

1. The $^{87}\text{Sr}/^{86}\text{Sr}$ and $^{143}\text{Nd}/^{144}\text{Nd}$ ratios of modern-day basalts (OIB and MORB) are inversely correlated. Explain why by providing the relevant details. [5]
2. Write and explain the essential criteria that must be fulfilled for dating of rock using isochrons. Given the choice between the whole-rock and mineral isochrons, which one would you prefer to use for dating of igneous rocks? Justify your choice. [3+3]
3. Discuss the problems associated with dating of rocks using U-Pb isochrons. [4]
4. The isotopes ^{234}U and ^{238}U maintain secular equilibrium in the rocks on the continents. However, the $^{234}\text{U}/^{238}\text{U}$ activity ratios in the freshwater are invariably much greater than one. Provide detailed explanations for this observation. [5]

