Geology MSc final exam
Hydrogeology–Petroleum geology topics

1. Groundwater flow systems in sedimentary basins: flow driving forces, basin hydraulics, hydrochemistry and isotopes, evaluation methods, scale-dependency in hydrogeology, examples.

2. Groundwater flow in geological processes: heat transport, salinization, ore deposits, landsubsidence, etc., examples and possible solutions.

3. Role of topography-driven groundwater flow in hydrocarbon migration, hydrodynamic and hydraulic traps; hydraulic behaviour of structures and low-permeability formations; nuclear waste disposal from a hydrogeological point of view.

4. Field hydrogeology: potential goals, field observations, groundwater sampling, aquifer/pumping tests, hydrogeophysics, evaluation and interpretation of the results.

5. Karst systems, epigenic and hypogenic, characteristics of groundwater flow, evaluation methods, vulnerability, economic significance as reservoirs.

6. Contaminant hydrogeology, transport and fate of contaminants in the unsaturated and saturated zone, remediation techniques.

7. Geothermal systems, evaluation and utilization, heat transport processes.

8H2O. Near surface flow, surface water – groundwater interaction, groundwater-dependent ecosystems, riverbank filtration, Managed Aquifer Recharge with examples

8CH. Thermal history of sedimentary basins, determining processes, related hydrocarbon potential. Examples.

9H2O. Numerical methods in hydrogeology. Basic solutions in well-hydraulics, hydraulics of multiple aquifer systems, potential consequences of water production (water level decline, interference of wells, land subsidence) with examples.

9CH. Elements and processes of hydrocarbon systems. Reservoirs: compaction, porosity, permeability change (during diagenesis and with depth), the significance of these parameters in hydrocarbon and groundwater systems.