THERAPEUTIC MEDICAL PHYSICS CONTINUING CERTIFICATION EXAM CONTENT GUIDE

1. **Reference and Relative Dosimetry**
   - Absolute calibration for photon and electron beams
   - Dosimeter design, characteristics, application and QA, including ion chambers, solid state, optical, chemical, film and arrays
   - Survey Detector design and application
2. **Treatment Machines**
   - Photon/Electron Medical Accelerators, beam characteristics, delivery hardware, QA and shielding
   - Proton accelerators and beam characteristics
   - Specialized machines, e.g., design and function of non-conventional or site-specific external beam delivery systems
3. **Therapy imaging and room design, patient safety, data transfer and integrity, professionalism and ethics**
   - Imaging for Therapy Simulation (including equipment design, application, and image reconstruction)
   - Shielding and Radiation Safety
   - Treatment Localization and Verification Imaging, Image registration
   - Quality Control and Error Prevention
   - Computing and IT
   - [Professionalism and Ethics](#)
4. **Treatment planning for photons, electrons, SRS, SBRT, inter- and intra-fraction variations, planning system safety**
   - Photon Treatment Planning
   - Electron Treatment Planning
   - Management of inter- and intra-fraction variations
   - Tx planning system safety and QA
5. **Brachytherapy, radiation protection, radiation biology**
   - Brachytherapy, radionuclides, delivery systems, planning, QA and shielding
   - Radiation Protection regulations, personnel monitoring and special conditions (pregnancy, implanted devices, etc.)
   - Radiation Biology

Sample Questions

Multiple Choice

1. Why are flattening filters used for high-energy photon beams from an accelerator?
   A. To increase low-energy photons
   B. To correct for the pulsing of radiation
   C. To increase fluence along the central axis of the beam
   D. To increase depth dose
   E. To make the beam flat across the full field

2. A physician is considering hypofractionating a treatment that is usually prescribed as 50 Gy in 25 fractions, i.e., 2 Gy per fraction. If the considered dose per fraction is 3 Gy, the α/β ratio for this particular tumor is 10 Gy, and the model for biological effective dose (BED) is used, what will be the approximate number of fractions?
   A. 5
   B. 10
   C. 15
   D. 20
   E. 25

3. According to TG-59, an ionization chamber reading is corrected to compensate for the temperature and pressure dependence of which of the following?
   A. Air volume in the ionization chamber
   B. Mass of air in the ionization chamber
   C. Mass stopping power ratio for electrons in the ionization chamber
   D. Mass stopping power ratio for electrons of the phantom material
   E. Density of air in the monitor chamber

4. According to the AAPM TG-43 protocol, the anisotropy function is used to calculate doses in the vicinity of brachytherapy sources. For line sources, at points away from the perpendicular to the source's long axis, the value of the anisotropy function decreases as which of the following changes occurs?
   A. The distance from the source increases.
   B. The photon energy increases.
   C. The angle from the perpendicular increases.
   D. Source encapsulation decreases.
   E. The atomic number of the encapsulation material decreases.

5. In using kV cone-beam CT for image-guided radiation therapy of head and neck cancer, which of the following structures receives the largest imaging dose?
   A. Brain stem

B. Mandible

C. Parotid

D. Lens

Answers for this section:

1. E
2. C
3. B
4. C
5. B

Fill in the Blank

The candidate must type in the correct response:

1. Per 10 CFR 20, the annual total dose to members of the public should not exceed _____ mSv.

Answer: 1 mSv (acceptable range of 0.99 to 1.01)

Drag and Drop

The candidate must identify a region on an image:

1. Which part of the internal shielding device shown in the picture below is designed to prevent backscatter?

Answer: The candidate must put the marker somewhere within the area marked in red.