

# 49

## Space Science

B.Sc.: Elective

### Outlines of Tests

Paper	Title of Course	Marks
A	Astronomy Astrophysics	50
B	Meteorology and Atmospheric Physics	50
C	Space Science	50
	Syllabus for B.Sc Practical Examination	50
	<b>Total</b>	<b>200</b>

### Syllabi and Courses of Reading

#### PAPER A : ASTRONOMY AND ASTROPHYSICS

##### Course Contents

##### 1. Astronomy:

The Sphere; small circles and great circles; principle formulae of the spherical triangle: The celestial sphere: Diurnal motion; system of coordinates; sun's apparent annual motion; sidereal and mean solar times; equation of time; standard time.

Atmosphere refraction, planetary motion, geocentric and annular parallax, eclipse of the sun and the moon.

Astronautics; the sextant; measurement of altitude on board the ship; determining the position of the ship; position circle, equipment used for land surveying, determination of azimuth.

##### ii. astrophysics

the planet earth; the moon; the solar system; the sun as a star; solar activity and its effects on the earth; properties of stars; luminosity and magnitude; the colour magnitude relation; interstellar medium; the universe.

Space techniques applied in the study of gravitational field and rotation of the earth; magnetosphere; space astronomy.

Books recommended

Foundations of astronomy; w.m. smart, Cambridge university press, Cambridge, u.k. modern astronomy ; Ludwig oster, modern-day inc., San Francisco, USA (1974).

Cambridge encyclopaedia of space. ed. m. croft, Cambridge university press. Cambridge, uk (1990).

Introduction to astronomy by baker and Fredrick.

Earth and space science by wolf, flaming, batten and others.

#### PAPER B: METEOROLOGY AND ATMOSPHERE PHYSICS

Physical properties of the atmosphere:

Composition of dry air; pressure, density and temperature, water vapour; heat transfer by radiation processes and convection; lapse isothermal layer. The tephigram.

Condensation and precipitation:

Microphysical processes: large scale processes, cloud classification.

Winds:

Nature of earth rotation and its effects: geostrophic winds, gradient winds, thermal wind, jet streams.

Meteorological instruments & observations:

Observation of pressure, temperature and humidity; precipitation.

Winds, cloud: upper air observations; radio sonde, ozone.

Synoptic meteorology:

Air mass characteristics, frontal characteristics, frontal non frontal depression heat lows, orographic lows ; anticyclones; surface and upper air weather charts.

Books recommended: essentials of meteorology; d.h. mcintosh & s.a. thom. Publication(London) U.K.(1983).

Atmosphere, weather and climate by r.barry, r.choley (1987).

Introduction to atmosphere by h. Reihl(1945).

## **PAPER C: SPACE SCIENCE**

(50 Marks)

### **Innospheric**

Ionospheric region and parameter. Solar cycle and sunspot activity: Ionospheric anomalies. The transmitting aerial and radio wave propagation: radiation.

Remote sensing

Introduction and principles of remote sensing physics; aerial and satellite remote sensing of remote sensing technology: interpretation methods.

Space Exploration

Principle of rocket: fuel for rocket propulsion; single and multistage rocket; launching and orbits of satellites; up-to-date survey of space communication; meteorological, navigation, scientific and earth resource satellites; space probes.

Book recommended

Radio wave propagation (HF Band) G.G.EC.Judd.

Principles of remote sensing by P.I.Cuuran(1984)

Satellite remote sensing: An introduction by ray harris(1987)

Practical B.Sc Space Science (50 Marks)

Identification of stars and constellations use star atlases; use of the astronomical almanac and computation of data for the position of the observer: use of the telescope and observation of various heavenly bodies.

Use of sextant and theodolite; determination of time, latitude, longitude and azimuth by different methods.

Use of instruments for meteorological observation, study and interpretation of daily weather maps; identification of various cloud pictures.

Note;

Each student will have to perform two experiments each of 20 marks during 5 hours. The question paper will consist of the following two sections each containing three experiments from the above course. Each student will have at least two questions from each section and the examiner will allot question from each section.

Section A: Use of instruments.

Section B: Manual studies and computation and analysis of data.

### **Books Recommended:**

1. Foundation of astronomy by W.M.Smart.
2. Introduction to astronomy by W.M.Smart
3. Earth and space science by wolfe, fleming, battern and others.
4. Your guide to the weather by goerge L. Cantzlaar.
5. Remote sensing by Philip N.Slater.
6. The Upper Atmosphere and solar terrestrial relations by J.K.