

**DETAILED SYLLABUS FOR THE POST OF  
JUNIOR HYDROGEOLOGIST IN GROUND WATER**

(Cat.No. 390/2021)

(TOTAL MARKS – 100)

Unit 1	Occurrence and distribution of groundwater
Unit 2	Geological characterization of subsurface
Unit 3	Groundwater movement and well hydraulics
Unit 4	Water wells and groundwater levels
Unit 5	Groundwater exploration
Unit 6	Groundwater quality assessment
Unit 7	Ground Water Resource Management
Unit 8	Groundwater protection and conservation (mitigation)
Unit 9	Ground water provinces of Kerala

Detailed description of the areas to cover and distribution of marks

Unit	Areas to cover	Marks
1	Origin of water on Earth: condensation school vs meteorite shower school global water cycle and budget; residence time concept, groundwater basins rivers and springs and relation to groundwater fractures, joints and contact plains in rocks	10
2	geologic formations as aquifers; confined and unconfined aquifers; groundwater table mapping and piezometric nests; porosity, void ratio, effective porosity and representative porosity range; primary and secondary porosities; groundwater zonation; specific retention, specific yield; various geological formations / lithological units conducive for the development of deep ground water sources	15
3	Groundwater flow concepts; Darcy's Law in isotropic and anisotropic media and validity; water flow rates, direction and water volume in aquifers; permeability and hydraulic conductivity and ranges in representative rocks; Bernoulli equation; determination of hydraulic conductivity in field and laboratory; concept of groundwater flow through dispersion and diffusion; transmissivity and aquifer thickness. various geological formations / lithological units and their transmissivity	15

4	Unidirectional and radial flow to a well (steady and unsteady); well flow near aquifer boundaries; methods for constructing shallow wells, deep wells drilling well and well completion; testing wells, pumping test, slug tests for confined and unconfined aquifers; fluctuations in groundwater levels; stream flow and groundwater flows; groundwater level fluctuations; land subsidence; construction of wells in various geological formations / lithological units	10
5	Surface investigation of groundwater- Geologic field studies, Remote sensing studies , Geophysical studies: electrical resistivity, seismic, gravity, magnetic methods; magneto-telluric Sub-surface investigation of groundwater- test drilling, resistivity logging, spontaneous potential logging, radiation logging.	15
6	Groundwater composition, units of expression, mass-balance calculations; rock-water interaction Graphic representation of chemical data; Groundwater hardness, Microorganisms in groundwater. Water quality standards; Application of isotopes (H, C, O) in groundwater; Concepts of artificial recharge methods;	15
7	Managing groundwater resources; Groundwater basin investigations and management practices. Methods and practices of ground water management in Kerala Traditional methods, modern methods Subsurface dams- advantages and challenges UNDP budgets of future ground water availability Impact of global climate change on groundwater.	5
8	Importance due to extensive urbanization and unexpected catastrophes affecting groundwater Submarine groundwater discharge Sea water intrusion Ground water contamination from mining, quarrying and waste fill sites Liquid waste disposal and groundwater quality Radioactive contamination ( non-power generative sources) Groundwater scarcity Global Strategies for mitigations	5
9	Geology of Kerala and its physiography Climatic conditions of Kerala State and its water budgets Surface flow and infiltration rates specially for rivers of Kerala Major aquifers systems of Kerala Ground water provinces in Kerala and associated geology Submarine ground water discharge impact in coastal aquifers of Kerala Sandmining in rivers and impact in water table – strategies to conserve Ground water scarcity in certain areas of Kerala and geological reasons Quality of Ground water of Kerala – protection and conservation strategies	10

**NOTE:** - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper