1. **Fundamental of Surveying**:  
   1) General background of Surveying.  
   2) Application of Surveying in water resources development.  
   3) Role of Surveying and Mapping for economic development projects.

2. **Survey Management**:  
   1) Management of survey teams to dispatch in the field.  
   2) Supervision in the field.  
   3) Problems of field surveying in Nepal.  
   4) Skill of a Surveyor.  
   5) Professional ethics and code of conduct of a Surveyor.  
   7) Public relation during field surveying.

3. **Geodetic Surveying**:  
   1) Trigonometrical Survey.  
   2) Concept of Trigonometrical Survey.  
   3) Monumentation and Signaling.  
   4) Establishment of horizontal and vertical controls.  
   5) Checking of 3rd and 4th order Triangulation control points.  
   6) Knowledge on co-ordinate systems : spherical and geodetic.  
   7) Transformation of co-ordinates.  
   8) Know-how on geodetic datum and reference ellipsoid.

4. **Global Positioning System (GPS)**:  
   1) Introduction to satellite geodesy.  
   2) Principle of GPS.  
   3) GPS signals and its positioning.  
   4) GPS observations : static and kinematic.  
   5) Geocentric co-ordinates and WGS- 84.  
   6) Knowledge on data processing.
5. **Leveling Survey**:
   1) Definition of terms.
   2) Principles of leveling.
   3) Establishment of 3rd and 4th order leveling.
   4) Field work and computation.
   5) Sources of errors and adjustment.

6. **Topographical Surveying**:
   1) General concept of photogrammetry.
   2) Introduction and concepts of digital photogrammetry.
   3) Function of aerial camera.
   4) Aerial photographs and their types.
   5) Scale of aerial photographs.
   6) Flight planning and photo index.
   7) Elements of photo interpretation, rectification, mosaicing.
   8) Stereoscopic vision.
   9) Use of aerial photographs for map revision.
   10) Photo verifications.
   12) Concepts of satellite images.
   13) Use of various remote sensing images.
   14) Comparison between aerial photographs and satellite imageries.

7. **Cartography**:
   1) Introduction to general cartography.
   2) Cartographic concepts.
   3) Comparison between conventional and digital cartography.
   4) Map compilation and production.
   5) Elements of topographical maps.
   6) Use of small and large scale topo maps.
   7) Use of drawing equipments and tools.
   8) Scribing and drafting.
   9) Importance of map symbols.
   10) Use of UTM modified projections in Nepal.
   11) Numbering system for small and large scale maps used in Nepal.
   12) Map design, compilation and generalization.
   13) Collection of geographical names and relief presentation.
   14) Map reproduction, enlargement and reduction.
   15) General knowledge on geographic information system (GIS).
   16) Basic concepts on data base.

8. **Cadastral Surveying**:
   1) Importance of cadastral survey for land acquisition.
   2) Process of cadastral surveying.
   3) Elements of cadastral surveying.
   4) Cadastral map reading.
   5) Methods of area calculation.
   6) Map edge matching error and adjustment.
   7) Knowledge to acquire land and to provide compensation.
   8) Land registries: Land record (Moth) and land ownership certificate (Lalpurja).

9. **Use of Survey Instruments**:
   1) Total Station Theodolite, EDM, Level, Tacheometer, Plane-table Set, Microptic Telescopic Alidade, GPS Receiver.
   2) Aerial Camera, Process Camera, Digital Camera, Scanner, Stereo-plotter,
10. **Economic and Financial Analysis of Hydro-power Scheme**:

1) Methods of economic/financial analysis, such as cost-benefit ratio, internal rate of return, net present worth, payback period, minimum attractive rate of return and their application.
2) Risk analysis, tariff structure.
3) Investment decision, interest and time value of money.

11. **Power Sector Development**:

1) Hydro-power potential of Nepal and power sector development
3) Hydro-power Policy, 2058.
4) Water Resources Act, 2049.
5) Electricity Act, 2049.
6) Nepal Electricity Authority (NEA) Act, 2041 (with Amendment).
7) Land Acquisition Act, 2034.
9) NEA Electricity theft Control Act. 2058.

12. **Institutional Know-How**

1) General knowledge of Nepal Electricity Authority, its organizational structure and function of various business groups.
2) General knowledge of various power plants of Nepal, their types, salient features and their geographical locations.
3) General knowledge on Nepalese Power Transmission System, Voltage levels and Lengths, export-import links for Power exchange with India.

**दूसरी पक्ष : इनजिनियरिङ सर्क्यूट्री**

1. **Principle of Surveying**:

1) Objective of Surveying.
2) General principles of surveying.
3) Classification of Surveys based upon nature and object of Field Surveying.
4) Map and map planning.

2. **Methods of Survey and Measurements**:

1. Chain Survey.
2. Compass Survey.
4. Linear and angular measurements.
5. Triangulation, Trilateration, Traversing, Intersection, Resection.
6. Tacheometry: field procedure, preparation of sketch, numbering, observation, recording of details and contouring.
7. Field observations and checking.

3. **Computation, Adjustment and Volume Calculation**:

1) Methods of determining and calculation of areas and volumes.
2) Errors, Accuracy and Precision: Sources and kinds of errors, theory of probability, permissible error.
3) Adjustment of errors.
4) Concept of Bearing, Co-Ordinates, Reduced Level, Mean Sea Level.
4. **Engineering Survey**:
   1) General concept of survey for the identification of Hydro-power scheme.
   2) Introduction to the Horizontal and Vertical control points.
   4) Setting out Curves: types of curves, setting out of simple circular curves, geometry of vertical curves and its application.
   5) Power transmission line Survey.
   6) Route Surveying: location survey, plan and profile, cross-section and longitudinal-section.
   7) Road alignment Survey: Gradient, curve, cutting, filling.

5. **Construction Survey of**:
   1) Hydro-power Station: Intake, Reservoir, Dam Powerhouse.
   2) Transmission line and distribution line.
   3) Tunnel alignment

6. **Digital Mapping**:
   1) Capture and handling of digital data.
   2) Conversion of raster data to vector vice versa.
   3) Knowledge of Auto-CAD, Arch-INFO, Arch-VIEW.