

QUESTION 12

You are the Health Physicist at an electron linear accelerator with a beam of up to 120 MeV and 50 kW used to strike a Tantalum target for the production of neutrons for research.

POINTS

- 10 A In reviewing the dose records for accelerator personnel, you notice that researchers and operators show low levels of neutron and β/γ exposures while maintenance workers show much higher levels of β/γ exposure only. How would you account for this difference?
- 10 B The accelerator needs to operate for approximately 96 hours per week and normally will require a block of about 8 hrs per week for scheduled maintenance. As the H. P., how would you recommend setting up the schedule? **Justify your answer.**
- 15 C At about what electron energy would one need to begin worrying about neutron production in most materials? Why this energy? What are the implications of higher energies?
- 5 D Why is knowing the neutron spectrum in areas occupied by accelerator personnel so important?
- 30 E Describe three distinctly different ways to measure a neutron spectrum and a brief statement indicating the basis on which they operate. **Number your responses. Only the first three will be graded.**
- 20 F Identify two different types of routine personnel dosimetry useful for accelerator neutron dosimetry. Describe the principle of detection for each. **Number your responses. Only the first two will be graded.**
- 10 G List one radioactive and one non-radioactive contaminant commonly produced in the air around the target area, and describe how each is produced. **Number your responses. Only the first two responses will be graded.**