

ANDHRA PRADESH PUBLIC SERVICE COMMISSION: HYDERABAD

NOTIFICATION NO.20/2016, Dt.17/12/2016

**TECHNICAL ASSISTANTS (GEOPHYSICS) IN A.P. GROUND WATER
SUBORDINATE 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.

Sl. No	Name of the Post	Educational Qualifications
01	Technical Assistants (Geophysics) in A.P. Ground Water Subordinate Service.	Degree in M.Sc. or M.Sc (Tech.) or M.Tech. or its equivalent in Geophysics from a University or an Institution recognized by the University Grants Commission.

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

SCHEME

WRITTEN EXAMINATION (Degree standard) (Objective Type)		Maximum Marks	No. of Questions	Duration
PAPER-1	General Studies & Mental Ability	150 Marks	150 Qns.	150 Minutes
PAPER-2	Geophysics	150 Marks	150 Qns.	150 Minutes
Total		300 Marks		

NEGATIVE MARKS: As per G.O.Ms. No.235, Finance (HR-I, Plg & Policy) Dept., Dt. 06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question.

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 emphases 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: **GEOPHYSICS**

BASICS : Occurrence of water in different forms, water cycle and water balance and factors contributing to the distortion of water balance.

Geo-Hydrology: Concepts of Geo-Hydrology and Hydro-Geology, Ground Water Aquifers – Definition of aquifer, aquiclude, aquited and aquifuge, concepts of confined, unconfined and leaky aquifers – Water bearing properties of aquifers – Storage properties – Definition of porosity, specific yield, specific retention factors influencing porosity of rocks – Determining porosity of rocks in field and in laboratory. Definition of permeability, transmissivity and storage coefficients – Ground Water Movement - Darcy's Law, distribution and concurrence of ground water. Dependency of ground water quality and yield on the recharge, Lithology and structural features. Ground water in hard rock, soft rock and coastal aquifers – Application of geological, geochemical and remote sensing methods in ground water exploration.

PRINCIPLES OF GEOPHYSICAL PROSPECTING OF GROUND WATER: Physical properties of rocks and ground water – Electrical resistivity, polarisability, dielectric permeability, thermal conductivity, density, magnetic susceptibility, elastic modulus and wave velocities in different media. Effect of porosity, mineral composition grain size, packing, temperature and pressure conditions water content, salinity etc., of the rocks and saturating fluids on the physical properties of rocks and Electrical resistivity method as employed in ground water problems. Various electrode configurations their applications and merits and demerits – VES and profiling methods – Interpretation – Tracing lateral and vertical boundaries of strata. Determining hydro geological properties of strata from electrical resistivity method – Principles and application of S.P., I.P. and E M methods in solving ground water problems especially in tracing the fracture and joint pattern of rocks.

Electromagnetic frequency sounding and applications – Seismic prospecting methods – Reflection and Refraction and Interpretation of seismic data in ground water problems – Gravity and magnetic methods – their role in ground water exploration, Geothermal methods – principle and application in solving ground water problems – Remote sensing and Airborne geophysical methods for assessing ground water potentialities on regional basis.

GEOPHYSICAL WELL – LOGGING METHODS: Consideration and specification for solving ground water problems. Principles and role of resistivity, S.P. Nuclear and thermal logging methods. Sonic, density and magnetic susceptibility logging for determining formation characters – Geophysical methods in estimating aquifer and reservoir conditions.

APPLICATION OF GEOPHYSICAL METHODS FOR SOLVING HYDROGEOLOGICAL PROBLEMS IN :

- (i) Soft Rock areas – Sedimentary and alluvial
- (ii) Hard Rock Areas – Granites, metamorphics etc
- (iii) Karst areas
- (iv) Coastal areas – Salt water intrusion in fresh water aquifers and their boundary determination
- (v) Prediction of hydraulic properties of granular aquifers
- (vi) Tracing buried river valleys
- (vii) Ground Water reservoir studies
- (viii) Studying valley fill areas.

HYDRODYNAMIC INVESTIGATIONS OF AQUIFERS AND WELLS: Hydro geological parameters of aquifers. Systematic pumping tests in steady and unsteady state conditions and methods of Theis and Jacob and Theis recovery method.

FORMATION DRILLING AND WELL CONSTRUCTION: Types of wells – Dug, Dug-cum-bore, shallow bore-wells, Tube Wells and Redial wells, Infiltration Galleries. Their advantages and disadvantages for discharging ground water, Methods of drilling and Percussion and Rotary – their advantages and disadvantages. Well construction-well design, well casing, Grouting and installation of well screens. Development of wells, surging, compressed air, high velocity setting, back washing, Over pumping, well efficiency and maintenance – causes of failure of wells and remedial measures pumps –

shallow and deep well, hand pumps, vertical turbine pumps, submersible pumps, centrifugal pumps, jet pumps.

ANALYTICAL STUDY OF GEO-HYDROLOGICAL DATA: Flow nests – Graphical construction, analog simulation, numerical simulation, saturated and unsaturated flow nest and well hydrographs and their analysis. Ground water modeling scope and utility. Types of models – Physical, analog, digital and hybrid models. Advantages and disadvantages; determining norms for safe yield in a basin by various methods. Ground water investigation in environmental and eco-balance studies.

1. Concept of programming languages Computer operating system like MS Dos, MS Windows, Unix.
2. Interpretation of Geophysical data by using computer techniques.
3. Artificial recharge Methods, conservation.
4. Ground Water Management, Ground Water Budget.
5. Ground Water pollution, landfills, waste disposal, Mining, water logging, reclamation – case studies.
6. Geographic Information system related to Ground water.

**Sd/-
SECRETARY**