. However, RNA is a notoriously **unstable** molecule, subject to extremely fast degradation. Can you try to think of reason why this might be an important thing for the well-being of a cell, tissue or organism?

LessEasyQ

In March 2013, research was published where scientists used a comprehensive set of proxy and direct temperature measurements, to extend the iconic climate change hockey stick graph back to include the last 11,300 years (most graphs to that point only showed the last 2000 years). This extended hockey stick graph is shown below:
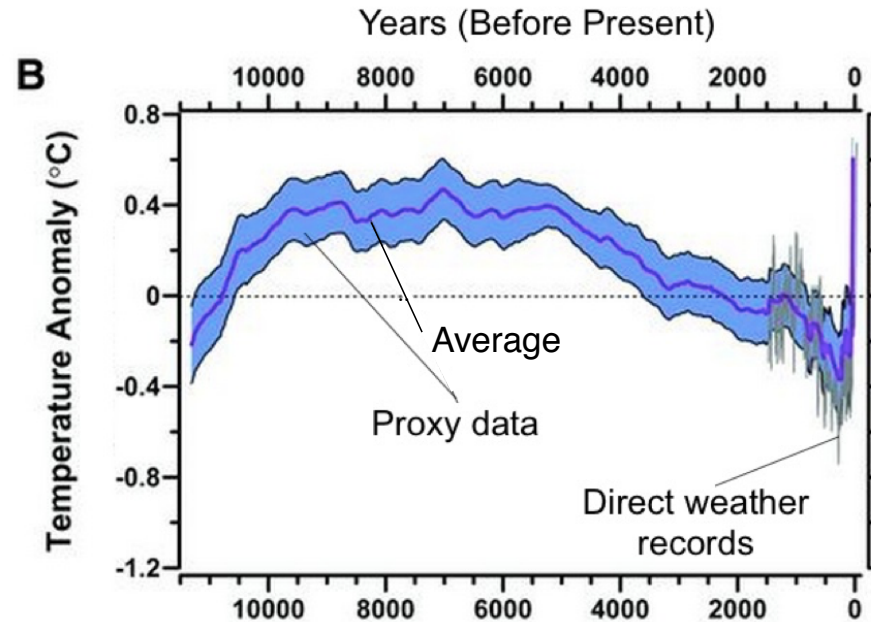
Graph legend: blue equals variation in proxy data; thin black line equals direct temperature measurements; purple line is mean average temperature data using both proxy and (where possible) direct temperature measurements.

Highlight **two** important trends/observations on this graph, one of which appears to *support*, and the other which appears to *weaken* the argument of anthropogenic climate change. Please briefly comment on your reasoning and the validity of your reasoning for choosing these two trends.