UNIVERSITY COLLEGE LONDON

EXAMINATION FOR INTERNAL STUDENTS

MODULE CODE : **GEOLGG17**

ASSESSMENT PATTERN : **GEOLGG17A**

MODULE NAME : **Palaeoceanography**

DATE : **03 May 2016**

TIME : **10:00 am**

TIME ALLOWED : **2 hours 30 mins**

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

2015/16

TURN OVER

GEOLM018_GEOLGG17 PALAEOCEANOGRAPHY

*Answer **THREE** questions. All questions carry equal marks. For multi-part questions the weighting of marks is given in brackets.*

1. Describe how **ONE** of the groups below are used as indicators of palaeoceanographic change, citing specific examples:
   - calcareous nannofossils;
   - planktonic foraminifera;
   - benthic foraminifera.

2. a) Describe the modern geographic distribution and environmental controls on the deposition of siliceous deep sea sediments. [20%]

   b) How and why has the distribution of deep sea sediments (calcareous, siliceous, glaciomarine, terrigenous, red clays) changed during the Cenozoic (last 65 million years)? [80%]

3. Marine palaeo-temperatures can be estimated using the following two methods:
   (a) stable isotopes of oxygen AND [50%]
   (b) using Mg/Ca ratios in biogenic calcite. [50%]

   Outline the basis of these methods and show how they have been used to understand aspects of past climates.

4. Discuss the palaeoceanographic, palaeoclimatic and biotic changes that occurred during **TWO** of the following intervals. Your account should include the evidence for this change and the possible causal mechanisms:
   - Cretaceous oceanic anoxic events; [50%]
   - the Paleocene/Eocene boundary; [50%]
   - the Eocene/Oligocene transition; [50%]
   - Heinrich events during the last glacial. [50%]

5. The Zachos et al. (2008) compilation is from multiple deep sea sites. Discuss what issues might arise when switching between sites. Put your answer in the context of deep water formation and the "thermohaline conveyor belt".

END OF PAPER