[AHS 0222]   **FEBRUARY 2022**   **Sub. Code: 4017**
(OCTOBER 2021 EXAM SESSION)

M.Sc. MEDICAL PHYSICS
FIRST YEAR
(Candidates admitted from 2010-2011 onwards – Paper VII)
(Candidates admitted from 2020-2021 onwards – Paper VIII)
PAPER VII & VIII – PHYSICS OF RADIATION THERAPY
Q.P. Code : 284017

Time: Three hours   **Answer ALL Questions**   **Maximum: 100 Marks**

I. Elaborate notes on: **(2 x 20 = 40)**

1. Describe the principle, construction and working of a Van De Graff generator and its role in megavoltage therapy. Also, highlight its advantages and disadvantages.
2. Explain in detail the role of a shutter system in a Telecobalt unit and describe the different types of shutter systems with neat diagrams and list their uses and limitations.

II. Write Short Notes on: **(10x6 = 60)**

1. Selection of energy for patient treatment with electron beam therapy.
2. *In vivo* dosimetry and its applications in radiotherapy.
3. What is a dose volume histogram? How is used in the evaluation of treatment plans?
4. Classification of brachytherapy based on dose-rate.
5. Commissioning of a new treatment planning system in radiotherapy.
6. Explain Sievert integral method.
7. Principle and working of a betatron for radiotherapy.
8. Write about the concept of surface dose in photon beam therapy, its impact with beam energy and its clinical implications.
9. List the various radioisotopes used in brachytherapy and tabulate their physical characteristics such as energy, half-life, specific activity, and exposure rate constant.
10. How does a standing waveguide accelerate electrons in a linear accelerator? Emphasize its merits over the travelling waveguide.

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