

QUESTION 5

You are the health physicist at a research facility and the staff has asked you to provide the following information regarding neutron detection.

POINTS

- 15 A. Identify the nuclear reaction which occurs in each of the following neutron detectors.
- $^{10}\text{BF}_3$ counter
 - ^6Li counter
 - ^3He counter.
- 15 B. Explain how to determine the flux and the average energy of an unknown neutron field using the Bonner sphere method with a $^6\text{Li}(\text{Eu})$ scintillator.
- 10 C. Explain the basis for neutron detection by the foil activation method. State one key advantage of this method when used for criticality dosimetry.
- 10 D. Fission chambers can be used for detection of either thermal or fast neutrons. Which uranium isotope (^{235}U or ^{238}U) provides for detection of thermal neutrons? **Briefly explain your answer.**