

**ANDHRA PRADESH PUBLIC SERVICE COMMISSION: HYDERABAD**

**NOTIFICATION NO.14/2016, Dt.30/09/2016**

**TECHNICAL ASSISTANT (HYDROLOGY) IN A.P. GROUND WATER  
SUB-SERVICE  
(GENERAL RECRUITMENT)**

**EDUCATIONAL QUALIFICATIONS:**

Applicants must possess the qualifications from a recognized University as detailed below or equivalent thereto, subject to various specifications in the relevant service rules and as per the indent received from the Department as on the date of notification.

<b>Sl. No</b>	<b>Name of the Post</b>	<b>Educational Qualifications</b>
01	Technical Assistant (Hydrology) in A.P. Ground Water Sub-Service	Degree in B.E. (Civil Engineering) with Geology as one of the subjects or M.Sc (Hydrology) 2 years course from any University recognized by the U.G.C

**SCHEME AND SYLLABUS FOR THE POST OF TECHNICAL ASSISTANT  
(HYDROLOGY) IN A.P. GROUND WATER SERVICE**

**SCHEME**

**Note:** Candidates have to choose subject paper-2 among Geology or Hydrology.

<b>WRITTEN (Objective Type) EXAMINATION</b>				
		<b>Max. Marks</b>	<b>No. of Qns.</b>	<b>Duration</b>
PAPER-1	General Studies & Mental Ability	150 Marks	150 Qns.	150 Minutes
PAPER-2	Geology <b>OR</b> Hydrology	150 Marks	150 Qns.	150 Minutes
<b>Total:</b>		300 Marks		

**SYLLABUS**

**PAPER -I**

**GENERAL STUDIES& MENTAL ABILITY**

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. Basics of General Science and their relevance to the day to day life.  
Current developments in science, technology and information technology
4. History of Modern India with emphasis upon Indian national movement.
5. Economic development in India since independence.
6. Logical reasoning, analytical ability and data interpretation.
7. Basic things about Disaster management (CBSE-VIII & IX Standard).
8. Geography of India with focus on A.P
9. Indian Constitution and Polity.
10. Sustainable Development and Environmental Protection
11. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and legal implications/problems, including

- a). Loss of capital city, challenges in building new capital and it's financial implications.
- b). Division and rebuilding of common Institutions.
- c). Division of employees, their relocation and nativity issues.
- d). Effect of bifurcation on commerce and entrepreneurs.
- e). Implications to financial resources of state government.
- f). Task of post-bifurcation infrastructure development and opportunities for investments.
- g). socioeconomic, cultural and demographic impact of bifurcation.
- h). Impact of bifurcation on river water sharing and consequential issues.
- i). AP REORGANISATION ACT, 2014 on AP and the arbitrariness of certain provisions.

## **PAPER-2: GEOLOGY**

### **Part – I**

- **General Geology:** Solar System. The Earth: its origin, age and internal constitution. Volcanoes-types, distribution geological effects and products. Earth-quakes-intensity, magnitude, distribution, causes and effects. Elementary ideas about isostasy, geosynclines, mountain building, continental drift, sea floor spreading and plate tectonics.
- **Geomorphology:** Basic concepts. External and internal processes. Rock weathering. Cycle of erosion. Fluvial landforms and drainage patterns. Landforms of Aeolian, marine, glacial and 'Karst' landscapes. Elements of Remote Sensing.
- **Structural and field Geology:** Primary and secondary structures. Dip and strike of beds. Unconformities. Study of folds, joints, faults, foliation and lineations. Overthrusts and nappe structures. Stages of rock deformation. Construction of block diagrams, Stereographic and equal-area nets. Solutions of simple problems by stereographic net. Topographic maps and their interpretation. Use of clinometer compass in the field Measurements of bed, foliation, folds joints, faults and lineations in the field. Principles of geological mapping. Effects of topography on outcrops. Drawing of sections.

### **Part – II**

- **Crystallography:** Elements of crystal structure. Laws of crystallography, Symmetry elements of normal classes of seven crystal systems. Properties and interaction of light and crystalline matter. Petrological microscope and accessories. Construction and use of Nicole prism. Pleochroism, double refraction, extinction angle, birefringence and twinning in crystals, Isotropic, uniaxial and biaxial minerals.
- **Mineralogy:** Physical, chemical and optical properties of the following common rock forming minerals: quartz, feldspar, mica, pyroxene, amphibole, olivine, garnet, chlorite, carbonates, aluminosilicates. Structure of silicates and crystal chemistry of minerals. Gemstones.

- **Economic Geology:** Ore, ore mineral and gangue. Classification of ore deposits. Important processes of their formation. Occurrence, origin and distribution in India of the ores of aluminium, chromium, copper, gold, lead, zinc, iron, manganese and radioactive elements. Deposits of minerals use as abrasives, refractories and in ceramics, deposits of coal and petroleum. Elements of prospective of mineral deposits.

### Part – III

- **Igneous Petrology:** Origin of magma and formation of igneous rocks. Bowen's reaction principle. Crystallisation of binary systems. Classification of igneous rocks. Textures and structures of igneous rocks. Composition, origin and mode of occurrence of granite, syenite diorite, mafic and ultramafic groups, anorthosites and alkaline rocks.
- **Sedimentary Petrology:** Sedimentary process and products. Classification of sedimentary rocks. Sedimentary structures. Residual deposits – their mode of formation, characteristics and types, Clastic deposits – their classification, mineral composition and texture. Elementary ideas about the origin and characteristics of quartz arenites, arkoses and greywackes. Siliceous and calcareous deposits of chemical and organic origin.
- **Metamorphic Petrology:** Types and factors of metamorphism. Zones, grades and facies of metamorphism. Regional and contact metamorphism. Textures and structures of metamorphic rocks. Metamorphism of argillaceous, arenaceous, calcareous and basic rocks. Metasomatism.

### Part – IV

- **Paleontology:** Habits and habitats of animals. Fossils and fossilization. Modes of preservation. Application of fossils, Study of morphology and geological history of Foraminiferida, Brachipoda, Bivalvia, Gastropoda, Cephalopoda, Trilobita, Echinoidea and Anthozoa. Mammals of Siwalik Group. A brief study of Gondwana flora.
- **Stratigraphy and Geology of India:** Fundamental laws of stratigraphy. Stratigraphic classification lithostratigraphic, biostratigraphic and chronostratigraphic. Geological time scale. Physiographic divisions and outline of stratigraphy of India. Brief study of Dharwar, Vindhyan and Gondwana Supergroups and Siwalik Group with reference to their major subdivisions, lithology, fossils, aerial distribution and economic importance.

### PAPER -2: HYDROLOGY

Hydrological cycle; atmospheric humidity, formation of clouds, types of clouds, monsoons, cyclones, thunderstorms; Condensation and Precipitation, precipitation processes, forms of precipitation, non-

recording, self recording, radio reporting rain gauges, spatial and temporal variations of rainfall over India; Composition of soils, soil classification, field capacity; Evaporation and Transpiration, soil evaporation, evaporation from free water surface, pan evaporimeter, transpiration, evapotranspiration, potential and actual evapotranspiration, measurement of evapotranspiration – lysimeters, methods of computing evapotranspiration, Climatic water balance; Infiltration, measurement of infiltration, factors affecting infiltration.

Drainage basin and its characteristics, water divide, water shed; Runoff – surface runoff, overland flow, base flow, subsurface runoff, excess precipitation, effective precipitation, factors effecting runoff, estimation of runoff; Discharge – hydraulic and hydrologic methods of discharge measurement, stage discharge relation, discharge hydrograph, unit hydrograph, S-hydrograph, dimensionless unit hydrograph, Flood elevation, flood discharge, flood volume, flood estimation, peak discharge, design flood, standard project storm, standard project flood, probable maximum flood, flood frequency, flood control, flood routing and reservoir routing and various methods, flood forecasting, flood forecasting system, flood control methods.

Hydrogeology – Occurrence of groundwater, aquifer – types of aquifers, aquiclude, aquifuge, aquitard, primary and secondary porosity, effective porosity, permeability, intrinsic permeability, hydraulic conductivity, transmissivity, storage coefficient, specific yield, determination of aquifer characteristics, occurrence and quality of groundwater in igneous, sedimentary, metamorphic rocks and unconsolidated sediments; Hydrochemistry – major, minor and trace elements in water, sources of the above elements, pH, conductivity, TDS, BOD, COD etc., Adjudication of suitability of water for drinking, domestic, agricultural and industrial purposes, contamination of surface and groundwater resources from various sources, salt water intrusion, Ghyben-Herzberg concept, Artificial recharge of groundwater.

Hydrological models: Types of hydrological models, major hydrological simulation models, continuous stream flow models, rainfall runoff event simulation models, temperature index and energy budget models, urban runoff models, Distributed groundwater flow models, surface and groundwater quality models. Hydrological processes; Interaction between atmosphere, biosphere, hydrosphere and lithosphere.

Remote Sensing in Hydrology: Definition, electromagnetic spectrum, interaction of electromagnetic radiation with atmosphere, matter, spectral reflectance curves, imaging sensors – pushbroom and whiskbroom type, sensor characteristics, color composites, meteorological and earth

observation satellites, satellites launched by India and their sensors as well as their characteristics, applications of optical and microwave satellite remote sensing in Hydrology; Geographical Information System (GIS) and its applications in Hydrology.

**Sd/-**

**SECRETARY**