



**PETROLEUM ENGINEERING  
SYLLABUS OF EXAMINATIONS  
1998 EDITION**

For textbook information please refer to the **Textbooks** section on page 3 of the document entitled **Information for Students and Examinations Candidates**.

**GROUP A  
COMPULSORY EXAMINATIONS (SEVEN REQUIRED)**

**98-Pet-A1 Principles of Stratigraphy and Sedimentation**

Sedimentary processes, environments and facies; properties and classification of sedimentary rocks; code of stratigraphic nomenclature and the stratigraphic column; stratigraphic nomenclature and the stratigraphic column; stratigraphic relationship and interpretations.

**98-Pet-A2 Petroleum Reservoir Fluids**

Phase behaviour of hydrocarbon systems ideal and non-ideal gases and liquid systems; qualitative and quantitative phase behaviour; fundamental properties of gas, oils, and waters; application of basic fluid properties to compositional analyses; separation and reservoir behaviour.

**98-Pet-A3 Fundamental Reservoir Engineering**

(Physical Properties and Flow of Fluid through Porous Media)

Porosity, fluid saturations, permeability, interfacial tension, wettability, capillary pressure, effective and relative permeability, steady and unsteady state fluid flow. An introduction to oil and gas material balance equations, drive indices. An introduction to performance prediction techniques.

**98-Pet-A4 Oil and Gas Well Drilling and Completion**

Rotary drilling, drilling fluids, drilling hydraulics, penetration rates, drilling techniques, core and core analyses, drillstem testing, casing and cementing procedures, well completion and stimulation.

**98-Pet-A5 Petroleum Production Operations**

Overall view of important steps involved in Petroleum Production Engineering. Inflow performance relationships. Two-phase vertical flow. Decline curve analysis. Other steps include importance of reservoir description, role of effective communication between the reservoir and the well bore, oil and gas separation, well bore damage, fluid movements and vigor of excluding undesirable fluids, workover and stimulation methods, oil well cementing and through tubing logging. Surface facility: storage, separators, emulsions, flow measurement gas hydrates.

**98-Pet-A6 Reservoir Mechanics**

Advanced reservoir engineering principles including estimation of reserves, material and volumetric balance, combined driving mechanisms including unsteady state water influx.

Performance prediction techniques. Linear material balance and Statistical analysis of unknowns from production history.

**98-Pet-A7 Secondary and Enhanced Recovery**

The fluid displacement process. Buckley/Leverett theory. Engineering fundamentals in the principles of secondary recovery; water flooding, miscible displacement methods and thermal recovery techniques.

**GROUP B**

**ELECTIVE EXAMINATIONS (TWO REQUIRED)**

**98-Pet-B1 Well Logging and Formation Evaluation**

Theory and engineering and applications of measurements of physical properties of the formation near the well bore, types of well logging devices, interpretation and use of information in petroleum, and natural gas engineering.

**98-Pet-B2 Natural Gas Engineering**

Estimation of reserves; flow measurements; flow through conduits; steady, transient, Darcy and non-Darcy flow through porous media; well testing, back pressure and drawdown tests; deliverability; well interference; phase behaviour in gas and condensate reservoirs. Decline curve analysis.

**98-Pet-B3 Oil and Gas Evaluation and Economics**

Oil and gas reserves, conservation, proration, value of money, evaluation nomenclature, payout time, profit ratio, rate of return, capital cost allowance, taxation, oil and gas unitization theory.

**98-Pet-B4 Petroleum Geology**

Physical and chemical characteristics of formation waters, natural gas, and crude oil. Origin and modes of occurrence of each of these in the earth. Geography of petroleum and natural gas in Canada, North America, and the world.

**98-Pet-B5 Well Testing**

Basics of Well Test Interpretation: diffusivity equation, skin, wellbore storage, radius of investigation; different flow regimes: transient, pseudo-steady state, steady state; interpretation of drawdown and build up data for estimating formation permeability, skin, reservoir pore volume, average reservoir pressure; superposition; effect of fault and double porosity systems; derivative analysis; gas well testing.

**Revised April 2005**