

KERALA PUBLIC SERVICE COMMISSION

DETAILED SYLLABUS FOR THE POST OF GEOLOGICAL ASSISTANT IN LAND USE DEPARTMENT (CATEGORY NO.046/2026)

(TOTAL 100 MARKS)

Unit I:

Definition, scope, and branches of Marine geology. Major methods of marine geological investigation. Oceanic expeditions: Challenger expedition, Deep Sea drilling Project, Ocean drilling Programme, Joint Global Flux Studies (JGOFS), Integrated Ocean Drilling Programme (IODP). Sea floor sampling techniques and devices – snappers, grabs, coring devices, dredging, underwater photography, diving.

(3Marks)

Unit II:

Major Physio graphic Features of ocean: Continental shelf, Continental slope, Continental rise, Abyssal plains, Oceanic trenches, Mid-oceanic ridges, Seamounts, guyots, Geothermal vents, and oceanic plateaus, Submarine canyons and Deep sea channels, fjords and Ria Topography of the Indian Ocean floor with special reference to the Bay of Bengal and the Arabian sea **(6Marks)**

Unit III:

Coral reefs – their types and theory of atoll formation, Sea level changes, causes and evidences of sea level changes, Submarine volcanism, Tsunamis – causes and effects, turbidity currents

(5Marks)

Unit IV:

Continental drift and development of modern oceans; Structure and evolution of Pacific, Atlantic and Indian Oceans, Red Sea and Mediterranean Sea. Recent developments in the theory of seafloor spreading provide a framework for consideration of the concepts of north south reversals in the direction of the geomagnetic field. Use of magnetic reversals to determine the rate of seafloor spreading.

(6Marks)

Unit V:

Marine sediments their classes, sources and transportation, deep sea sediments, Terrigenous sediments, Biogenous sediments, Hydrogenous/authigenic sediments, Cosmogenous sediments, Volcanogenic sediments, brown clay, oozes, Marine Mineral Resources and Manganese nodules

(6Marks)

Unit-VI

Coastal zone: Definition and nomenclature. Waves tides and currents: types and characterisation. Shore and shore dynamics: classification of shorelines, beaches and coasts,

Sources and composition of beach materials, Factors controlling the character of the beach, beach cycles, Sediment transportation mechanisms: breakers and surf, wave refraction, reflection and diffraction, Rip currents and longshore currents, Littoral drift cells and sediment budget

(5Marks)

Unit-VII

Coastal landforms: Classification of coastal landforms: Beach and near shore system. Formation of dunes, cliff, spit, bar, tombolo, isthmus and barriers, estuaries, deltas, mangroves, intertidal mud flats, marshes, coral reef islands and coastal lagoons. Origin of spits, bars and barriers. Evolution of transgressive and regressive barriers. Coasts dominated by waves/ tides and rivers, deltaic coasts. Coasts of coral and other small islands. Mud banks: their nature, classification and coastal erosion

(6Marks)

Unit-VIII

Coastal zone management: Conservation and protection strategies, seawalls, groins and backwaters. Beach restoration techniques. Adaptation strategies for coastal communities. Coastal zone management Acts and amendments. Integrated coastal zone management approaches. Sustainable development practices in coastal areas. Evolution and tectonics of Indian coasts, Coastal wetlands

(5Marks)

Unit IX

United Nations Convention on the Law of the Sea (UNCLOS), Internal Waters, Territorial Sea, Contiguous Zone, Exclusive Economic Zone (EEZ) and High Seas. Rights and Rules in the EEZ

(4Marks)

Unit-X

Emerging Areas: Deep-sea exploration, Deep Ocean Mission of Govt. of India, Seabed mining, Climate change and ocean geology, Carbon storage in marine sediments, Geohazards and sustainable use of ocean resources

(4Marks)

Unit-XI

- Geomorphology-fundamental concepts.
- Different models of evolution of landscape.
- Geomorphic agents and processes
- Geomorphology of Kerala
- Role of Geologists in environment management.
- Wastes and its disposal.
- Different types of Pollution.
- Weathering – Type, Processes and products
- Soils and soil formation
- Soil profile.

(10marks)

Unit-XII

- Minerals, their classification and their identification in the field and in hand specimens.
- Optical properties of minerals and the identification of minerals in thin section.
- Geochemical classification of elements
- Geochemical cycle
- Structures and textures of igneous, sedimentary & metamorphic rocks.
- Petrography and petrogenesis of important rocks of Kerala
- Factors of metamorphism
- Grade, Zone & Facies concept in metamorphism
- Building stones of Kerala.

(10marks)

Unit-XIII

- Electromagnetic radiation characteristics,
- remote sensing regions and bands;
- radiation principles and energy resources,
- energy interaction with the atmosphere.
- Acquisition and interpretation of remote sensing data
- Aerial photography – types of aerial photographs, their geometry and photo characters
- Digital image processing
- Components of GIS
- GIS softwares

(10 marks)

Unit-XIV

- Principles of geological mapping
- Rock deformation: concept of stress and strain.
- Classification of folds, joints and faults; their recognition in the field.
- Foliations and Lineations.
- Petrofabric analysis.
- Plate Tectonics
- Principles of stratigraphy.
- Geologic Time scale
- Modern Stratigraphic classification
- Stratigraphy of Kerala

(10marks)

Unit-XV

- Occurrence of ground water
- Water bearing geologic formations
- Types of aquifers
- Groundwater movement-Darcy's Law
- Ground water flow rates

- Ground water flow directions
- Tracers
- Surface and subsurface investigation methods of ground water.
- Saline water intrusion
- Ground water quality

(10 marks)

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.