

SYLLABUS & WEIGHTAGE FOR
COMPUTER BASED TEST
ADVERTISEMENT No: 12/2026/CHQ/DR-CBT

JUNIOR EXECUTIVE (SURVEY & CARTOGRAPHY)

Total Marks: 120

Duration: Two hours

Part-A

General Knowledge, General Intelligence,
General Aptitude, English etc.

Weightage 50%

Part-B

Questions on subjects relating to
Educational Qualifications

Weightage 50%

Basic Sciences & Civil Engineering:

- Calculus, Linear Algebra, and Differential Equations
- General Chemistry, Physics, and Introductory Biology
- Engineering Mechanics and Computer Science
- **Structural Engineering:** Mechanics of Solids, Structural Analysis I & II, Civil Engineering Materials, RC Design, Steel Design, Construction Practices, and Management.
- **Geotechnical & Geology:** Engineering Geology, Soil Mechanics, Geotechnical Engineering.
- **Water Resources & Environment:** Mechanics of Fluids, Environmental Engineering, Hydraulics, and Engineering Hydrology.
- **Surveying & Transportation:** Fundamentals and Elements of Surveying, surveying instruments, Measurement techniques, Chain and compass surveying, plane table surveying, Levelling and contouring, Theodolite surveying, Engineering surveying, UAV/Drone Surveying, Cadastral and land surveying, Hydrographic Surveying, Introduction to Transportation Engineering.

Geography:

- **Geomorphology:** Earth surface processes, fluvial mechanics, and landform evolution.
- **Climatology & Oceanography:** Atmospheric circulation, climate change impacts, and marine ecosystems.
- **Geographical Thought:** History and paradigm shifts in spatial philosophy.
- **Quantitative Techniques & Cartography:** Statistical analysis, spatial data modeling, and map projections.

- **Remote Sensing & GIS (Geographic Information Systems):** Digital image processing, spatial querying, and terrain mapping.
- **Biogeography & Soil Science:** Ecosystem dynamics and pedological studies.
- **Research Methodology:** Scientific methods, hypothesis formulation, and data collection techniques.
- **Practical & Field Studies:** Hands-on geomorphic and socio-economic fieldwork.
- **Advanced GIS & Spatial Modeling:** Predictive modeling, network analysis, and spatial database management.
- **Environmental Management & Hazard Studies:** Disaster risk reduction, watershed management, and sustainability.

Remote Sensing and GIS:

- **Fundamentals of Remote Sensing:** Principles of electromagnetic radiation, energy interactions with Earth's surface (atmosphere, soil, vegetation), and satellite orbits.
- **Principles of Photogrammetry:** Aerial photography, stereoscopy, digital photogrammetry, and the measurement of elevation and relief displacement.
- **Cartography and Map Projections:** Fundamental of Cartography, Cartography design, Thematic cartography, Coordinate systems, digital cartography, and topographical mapping.
- **Practical Labs:** Hands-on experience with stereoscopes, visual image interpretation, and downloading open-source satellite data (e.g., Landsat, Sentinel).
- **Digital Image Processing (DIP):** Geometric corrections, radiometric calibration, image enhancements, and spatial filtering.
- **Geographic Information Systems (GIS):** Raster vs. vector data models, database management systems (DBMS), and spatial data integration.
- **Spatial Analysis:** Interpolation techniques, buffer analysis, overlay operations, and surface modeling.
- **Practical Labs:** Supervised/unsupervised image classification, accuracy assessment, and creating thematic land-use/land-cover maps using specialized software (e.g., QGIS, ArcGIS, ERDAS Imagine).
- **Advanced Remote Sensing:** Principles of LiDAR, microwave/radar, thermal infrared, and hyperspectral imaging.
- **Global Navigation Satellite Systems (GNSS):** GPS, Galileo, IRNSS/NavIC, and geodetic surveying.
- **Applications and Modeling:** Urban planning, disaster management, agriculture, forestry, hydrology, and environmental monitoring.
- **Fieldwork & Practical Labs:** Conducting GNSS field surveys, network analysis, and web GIS development.

- **Elective Courses:** Specialized topics which may include Python/R programming for geospatial analysis, machine learning for remote sensing, or advanced geostatistics.

Geo-informatics:

- **Principles of Remote Sensing:** Aerial photography, electromagnetic spectrum, and satellite data acquisition.
- **Geographical Information Systems (GIS):** Vector and raster data models, topology, and spatial databases.
- **Cartography & Surveying:** Map projections, scale, and digital mapping techniques.
- **Spatial Statistics & Mathematics:** Quantitative methods for spatial analysis.
- **Programming for GIS:** Basics of Python, SQL, or R for spatial data.
- **Digital Image Processing (DIP):** Image enhancement, classification, and radiometric/geometric corrections.
- **Photogrammetry:** Stereo-3D modeling, DEM/DTM generation, Laser scanning and LiDAR.
- **GNSS/ GPS:** Principles of global navigation systems, DGPS, and location-based services.
- **Spatial Database Management (SDBMS):** Managing large geospatial datasets and enterprise architecture.
- **Field Survey Techniques:** Practical, hands-on training using Total Station and DGPS in real environments.
- **Web GIS & Cloud Computing:** Publishing interactive maps, web services, and cloud-based spatial infrastructure.
- **Spatial Modeling & Decision Making:** Predictive modeling, network analysis, and multi-criteria evaluation.

Geomatics:

- **Topographical Surveying & Mapping:** Advanced traversing, triangulation, and modern surveying instruments like Total Stations.
- **Introduction to Geodesy:** Earth's gravity field, coordinate systems, and reference datums.
- **Remote Sensing:** Electromagnetic spectrum, multispectral/microwave sensors, and data products.
- **Elements of Photogrammetry:** Stereoscopy, aerial cameras, and Digital Elevation Models (DEM).
- **Database Management Systems (DBMS) & OOPS for GIS:** Data modeling and spatial data structures.
- **Digital Photogrammetry:** Stereo-plotting, feature extraction, and orthorectification.
- **Geographical Information System (GIS):** Spatial interpolation, network analysis, and buffer/overlay operations, Web GIS and Cloud GIS

- **Advanced Geodesy & GNSS:** Satellite positioning principles (GPS), error corrections, and geodetic networks.
- **Digital Cartography, Visualization & Web GIS:** Web-based spatial data dissemination and spatial data infrastructures, Spatial data base management.
- **Advanced Digital Image Processing:** Image enhancements, Principal Component Analysis (PCA), and classification algorithms.
