

# ALIGARH MUSLIM UNIVERSITY, ALIGARH

## FACULTY OF SCIENCE

### SYLLABUS FOR

## M.SC. (REMOTE SENSING & GIS APPLICATIONS)

This paper contains 100 multiple-choice questions from the following subjects:

### **Earth Sciences (Geology and Geography)**

Earth's origin, size, shape, mass, density, rotational and revolution parameters. Earth's structure and composition: crust, mantle and core. Plate tectonics, continental drift, and seafloor spreading. Volcanoes: Type and distribution. Rock cycle and basic mineral groups (silicates and non-silicates), Weathering, erosion and deposition. Geomorphology and Surface Processes: Fluvial, glacial, aeolian and coastal landforms, Drainage systems and stream patterns, Slope processes and landslides (causes and mitigation). Atmosphere and Hydrosphere: Structure of the atmosphere, Atmospheric circulation and weather systems, Hydrological cycle, Basic concepts of watersheds and river basins. Soil formation and soil types, Biogeochemical cycles, Natural hazards (floods, droughts, earthquakes). Major global geographic features. Major physiographic divisions of India.

### **Physics**

Mechanics: Distance, displacement, velocity and acceleration, Newton's laws of motion, Work, energy and power, Conservation of energy and momentum, Uniform circular motion. Gravitation: Universal law of gravitation, Acceleration due to gravity, Satellite motion and Kepler's laws. Waves and Sound: Wave motion (longitudinal and transverse), Reflection of sound, echo, and Doppler effect, Basic properties of waves. Heat and Thermodynamics: Temperature and thermal equilibrium, First law of thermodynamics, Heat transfer: conduction, convection and radiation. Optics and Electromagnetic Radiation: Nature and properties of light, Reflection and refraction, Basic idea of the electromagnetic spectrum, Interaction of radiation with matter

### **Mathematics**

Algebra and Linear Algebra: Real and complex numbers, Polynomials and quadratic equations, Systems of linear equations, Matrices and determinants. Coordinate Geometry and Vector Geometry: Straight lines and the distance formula, Circle and basic conic sections (parabola, ellipse, hyperbola), 3D coordinate geometry, Direction cosines and direction ratios, Equation of a plane and a line in 3D. Trigonometry: Trigonometric identities, Trigonometric functions and the unit circle, Radian and degree measure, Inverse trigonometric functions, Heights and distances, Solution of simple trigonometric equations. Calculus: Limits and continuity, Differentiation of algebraic, trigonometric and exponential functions, Applications of derivatives (rate of change,

maxima and minima), Partial derivatives, Indefinite and definite integrals, Applications of integrals (area under the curve), Differential equations.

### **Statistics**

Types of data: qualitative and quantitative. Scales of measurement. Mean, Median and Mode. Measures of Dispersion (range, variance, standard deviation). Correlation. Simple linear regression. Basic probability (classical definition and simple problems). Graphical representation of data (histogram, cumulative frequency curve).

### **Computer Science**

Fundamentals of Computers: Basic components of computer systems, Hardware and software, operating systems, and Input-output devices. Data and Number Systems, Binary, decimal and hexadecimal number systems, Data representation and storage, Basic data types. Programming and Problem Solving, Algorithms and flowcharts, Basic concepts of programming (variables, loops, conditions), Structured programming concepts. Computer Applications: Basics of spreadsheets and data handling, Computer networks and Internet fundamentals, Awareness of databases and digital data management

### **Reasoning**

Reasoning includes questions of both verbal and non-verbal types. This component may include questions on analogies, similarities and differences, spatial visualisation, spatial orientation, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning and basics of English grammar.