

APRCET 2023-24

67-GEO ENGINEERING

Engineering Mathematics Linear

Algebra:

Matrix algebra, Systems of linear equations, Eigen values and eigenvectors.

Calculus:

Functions of single variable, Limit, continuity and differentiability, Mean value theorems, Evaluation of definite and improper integrals, Partial derivatives, Total derivative, Maxima and minima, Gradient, Divergence and Curl, Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

Probability and Statistics:

Definitions of probability and sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Exponential, Poisson, Normal and Binomial distributions.

Geo - Engineering Surveying

Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals Distances and Direction: Distance measurement methods; use of chain, tape and Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle. Leveling and Contouring: Concept and Terminology.

Water Resource

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data -

Adjustment of record - Rainfall Double Mass Curve. Runoff- Factors affecting Runoff - Runoff over a Catchment - Empirical and Rational Formulae.

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of well's, Well Construction - Well Development

Basics of Computer science

Evolution of Computers - Generations, Types of computers, Computer system characteristics, Basic components of a Digital Computer - Control unit, ALU, Input/Output functions and memory, Memory addressing capability of a CPU, Word length of a computer, processing speed of a computer, Computer Classification.

Database concepts

Data management, data modeling and database models, database management systems, database applications DBMS Definition, Characteristics of DBMS ,Application and advantages of DBMS, Instances , Schemas and Database States, Three Levels of Architecture.

Data Models, types and their comparison, Entity Data Integrity RDBMS – Concept, Components and Codd's rules.

Internet concepts

Concept of the point to point and Broadcast Network, Bus, Ethernet LAN, FDDI LAN, , TCP/IP, Routers, Gateways, Bridge, Switches, Subnet, Internet & Intranet Concept of ISP(Internet Service Provider), Internet Backbones, NAPs, Concept of URL Address, Domain Names, Hypertext Concepts and World Wide Web, FTP.

Geo-Engineering

Continents. Earth composition. Earth - Orbit, Oceans - Depth, Bottom, Relief **Rocks:** Kinds of rocks, (Igneous, Sedimentary, Metamorphic Rocks origin and classification) Minerals (Silicate Minerals and Non Silicate Minerals) & physical properties of minerals.

Photogrammetry

Topographic surveying, topographic sheets, aerial photo formats Maps: Types of photographs: vertical and oblique photographs. Aerial cameras: lens, optical axis, focal length, focal plane and fiducial marks; Principal Point; Geometry of vertical photographs map projections, fundamentals of cartography. DEM/DTM concepts and accuracy requirements. LiDAR Basics.

Concepts of Aero Triangulation, bundle block adjustments.

Physical principles of remote sensing, electromagnetic spectrum

Electro Magnetic Radiation (EMR): Velocity of EM radiation, Propagation of EM waves, Fundamentals of Radiometry: Measure Geometry-concept of the solid angle, radiometric quantities, classification of Remote sensor, selection of sensor parameters, spatial resolution, spectral resolution, radiometric resolution, Temporal resolution Optical and Infrared sensors synchronous and Geosynchronous satellites –Land coverage – Repetitively – On track and Across track stereovision capability.
IRS, LANDSAT, SPOT, CANADA, JAPAN, EUROPEAN, satellite series.

GIS concepts

Components of GIS – Hardware, Software, Data Files and Data bases- Data Types Data base structures – Hierarchical, Network, Relational. Vector Data Structure - Vector Data Model – Arcs, Storing area–Data Base Creation – Digitizer, Topology – Euler Equation, Topological Consistency, Topological Errors, Digital Elevation Models, Data Transformation – Change in Dimensionality, Change in position – Rubber Sheeting, Tin Sheeting – Vector to Raster, Raster to Vector Conversion Vector data – Polygon overlay, polygon statistics, Network Analysis – Non-spatial data analysis – Structured Query Language. Modeling – Definition – Spatial Modeling – External Model, Conceptual Model, Logical Model, Internal Model – GIS applications in Resource Management Data capture using GPS for GIS FM studies – Object Oriented Database Models. Recent trends in GIS. and applications Study of rain fall, estimation of run-off and evapotranspiration, water table Environment
- meaning, scope, components Environments. Soils-texture, strengths, porosity and permeability