UNIVERSITY OF RUHUNA

BACHELOR OF SCIENCE IN FISHERIES AND MARINE SCIENCES DEGREE

Level III Semester II – December 2016/ January 2017

OCG3222 - Paleoceanography and Marine Archaeology

Answer **any Four (04)** questions

Time: 02 hours

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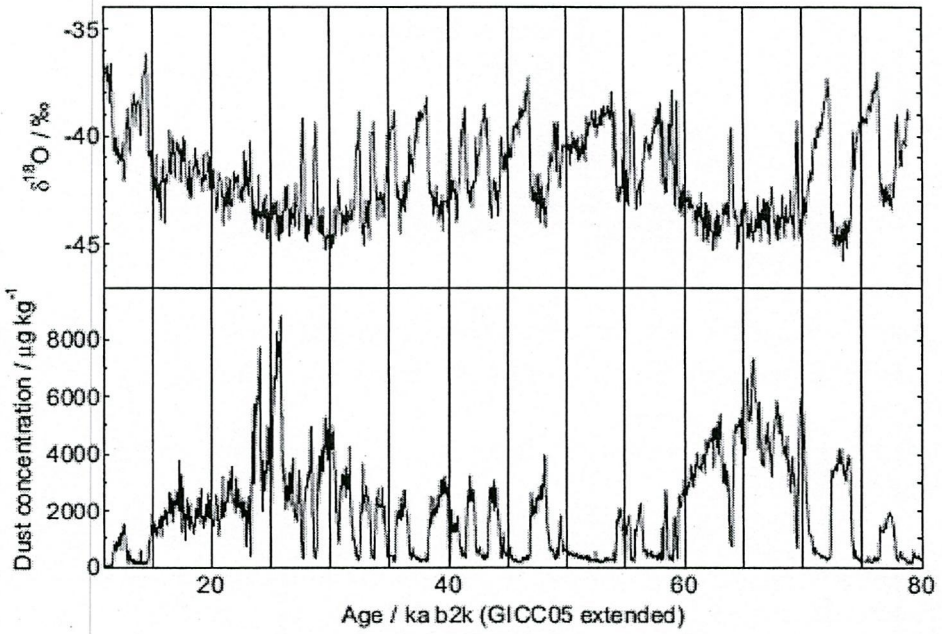
01. i. Briefly discuss two types of millennial climate events that occurred from the last deglaciation (10 Marks)

ii. The following diagram shows the $\delta^{18}O$ isotope and dust records from the North GRIP ice core extracted from the Greenland ice sheet.

a. Based on these two proxies describe the events shown in these diagrams. Justify your answer considering the behavior of these two proxies. (10 Marks)

b. Define at least three mechanisms that have been proposed to explain the occurrence of these events (05 Marks)

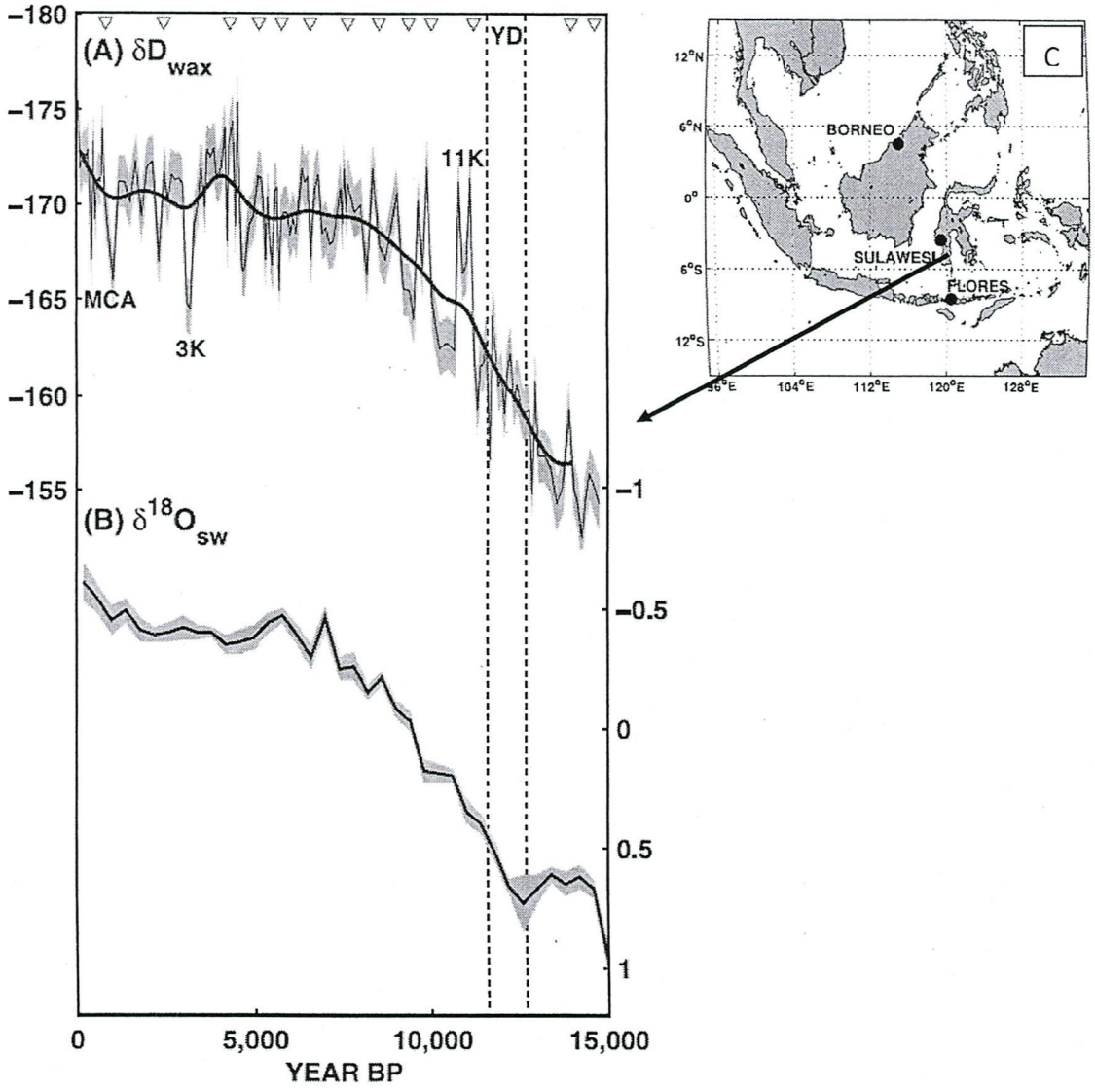


02. i. Briefly explain the contrasting contribution of weathering and metamorphism on long climate time cycles. (10 Marks)

ii. Explain possible mechanisms of any two tectonic related global climatic events (15 Marks)

03. i. Briefly explain the use of two paleothermometers in paleoceanography (10 Marks)

ii. The following diagrams show (a) Leaf wax hydrogen isotope data (δD_{wax}) (b) $\delta^{18}O$ (sea water) from marine sediment core 70GGC from Makassar Strait (shown in figure C). Interpret the proxy variability during the last 15000 yrs. (15 Marks)



04. i. Briefly explain how sunspot activity controls global climate (10 Marks)
ii. Explain the role of ocean in controlling atmospheric green house gasses (15 Marks)

05. i. $\delta^{18}O$ records in ice cores and marine sediment cores show a contrasting behavior. Explain why? (09 Marks)

ii.

a. A paleoclimatic study based on a 40m long terrestrial sediment core from Ratnapura basin in Sri Lanka yielded AMS ^{14}C dates over 45,000 years at 15 m depth (There are no reliable AMS dates for the top 15 m due to disturbance of sediment). If there is high-resolution proxy data that covers the full depth range of the core, suggest a method to develop an age model for the interval from 15 to 40m depth in the core. Justify your answer. (08 Marks)

b. AMS^{14}C revealed that corals in the Kachchathivu Island in Palk Strait are older than 45000 yrs. Suggest s method to get precise age of these corals. List the limitations of this method. (08 Marks)

06. Define what Maritime Archaeology is and compare it with Underwater Archaeology & Nautical Archaeology. (25 marks)