**BIRKBECK**
**(University of London)**

**BSc EXAMINATION**

**SCHOOL OF SCIENCE**

**Palaeoclimatology**

**SCES014H6**

**15 credits**

**Monday 4 May 2020 09:30-13:30**

**Time allowed: 4 hours**

## INSTRUCTIONS

Answer THREE questions from the six questions provided.

All questions carry equal marks.

Candidates are advised to spend 1 hour on each question; the additional 1 hour is available for the document upload process.

It is recommended that you type your answers.

Use diagrams to support written answers wherever possible; images of your sketches should be included in your submitted document.

You are **not permitted** to include copied graphics or text from lecture notes or the internet in your answer. Your work will be passed through plagiarism-detection software. Suspected plagiarism will be investigated following the Birkbeck College unfair practice policy.

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1. Discuss the use of climate modelling in palaeoclimate research including recent model developments, sensitivity studies and data-model comparison.

2. Explain how oxygen isotopes in ocean sediments reflect changes in Earth's climate and outline the principal features of the Cenozoic record of $\delta^{18}O$ from benthic foraminifera.

3. Describe the Milankovitch cycles and explain how the orbital forcing of Earth's climate is recorded in palaeoclimate archives.

4. Describe the climate transition from the Last Glacial Maximum (LGM) to the Early Holocene. Include a discussion of the relevant climate forcings and the climate response (both modelled and observed).

5. (a) Explain how the El Niño Southern Oscillation (ENSO) operates in the present-day.
(b) Evaluate and discuss the evidence for ENSO variability from palaeoclimate archives.
(c) What are the predictions for future ENSO variability?

6. Evaluate the strengths and weaknesses of palaeoclimate proxies and discuss how they have contributed to the debate about future anthropogenic climate change.

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