UNIVERSITY COLLEGE LONDON

EXAMINATION FOR INTERNAL STUDENTS

MODULE CODE	:	**BIOC0006**
ASSESSMENT PATTERN	:	**BIOC0006A5UC**
MODULE NAME	:	**BIOC0006 - Essential Protein Structure and Function**
LEVEL:	:	**Undergraduate**
DATE	:	**20/05/2021**
TIME	:	**10:00**

This paper is suitable for candidates who attended classes for this module in the following academic year(s):

**Year
2020/21**

Additional material	
Special instructions	
Exam paper word count	

BIOC0006: ESSENTIAL PROTEIN STRUCTURE AND FUNCTION

Construction of answers:

You have a period of 24 hours to complete this exam. However, it is expected that it should take approximately 2-3 hours to complete.
The word limit for each question is 700 words. Any words over this limit will not be marked. Please include a word count at the end of each answer.

You may refer to lecture material and the literature whilst writing your answers but you should not include references or a bibliography.
You will need to write concisely and compose a well-structured answer using a stepwise style to introduce and explain concepts and ideas.
You are encouraged to use annotated diagrams to explain your answers when necessary. Words included in a diagram itself, such as labels, will not count towards the word count. Figure legends are not required; if included, words in a legend will be counted towards the word count.
Do NOT paste figures or images from other sources. You should neatly hand draw figures, and then insert an image file.
If a table is included in your answer, words within the table itself and the table legend will be included in the word count.

Marking:

Answers will be awarded percentage marks based on the 'UCL Division of Biosciences 24-hour exam Marking Criteria'.

ANSWER THREE QUESTIONS.

1.   a) Compare and contrast global and local sequence alignment including an explanation of where the two techniques are used. When aligning protein sequences, what scoring schemes can be used to compare amino acids with one another?

    b) Explain why sequence alignment alone is not practical for searching large datasets to identify homologues and give a brief overview of fast techniques that can be used to identify potential homologues.

2.   Explain what biochemical and structural features make haemoglobin an allosteric oxygen transporter. Use appropriate diagrams to illustrate your answer.

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3. Describe with diagrams the membrane protein secondary structures for a photosynthetic reaction centre, the bacterial potassium channel protein, and porin. For each of these, explain how the secondary structures are correlated with the protein function. (each part has equal marks)

4. Describe the role played by the different enzymes in the biosynthesis, release and action of thyroid hormones under normal and dietary iodine deficiency.

5. Describe the structural characteristics of amyloid fibrils and how these are formed by a protein. Outline how aducanumab acts on fibril formation.

END OF PAPER