Reg. No. : ....

Name : ....

Third Semester M.A./M.Sc./M.Com. Degree (Reg./Supple./Improv.) Examination, November 2016
PHYSICS
PHY 3E02 : Radiation Physics
(2014 Admission Onwards)

Time : 3 Hours   Max. Marks : 60

SECTION – A

Answer **both** questions. (either **a** or **b**).

1. a) What is stopping power of alpha particles ? Derive an expression for the stopping power of alpha particles. On what factors does the stopping power and range depend ?

   OR

   b) Discuss the Compton scattering and pair production interaction mechanisms of gamma rays. Calculate the maximum energy of the Compton recoil electrons resulting from the absorption in aluminium of 2.19 mev r-rays.

2. a) Discuss the radiophotoluminiscence (RPL) dosimetry systems.

   OR

   b) Discuss the effects of ionizing radiation at molecular and cellular levels.

   (2×12=24)

SECTION – B

Answer **any four**. (1 mark for part **a**, 3 marks for part **b** and, 5 marks for part **c**)

1. a) How are neutrons sources produced ?

   b) Explain spontaneous fission with an example.

   c) What are photo neutron sources ? How is it constructed ? Give the advantages and disadvantages of photo neutron sources.

2. a) What is elastic interactions of electrons with matter ?

   b) Explain inelastic interaction of electron with matter.

   c) Explain Angur electron emission and show why it is a competing process with x-ray emission.

3. a) What is dosimetry ?

   b) How is radiation dose measured ?

   c) Discuss the equivalent dose and effective dose of measurement of dose.

4. a) Give the basic concept of cell biology.

   b) Explain chromosome mutation.

   c) Give an account of radiation sterilization.

5. a) What is radiation protection ?

   b) How can we protect ourselves against radiation ?

   c) What is the basis of ALARA and how is it implemented ?

6. a) What are gamma rays ?

   b) Explain gamma ray attenuation and define mass absorption coefficient.

   c) Discuss the physical interactions leading to attenuation.   (4×9=36)

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