

Space Science and Astronomy

Earth's Atmosphere - Structure of Earth's Atmosphere, pressure, density, temperature, variations metrological parameters of lower atmosphere, troposphere, stratosphere, mesosphere, ionosphere, thermosphere, and magnetosphere Interaction of solar ionizing radiation and Earth's atmosphere, Effect of ionosphere on radio wave propagation.

Interplanetary medium - Solar wind, interplanetary magnetic field, interplanetary shock waves and blast waves, Magnetsphere of planets, planetary atmosphere - Composition and structure, comets-Origin and composition.

Techniques for Exploration of upper atmosphere - Ionospheric parameters such as electron density, critical frequency, virtual and real height and refractive index, effect of ionospheric plasma on reflection, refraction, absorption, polarization of radio waves, phase refractive index, group refractive index.

Ionosonde and Ionograms- Definition of an ionosonde, block diagram of Ionosonde, Description of broad band antenna, detailed description of transmitter, receivers and pulse generators, circuit of typical ionosonde, Description of an ionogram by photographic method and its interpretation.

Sun and its radiation – Solar structure, Sun's outer layer, temperature of corona, visible features of the Sun, solar activity sunspots and sunspot cycle, solar flare, wave radiation from the Sun, solar radiation and X-ray, radio emission, the 10.7 cm radio noise flux.

Super Heterodyne receiver- Characteristics of receiver such as sensitivity, reflectivity, noise figure, source of noise in the receiver, external radio noise (natural and manmade)

Astronomy- Different types of astronomy-Optical, IR, radio, X-ray, gamma-rays Radio Sun, galactic radio astronomy, continuous background and discrete radio sources, Pulsars, Aperture synthesis, imaging of radio sky, radio telescopes.

REFERENCE BOOKS-

- 1) An introductory course on space science and Earth's Environment - S. S. Degaonkar
- 2) Ionospheric radio propagation- Kenneth Davies
- 3) The upper atmosphere and solar terrestrial relations-Hargraves J.K.
- 4) Electronic communication—Raddy and Collen
- 5) An introduction to ionosphere and magnetosphere- Ratcliffe J. A.
- 6) Radio telescope-Christention and Hogbom
- 7) Astronomy-Roy and Clarke
- 8) Astronomy-Structure of universe-Roy A.E. and Clarke D.C.