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89.582 - GEOLOGICAL OCEANOGRAPHY
HOMEWORK II - STRATIGRAPHY, CORRELATION, CHRONOLOGY

1. Define stratigraphy.
2. Distinguish between relative age and absolute age.
3. What is a *key bed*?
4. In the case of biostratigraphy, distinguish between the *datum* and *zonal* concepts.
5. Sediment collected at a depth of 50 cm by a deep sea core contains foram shells with a $^{14}\text{C}/\text{C}$ ratio of 12.5% that for sediment from a depth of 10 cm. Calculate the apparent sedimentation rate.

6. The following results were obtained using uranium series measurements at various depths in a deep sea core. The units are disintegrations per minute per gram (dpm g⁻¹) of sediment.

Depth (cm)	U-238	U-235	Th-230
0	1.3	1.4	65.6
20	1.5	1.6	33.6
40	1.4	1.3	17.4
60	1.5	1.3	9.6
80	1.5	1.5	5.7
100	1.2	1.3	3.5
120	1.4	1.5	2.4

What is the sedimentation rate? If the Pa-231 activity is 6.9 dpm/gm at 10 cm, what should it be at 50 cm?

7. How can magnetostratigraphy be used to determine the age of seafloor sediments?

8. What factors affect the ¹⁸O/¹⁶O isotopic ratios of planktonic calcium carbonate shell material?

9. A benthic organism recovered from a deep sea sediment core has $\delta^{18}\text{O} = +3$. Given a seafloor water temperature of 1°C , the seawater in equilibrium with the benthic organism would have had $\delta^{18}\text{O} = +1$. A planktonic organism collected from the same core gives $\delta^{18}\text{O} = +4.5$. Calculate the surface seawater temperature.

10. What is *carbon isotopic stratigraphy* and what factors affect the $^{13}\text{C}/^{12}\text{C}$ ratio of seawater?