1304E031

Candidate's Seat No :_____

M.Sc. Sem-4 Examination

508

Med. Physics

April 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.	Define radiometry units.	7
	B.	Explain about cyclotron produced isotopes	7
Q-II	A.	Define dosimetry units.	7
	B.	Write the relationship between kerma, absorbed dose and exposure under charged particle equilibrium	7
Q-III	A.	What is free air ionization chamber? Describe the design of parallel plate free air ionization chamber. Write the limitations of free air ionization chamber.	7
	B.	Define apparent activity and reference air kerma rate.What are standards for Ir^{192} and Co^{60} in brachytherapy?	7
Q-IV	A.	What is beam quality? Write the beam quality index of photon beams used in radiotherapy.	7
	B.	Explain reference conditions for the measurement of absorbed dose to water in high energy photon beams.	7
Q-V	A.	List out various sources of neutrons and explain in brief about neutron dosimeters.	7
	B.	What are the characteristics of a re-entrant ionization chamber and mention about Manganese sulphate bath system?	7

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E-31-2

Q-VI A. How neutrons are classified and explain about a liquid counter? 7

B. What are the various neutron standards and explain about GM and proportional counter? 7

Q-VII A. Explain the radiation chemistry of water. 7

B. Explain the Fricke dosimetry and factors influencing the yield in Fricke dosimetry. 7

Q-VIII A. Define Beer_lambert's law, what is optical density. 7

B. Explain Spectrophotometry and its application. 7

Section – II

Q-IX MCQs 8

1. Which is not a cyclotron produced radioisotope

A. Ga^{67} B. I^{123}

C. Tl^{201} D. Tc^{99m}

2. What is the SI unit of activity

A. Gy B. cKg^{-1}

C. Bq D. Sv

3. Ionization in air is measured as

A. Absorbed dose B. Roentgen

C. Specific Activity D. RBE

4. According to AAPM and ICRU the strength of a brachytherapy source must be specified in terms of ----

A. Air kerma rate K_{air}

B. Activity

C. Number of disintegrations per unit time

D. Exposure rate produced at a distance from the source

5. If neutron is isolated from matter it decays to a proton by emission of a beta particle and -----

A. Alpha particle

B. Tritium

C. Neutrino

D. Antineutrino

6. Neutrons with energies 0 to 1 keV are included in ----

A. Fast neutron

B. Relativistic neutron

C. Intermediate neutron

D. Slow neutron

7. What is the wavelength of monochromatic light used for getting the absorption peak in Fricke dosimetry?

A. 204 nm

B. 324 nm

C. 304 nm

D. 424 nm

8. Which of the following equation is correct for representing the yield of Fe^{3+} in standard condition in Fricke dosimetry

A. $G(Fe^{3+})=G(H)+2G(H_2O_2)+G(OH)$

B. $G(Fe^{3+})=G(H_2O_2)+2G(H)+G(OH)$

C. $G(Fe^{3+})=3G(OH)+2G(H_2O_2)+G(H)$

D. $G(Fe^{3+})=3G(H)+2G(H_2O_2)+G(OH)$