Roll No. .....

(05/24)

15432

M. Sc. EXAMINATION

(For Batch 2021 & Onwards)

(Fourth Semester)

PHYSICS

MSc/Phy/4/CC16(A)

Radiation Physics

Time : Three Hours *Maximum Marks : 70*

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

(Compulsory Question)

1. (a) What do you mean by Bremsstrahlung radiation ? When are they produced ? 2

(b) How Corona discharge can be prevented ? How does it influence the working of GM counter ? 2

(c) What is internal conversion when it happens ? 2

(d) Calculate the spin and parity of ^{16}O and ^{14}N. 2

(e) On which factors biological effects of nuclear radiations depends ? 2

Unit I

2. Discuss different modes of interaction of Gamma rays and heavy charged particles with matter. 15

3. List different neutron sources, how they interact with matter ? Discuss in brief the working of neutron detector. 15

Unit II

4. Discuss in detail the working of GM counter. Also draw sketches for dead time, recovery time and resolving time of a GM counter. Also write its merits and demerits. 15

5. (a) Discuss in brief scintillation detector along with its merits and demerits. 5

(b) Explain the working construction and principles of semiconductor detector for charged particles and discuss applications and limitations of semiconductor detectors. 10

Unit III

6. Discuss the measurement of g-factor and hyperfine-fields. Also discuss the safety aspects of nuclear radiations. 15

7. (a) Discuss the terms does unit and safety limits. 5

(b) Write a note on internal conversion coefficients, angular correlation and perturbed angular correlation. 10

Unit IV

8. What is radiation dosimeter ? Explain the single photon emission computed tomography. 15

9. Discuss the Boron neutron capture therapy and use of ion beam in cancer therapy. 15