

(i) Printed Pages : 3

Roll No.

(ii) Questions : 7

Sub. Code :

1	7	5	4	6
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Exam. Code :

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B.A. / B.Sc. (General) 6th Semester

(2056)

PHYSICS

Paper – C : Nuclear & Particle Physics–II

Time Allowed : 3 Hours] [Maximum Marks : 44

Note :- (i) Attempt **five** questions in all, selecting **two** questions each from Unit I and II. Unit III is compulsory.

(ii) Use of non-programmable calculator is allowed.

UNIT—I

1. (a) Explain in detail the principle, construction, and working of a scintillation counter.
(b) Compare GM counter and proportional counter. 6,3
2. (a) What is Compton effect? Derive an expression for the change in wavelength of scattered photon.
(b) Light of wavelength $6000 \text{ \AA}$ falls on a photo-metal of photoelectric work function 1.9 eV . Find :
 - (i) Energy of photons in eV
 - (ii) Kinetic energy of most energetic electrons
 - (iii) Stopping potential 6,3

3. Write short notes on :

(i) Bremsstrahlung

(ii) Pair production

9

UNIT—II

4. (a) Describe the principle, construction, and theory of linear accelerator.

(b) A fixed frequency cyclotron has oscillator frequency of 12 MHz and dee radius 0.5 m. If it is used to accelerate deuterons ($m = 3.34 \times 10^{-27}$ kg), calculate the magnetic flux density required and energy to which deuterons are accelerated. 6,3

5. (a) Discuss the quantum numbers associated with elementary particles. Give the corresponding conservation laws.

(b) Compare the properties of particle and antiparticle. 6,3

6. (a) What are quarks? Give a qualitative description of quark model and discuss their properties. Discuss the quark structure of nucleons.

(b) How do you differentiate between baryons and leptons?

6,3

UNIT—III

7. Attempt any **eight** parts :

- (a) What is hypercharge?
- (b) What is the principle of Van de Graaff generator?
- (c) Distinguish between a photon and neutrino.
- (d) What are Cerenkov radiations?
- (e) What is Gell-Mann-Nishijima formula?
- (f) Give limitations of ionization chamber.
- (g) What is linear absorption coefficient?
- (h) What is the principle of nuclear detectors?
- (i) What is dead time in a GM counter?
- (j) What are cosmic rays?

1×8=8