

**THE NATIONAL COUNCIL OF EXAMINERS FOR ENGINEERING AND SURVEYING
PRINCIPLES AND PRACTICE OF ENGINEERING EXAMINATION**

PETROLEUM

Effective October 2007

	Approximate Percentage of Examination
I. Drilling Engineering	25%
A. General Drilling Engineering	15%
1. Casing and tubulars (e.g., collapse and burst strength, grade, connections)	
2. Drilling fluids (e.g., rheology, chemistry, oil-base/water-base)	
3. Drill string and BHA	
4. Hydraulics (e.g., pressure drops, nozzle selection, fluid velocities)	
5. Directional/horizontal drilling (e.g., motors, calculations, steering)	
6. Well control/BOP (e.g., kick tolerance, methods, equipment)	
7. Associated knowledge ⁴	
B. Specialized Drilling Engineering	10%
1. Cementing (e.g., properties, yield, placement, downhole equipment)	
2. Drilling mechanics (e.g., rock properties, drill-off test)	
3. Rig equipment capabilities	
4. Wellheads	
5. Solids control	
6. Fishing (e.g., equipment, techniques)	
7. Bits (e.g., classification, cutting, structures, grading)	
8. Underbalanced drilling (e.g., candidate selection, air, foam, equipment)	
9. Associated knowledge ⁴	
II. Production Engineering	35%
A. Completion	14%
1. Perforation (e.g., size, density, tools, methods)	
2. Completion and work-over fluids	
3. Well and completion systems, including nodal analysis	
4. Inflow performance curve analysis	
5. Fracture treatments, including acid fracs	
6. Matrix acid treatments	
7. Tubing and downhole equipment (e.g., zonal isolation, tubing movement, packers)	
8. Associated knowledge ⁴	
B. Surveillance	14%
1. Lift mechanism selection given a set of well conditions	
2. Sucker rod pumping systems	
3. Gas lift, including intermitters, plunger lifts, or gas lift valves	
4. Downhole pumps, including ESPs, progressing cavity pumps, or jet pumps	
5. Production logging (e.g., pressure surveys, fluid profiles, cased-hole logs)	
6. Plug and abandonment procedures	
7. Remedial/recompletion operations (e.g., squeeze cementing, sand and water control)	
8. Coiled tubing operations	
9. Associated knowledge ⁴	
C. Facilities	7%
1. Selection of piping to accommodate flow rate, total pressure, and pressure drop considerations	
2. Compressor application and sizing parameters	
3. Onsite processing equipment (e.g., separators, heater treaters, dehydrators)	

**Approximate
Percentage of
Examination**

4. Onsite storage vessels, including piping, valves, and venting
5. Custody transfer metering devices for oil and gas (e.g., orifice meters, LACT)
6. Produced fluid treatment (e.g., scale, asphaltenes, paraffin, corrosion)
7. Associated knowledge⁴

III. Reservoir Engineering

40%
20%

A. General Reservoir Engineering

1. Reservoir geoscience (e.g., lithology, rock mechanics, porosity, permeability, borehole stability)
2. Oil/gas reservoir drive mechanics
3. Fluid properties (e.g., phase behavior, viscosity, density)
4. Single/multiphase flow in porous media (e.g., wettability, mobility, relative permeability)
5. Methods for estimating reserves and recoveries (e.g., decline analysis, material balance, volumetrics)
6. Reservoir development techniques (e.g., well spacing, patterns, rates, stimulation)
7. Associated knowledge⁴

B. Specialized Reservoir Engineering

7%

1. Water/gas injection (e.g., water flood, pressure maintenance, gravity drainage)
2. Enhanced oil recovery (e.g., miscible injection, chemical injection, thermal recovery)
3. Fundamental reservoir numerical simulation concepts
4. Analysis of tight gas reservoirs
5. Associated knowledge⁴

C. Formation Evaluation

13%

1. Methods to determine net pay
2. Log measurements (e.g., acoustic, nuclear, electrical)
3. Logging methods (e.g., MWD/LWD, open hole, cased hole)
4. Well testing (e.g., wireline, production test, well test analysis)
5. Coring (e.g., SWC, full-hole core, petrophysical/lab analysis)
6. Mud logging (e.g., gas units and analysis, cuttings analysis, ROP)
7. Associated knowledge⁴

TOTAL

100%

Notes

1. The examination is developed with questions that require a variety of approaches and methodologies, including design, analysis, and application. Some questions may require knowledge of mathematics and physical sciences as well as relevant petroleum engineering terminology.
2. The examples listed in parentheses are not exclusive or exhaustive.
3. This examination contains a total of 80 multiple-choice questions. Examinee works all questions.
4. Associated knowledge areas:
 - a. Relevant industry design standards
 - b. Relevant industry regulatory/environmental law and safety requirements
 - c. Project management techniques (e.g., costing, scheduling, contracting, logistics)
 - d. Geoscience principles (e.g., pore pressure, fracture gradients, wellbore stability)
 - e. Risk analysis/contingency planning
 - f. Surveillance/optimization techniques (e.g., data acquisition and control, modeling)
 - g. Economic principles