Production of X-Rays

80. The process of bremsstrahlung production is the result of collision between:

    A.   Neutrons and a nucleus
    B.   A high speed electron and the strong electric field near a nucleus
    C.   A photon and a neutron
    D.   A neutron and another neutron

81. The x-rays produced by 10 MeV electrons travel:

    A.   Are mostly backscattered
    B.   At about 30 degrees to the target
    C.   At about 90 degrees to the target
    D.   In same general direction as the electrons

82. The efficiency of x-ray production in radiation therapy machines is less than:

    A.   50%
    B.   10%
    C.   5%
    D.   1%

83. Characteristic x-rays are produced when:

    A.   An electron is converted into a photon
    B.   An ejected neutron gives away excess energy to become stable
    C.   An electron from an outer shell makes a transition to an inner shell
    D.   None of the above

84. Photons produced by an x-ray machine at 80 kVp:

    A.   Are mostly monoenergetic
    B.   Have about 90% of the same energy
    C.   Have a distribution of energies
    D.   Have about 50% of the maximum energy

85. The maximum energy of an x-ray photon from a 100 kVp unit is:

    A.   50 keV
    B.   10 keV
    C.   100 keV
    D.   1 keV

86. Hardening of x-ray beams refers to using filters to produce a beam of:

    A.   Greater intensity
    B.   Lower average energy photons
    C.   Higher average energy photons
    D.   None of the above

87. The average energy in keV of a diagnostic x-ray beam is about:

    A.   50% of the maximum kVp
    B.   33% of the maximum kVp
    C.   25% of the maximum kVp
    D.   20% of the maximum kVp

88. The output of an x-ray beam increases as:

    A.   The tube voltage increases
    B.   The tube current increases
    C.   The atomic number (Z) of the target increases
    D.   All of the above

89. X-ray tube targets are generally made of:

    A.   Low Z material such as Al
    B.   High Z material such as tungsten
    C.   An alloy of lead and copper
    D.   Complex organic compounds

90. Heel effect of a diagnostic x-ray beam:

    A.   Depends on the angle of the x-ray target
    B.   Produces a variation in intensity in the x-ray beam parallel to the cathode-anode axis
    C.   Results in a lower intensity at the anode end of the beam
    D.   All of the above