NCEES
advancing licensure for engineers and surveyors

NCEES Principles and Practice of Engineering Examination
PETROLEUM

Effective beginning October 1, 2019

- The exam topics have not changed since October 2014 when they were originally published.
- The PE Petroleum exam is computer-based. It is closed book with an electronic reference.
- Examinees have 9.5 hours to complete the exam, which contains 85 questions. The 9.5-hour time includes a tutorial and an optional scheduled break. Examinee works all questions.
- The exam uses both the International System of units (SI) and the U.S. Customary System (USCS).
- The exam is developed with questions that will require a variety of approaches and methodologies, including design, analysis, and application.
- The knowledge areas specified as examples of kinds of knowledge are not exclusive or exhaustive categories.

		Number of Questions
I.	**Drilling**	**18–27**

A. Casing and tubulars (e.g., collapse, burst, and tensile strength; grade; connections; working design)
B. Cementing (e.g., properties, yield, placement, downhole equipment, testing protocols)
C. Drilling fluids (e.g., rheology, chemistry, oil-base/water-base, density, hydrostatics calculations, pore pressure, leakoff, fracture gradients, wellbore stability)
D. Drill string and BHA (e.g., available weight, overpull, equipment, location in string, tubular movement)
E. Drilling mechanics (e.g., rock properties, drill-off test, torque and drag)
F. Hydraulics (e.g., pressure drops, nozzle selection, fluid velocities, ECD, mud pump performance)
G. Rig equipment capabilities (e.g., equipment, pressure ratings, size and configuration)
H. Directional/horizontal drilling (e.g., motors, calculations, steering, TVD/MD, horizontal displacement, vertical section)
I. Wellheads (e.g., equipment, pressure ratings, size and configuration)
J. Well control/blowout preventer (e.g., kick tolerance, well kill methods, equipment, trip margins, swab and surge pressures)
K. Solids control (e.g., equipment, process, removal)
L. Fishing (e.g., equipment, techniques, stretch, stuckpoint, freepoint/backoff)
M. Bits (e.g., classification, cutting structures, grading, ROP, nozzle size and velocity, jet impact, hydraulic horsepower)

N. Underbalanced drilling (e.g., candidate selection, air, foam, equipment, rotating blowout preventers)
O. Deepwater drilling (e.g., rig type, mooring, riser analysis, subsea equipment)

II. Production/Completion 19–29

A. Lift mechanism selection given a set of well conditions
B. Sucker rod pumping systems
C. Gas lift, including intermitters, plunger lifts, and gas lift valves
D. Downhole pumps, including ESPs, progressing cavity pumps, and jet pumps
E. Perforating (e.g., size, density, tools, methods, phasing)
F. Completion and workover fluids
G. Well and completion systems, including nodal analysis
H. Inflow/outflow performance curve analysis, including mechanical skin identification
I. Production logging (e.g., pressure surveys, fluid profiles, cased-hole logs)
J. Completion tubing and downhole equipment (e.g., zonal isolation, tubular force analysis, packers)
K. Abandonment (e.g., plug placement, barriers, casing cutting and pulling)
L. Remedial/recompletion operations (e.g., squeeze cementing, sand and water control, fishing, wireline)
M. Selection of tubular size and material to accommodate flow rate, pressure and pressure drop considerations, corrosion/erosion
N. Coiled tubing operations
O. Production of unconventional reservoirs (e.g., coal bed, shales, tar sands)
P. Enhanced recovery (e.g., pressure maintenance, miscible injection, water floods, thermal recovery)
Q. Production chemistry/fluid compatibility (e.g., scale, asphaltene, paraffins, corrosion, hydrates, produced water)
R. Deepwater production considerations
S. Well stimulation methods (e.g., fracture treatments, matrix acid treatments)
T. Rock mechanics, including properties and stability
U. Production and injection allocation of all fluid streams

III. Facilities 11–17

A. Selection of piping to accommodate flow rate, total pressure and pressure drop considerations
B. Compressor application and sizing parameters
C. Onsite processing equipment (e.g., separators, heater treaters, dehydrators)
D. Onsite storage vessels, including piping, valves, and venting
E. Custody transfer metering devices for oil and gas (e.g., orifice meters, LACT, samplers)
F. U.S. codes and standards associated with facility design and construction

G. Hydraulic analysis of fluid collection systems (e.g., slugging, impediments to flow)
H. Production impact of equipment deficiencies
I. Pump sizing and selection
J. Relief and safety system sizing
K. Materials selection and corrosion inhibition and treating
L. Facility mass and energy balance
M. Dynamic effects associated with tank filling/deinventory
N. Regulatory and environmental support (e.g., emission control and quantification, gas dispersion analysis)
O. Gas conditioning and treatment (e.g., dehydration, amine sweetening, acid gas treatment, scavenging, dew point control)
P. Liquid hydrocarbon treatment and processing
Q. Water treatment and processing
R. Water and steam quality for injection
S. Corrosion monitoring location/frequency
T. Production chemistry/fluid compatibility for facilities (e.g., scale, asphaltene, paraffins, corrosion, hydrates)

IV. Reservoirs 17–25

A. Empirical decline curve analysis (e.g., rate-time, rate-cum, ratio plots)
B. Material balance (e.g., hydrocarbons in place, water influx, P/z, drive mechanisms)
C. Reservoir simulation (e.g., model geometry, model formulation, history matching, model selection)
D. Well testing (e.g., pressure transient, rate transient, type curve, interference testing, wireline, drillstem test)
E. Impact of geology on reservoir analysis (e.g., mapping, stratigraphy, faulting, boundaries)
F. Reservoir geoscience (e.g., lithology, rock mechanics, porosity, permeability, borehole stability)
G. IOR and EOR (e.g., sweep efficiency, pattern geometry, project selection, design, pressure maintenance)
H. Drive mechanisms (e.g., identification, production profiles, recovery factors)
I. Fluid properties and identification (e.g., bubble point, dewpoint, viscosity, compressibility, composition)
J. Rock properties (e.g., porosity, permeability, compressibility, relative permeability, stress orientation)
K. Volumetric calculations (e.g., OOIP, OGIP, fluid contacts, aquifers)
L. Formation evaluation (e.g., logs, appropriate selection, interpretation)

V. Project Management **5–8**

A. Quality assurance/quality control

B. Cost and schedule management

C. Management of change

D. Risk assessments

E. Petroleum ownership and economics (e.g., cash flows, royalty burdens, interest, capital and operating expenses, financial metrics)