Q1.(a)   Explain why the effective half-life of a radionuclide in a biological system is always less than the physical half-life.

....

....

....

(2)

(b)   The physical half-life of a radionuclide is 20 days. The nuclide was administered to a patient. Initially the corrected count rate at the patient's body was 2700 counts s^{-1}. Five days later, the corrected count rate at the same place on the patient was 1200 counts s^{-1}.

Calculate the biological half-life of the nuclide.

biological half-life = _____ days

(4)

(c)   The table below gives the properties of two radionuclides.

	Technetium 99 m	**Iodine 131**
emitted radiation	gamma	beta⁻ and gamma
half-life / hours	6.0	190
energy of gamma ray / keV	140	610

By considering information in the table suggest which of these nuclides is more suitable for use as a tracer in medical diagnosis.

....

....

....

....

....

....

....

....

(4)
(Total 10 marks)