VEER NARMAD SOUTH GUJARAT UNIVERSITY

Syllabus for B. Sc. Semester VI
Subject: Physics (PHY-6008)
Paper – VIII
[2 credit course- 2 hours per week]

Unit – I **Atomic physics** **Duration: 15 hrs**

Atomic structure:
The vector atom model (6.12), quantum numbers associated with vector atom model (6.13), coupling schemes (6.14), the Pauli exclusion principle (6.15), the periodic classification of elements (6.16), some examples of electron configurations with their modern symbolic representations (6.17), magnetic dipole moment due to orbital motion of the electron (6.18), magnetic dipole moment due to spin (6.19), the Stern-Gerlach experiment (6.20), spin-orbit coupling (6.21), optical spectra (6.22), Zeeman effect (6.23), Larmor's theorem (6.24), quantum mechanical explanation of normal Zeeman effect (6.25), anomalous Zeeman effect (6.26), Paschen-Back effect (6.27), Stark effect (6.28)
Text book: Modern physics by R Murugeshan, S Chand & Company ltd. (15^{th} edition)

Unit – II **Radioactivity** **Duration: 15 hrs**

Alpha Decay:
Determination of e/m of Alpha particle (31.7), determination of charge of an alpha particle (31.8), velocity of an alpha particle (31.9), range of an alpha particle (31.10), experimental measurement of range of alpha particle (31.11), alpha particle disintegration energy (31.12), alpha particle spectra (31.13), theory of alpha decay (31.14), Gamow's theory of alpha decay (31.15)
Beta Decay:
The nature of Beta particle (31.16), determination of e/m of beta particle (31.17), Kauffmann's experiment (31.18), Bucherer's experiment (31.19), increase of beta particle mass with velocity (31.20), beta ray spectra, magnetic spectrograph (31.21), origin of line and continuous spectra, the Neutrino theory of beta decay (31.22)
Gamma Ray:
Introduction (31.23), determination of wavelength of gamma rays (31.24), origin of gamma rays (31.25), internal conversion (31.27)
Elementary Particles:

Introduction (38.1), particle and anti particles (38.2), Anti matter (38.3), fundamental interactions (38.4), elementary particle quantum numbers (38.5), conservation laws and symmetry (38.6), the quark model (38.7)
Text book: Modern physics by R Murugeshan, S Chand & Company ltd. (15^{th} edition)

Note: Illustrative problems on all the relevant topics should be covered.

REFRENCE BOOKS:

1. Atomic & nuclear physics by J B Rajam, S Chand & Co.
2. Atomic & nuclear physics by Brij Lal & Subrahmanyam, S Chand publisher
3. Modern physics by K Crane, Wiley
4. Introduction to Modern Physics by Richtmyer, Kennard, Cooper, McGraw Hill
5. Nuclear physics by S B Patel, New age international
6. An introduction to nuclear physics by H Enge, Addition-Wesley publication co
7. Nuclear physics by Kaplan, Addition-Wesley publication co