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ENJOY QUIZZING - 1

**Radiation Damage of Structural Materials
for Fast Reactor Fuel Assembly**

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ENJOY QUIZZING

RADIATION DAMAGE OF STRUCTURAL MATERIALS FOR FAST REACTOR FUEL ASSEMBLY

CHAPTER 1 : INTRODUCTION

STRUCTURAL MATERIALS AND THEIR BEHAVIOUR IN A FAST REACTOR FUEL ASSEMBLY

I. Answer Yes or No

- a. Thermal reactors use neutrons of energy ~ 1 MeV
- b. Temperature and radiation is higher in present fast reactors than thermal reactors.
- c. Point defects are annealed during irradiation
- d. Steels are preferred structural materials for thermal reactors.
- e. Vacancies move faster than interstitials.

II. Explain Why ?

- a. It is difficult to create interstitial than vacancy.
- b. Materials are exposed to more stringent conditions in fast reactors than thermal reactors.
- c. Displacement cascade does not form during electron irradiation.
- d. It is easy to form vacancy in Nickel than the intermetallic, Nickel Aluminide.
- e. Vacancies are thermodynamically stable defects, while interstitials are not.

III. Discuss (two to three pages): Is Nuclear energy the best option for future generation?

IV. Draw the energy level diagram in an A-B alloy, when irradiation amorphises the system and destabilizes the original crystal structure.

- V. Consider a system A-50% B. Radiation induced segregation near a sink takes place in the system. The B.E. of A with vacancy is 0.5 eV and that of B with vacancy is 0.05 eV. The diffusivity of A-vacancy complex is higher than that of B-vacancy complex. Draw the sketch of concentrations of A, B and vacancy after irradiation.