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0806E480

Candidate's Seat No :_____

M.Sc Sem.-2 Examination
P - 408
Medical Physics
June 2022

Time : 2-00 Hours] **[Max. Marks : 50**

Instructions: All questions in **Section – I** carry equal marks.
Attempt any **Three** questions in **Section – I.**
Questions in **Section – II** is **COMPULSORY.**

Section – I

Q-I A. Describe the components of medical linear accelerator with block diagram 7

B. Describe the working principle of Magnetron. What are the differences between Magnetron and Klystron. 7

Q-II A. Write short note on Van De Graff Generator. 7

B. Describe the working principle of Microtron. 7

Q-III A. Describe hot cathode X-ray tune. Explain Heel effect. 7

B. Explain basic X-ray circuit. 7

Q-IV A. What are types of anodes in x-ray tube. 7

B. Explain hooded anode in Radiotherapy X-ray tube. 7

Q-V A. How does indirectly ionising radiations interact with matter? Explain all the types of interaction with their clinical importance. 7

B. How electrons interact with matter? 7

Q-VI A. Explain the two interactions of matter that are important in diagnostic radiology? 7

B. How light charge particle interact with matter. 7

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Q-VII A. Explain how neutrons interact with matter? 7

B. Elaborate how heavy charged particle loss their energy while interacting with matter. 7

Q-VIII A. Derive Bethe Bloch formula for heavy charged particles. 7

B. What is Bragg curve? Write the advantage of proton therapy. 7

Section – II

Q-IX MCQs 8

1. Cyclotron was invented by

A. Sir Arthur Wynne
B. Sir Ernest Lawrence
C. Sir John Biggins
D. Sir Arthur Wynne

2. Two waves are propagating with the same amplitude and nearly same frequency in opposite direction, they result in _____

A. Stationary wave
B. Resonance
C. Wave packet
D. Beats

3. How much of the generated energy actually utilized for taking an X-Ray?

A. 10 %
B. 100%
C. 0.1%
D. 1%

4. The primary x-ray beam penetration (percent) through a patient can be increased by increasing the:

A. kV
B. Filtration

C. mAs

D. Beam Area

5. Which photon processes are dominant in the context of diagnostic radiology?

A. Compton scattering and photoelectric effect.

B. Photoelectric effect and pair production.

C. Compton scattering and pair production.

D. Compton and Rayleigh scattering.

6. An orthovoltage beam has an HVL of 2mm Cu. What percentage of the beam will be transmitted through 8mm Cu.

A. 25%

B. 50%

C. 6.25%

D. 75%

7. Which of the following is not shielding materials for neutrons .

A. water

B. polyethylene

C. paraffin wax

D. lead

8. The "track average" method and the "energy average" method for calculating LET give different numerical values in the case of:

A. x-rays and gamma rays.

B. protons.

C. alpha particles.

D. neutrons.

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