Ch 24 • Nuclear Chemistry
NChO Practice Problems

1999 NChO Exam

30. Tritium decays by a first-order process that has half-life of 12.5 years. How many years will it take to reduce the radioactivity of a tritium sample to 15% of it original value?

    (A) 64 y
    (B) 54 y
    (C) 34 y
    (D) 24 y

1995 NChO Exam

30. For a first order reaction that has a half-life of 72 s at 80 °C, what is the value of the rate constant, k?

    (A) 9.6×10^{-3} s^{-1}
    (B) 6.2×10^{-3} s^{-1}
    (C) 4.2×10^{-3} s^{-1}
    (D) 1.4×10^{-3} s^{-1}

1994 NChO Exam

29) If the half-life of a reaction is independent of concentration, what is the order of the reaction?

    (A) zero
    (B) first
    (C) second
    (D) zero, first, or second

1993 NChO Exam

39. Which species contains the most neutrons?

    (A) $_{26}Fe^{59}$
    (B) $_{29}Cu^{61}$
    (C) $_{30}Zn^{61}$
    (D) $(_{30}Zn^{60})^{2+}$

40. Which type of radiation changes both the atomic number and mass number of the emitting atom?

    (A) alpha
    (B) beta
    (C) gamma
    (D) X-ray

1992 NChO Exam

1. Which represents the ^{235}U atom?

	Protons	Electrons	Neutrons
(A)	46	46	143
(B)	92	92	92
(C)	92	92	143
(D)	92	92	146

65. For a first- order reaction of half-life 150 min, what is the rate constant in min^{-1}? $t_{1/2} = 0.693 / k_1$

    (A) 0.00104
    (B) 0.00462
    (C) 69.3
    (D) 216

1991 NChO Exam

59. The half-life of ^{14}C is 5570 years. How many years will it take for 90% of a sample to decompose?

    (A) 5,570 years
    (B) 17,700 years
    (C) 18,600 years
    (D) 50,100 years

1990 NChO Exam

26. The half-life of ^{99}Tc is 6.00 hours. If it takes exactly 12.00 hours for the manufacturer to deliver a ^{99}Tc sample to a hospital, how much must be shipped in order for the hospital to receive 10.0 mg?

    (A) 40.0 mg
    (B) 30.0 mg
    (C) 20.0 mg
    (D) 15.0 mg

36. An atom of iron-56, ^{56}Fe, contains

    (A) 26 electrons, 26 protons, 56 neutrons.
    (B) 56 electrons, 26 protons, 26 neutrons.
    (C) 56 electrons, 56 protons, 26 neutrons.
    (D) 26 electrons, 26 protons, 30 neutrons.