


NCEES Principles and Practice of Engineering Examination

CIVIL BREADTH and GEOTECHNICAL DEPTH Exam Specifications

DAY	Topic/ Number of Questions	Knowledge Area	v	DAY	Topic/ Number of Questions	Knowledge Area	v
1	I. Project Planning 4	A. Quantity take-off methods		66	Rest	Rest	
2		B. Cost estimating		67	II. Soil Mechanics, Laboratory Testing, and Analysis 5	A. Index properties and testing	
3		C. Project schedules		68		B. Strength testing of soil and rock	
4		D. Activity identification and sequencing		69		C. Stress-strain testing of soil and rock	
5	II. Means and Methods 3	A. Construction loads		70		D. Permeability testing properties of soil and rock	
6	Rest	Rest		71	E. Effective and total stresses		
7	II. Means and Methods 3	B. Construction methods		72	Rest	Rest	
8		C. Temporary structures and facilities		73	III. Field Materials Testing, Methods, and Safety 3	A. Excavation and embankment, borrow source studies, laboratory and field compaction	
9		III. Soil Mechanics 6	A. Lateral earth pressure			74	B. Trench and construction safety
10	B. Soil consolidation			75		C. Geotechnical instrumentation (e.g., inclinometer, settlement plates, piezometer, vibration monitoring)	
11	C. Effective and total stresses			76	IV. Earthquake Engineering and Dynamic Loads 2	IV. Earthquake Engineering and Dynamic Loads 2	
12	Rest	Rest		77	A. Liquefaction analysis and mitigation techniques		
13	III. Soil Mechanics 6	D. Bearing capacity		78	Rest	Rest	
14		E. Foundation settlement		79	IV. Earthquake Engineering and Dynamic Loads 2	B. Seismic site characterization, including site classification using ASCE 7	
15		F. Slope stability		80		C. Pseudo-static analysis and earthquake loads	
16	IV. Structural Mechanics 6	A. Dead and live loads		81		V. Earth Structures 4	A. Slab on grade
17		B. Trusses		82	B. Ground improvement (e.g., grouting, soil mixing, preconsolidation/wicks, lightweight materials)		
18	Rest	Rest		83	C. Geosynthetic applications (e.g., separation, strength, filtration, drainage, reinforced soil slopes, internal stability of MSE)		
19	IV. Structural Mechanics 6	C. Bending (e.g., moments and stresses)		84	Rest		Rest
20		D. Shear (e.g., forces and stresses)		85	V. Earth Structures 4	D. Slope stability and slope stabilization	
21		E. Axial (e.g., forces and stresses)		86		E. Earth dams, levees, and embankments	
22		F. Combined stresses		87		F. Landfills and caps (e.g., interface stability, drainage systems, lining systems)	
23		G. Deflection		88		G. Pavement structures (rigid, flexible, or unpaved), including equivalent single-axle load (ESAL), pavement thickness, subgrade testing, subgrade preparation, maintenance and rehabilitation treatments	
24	Rest	Rest		89		H. Settlement	
25	IV. Structural Mechanics 6	H. Beams		90	Rest	Rest	
26		I. Columns		91	VI. Groundwater and Seepage 3	A. Seepage analysis/groundwater flow	
27		J. Slabs		92		B. Dewatering design, methods, and impact on nearby structures	
28		K. Footings		93		C. Drainage design/infiltration	
29	L. Retaining walls		94	D. Grouting and other methods of reducing seepage			
30	Rest	Rest		95	VII. Problematic Soil and Rock Conditions 3	A. Karst; collapsible, expansive, and sensitive soils	
31	V. Hydraulics and Hydrology 7	A. Open-channel flow		96	Rest	Rest	
32		B. Stormwater collection and drainage (e.g., culvert, stormwater inlets, gutter flow, street flow, storm sewer pipes)		97	VII. Problematic Soil and Rock Conditions 3	B. Reactive/corrosive soils	
33		C. Storm characteristics (e.g., storm frequency, rainfall measurement and distribution)		98		C. Frost susceptibility	
34		D. Runoff analysis (e.g., Rational and SCS/NRCS methods, hydrographic application, runoff time of concentration)		99		VIII. Earth Retaining Structures (ASD or LRFD) 5	A. Lateral earth pressure
35		E. Detention/retention ponds		100	B. Load distribution		
36	Rest	Rest		101	C. Rigid retaining wall stability analysis (e.g., CIP, gravity, external stability of MSE, crib, bin)		
37	V. Hydraulics and Hydrology 7	F. Pressure conduit (e.g., single pipe, force mains, Hazen-Williams, Darcy-Weisbach, major and minor losses)		102	Rest	Rest	
38		G. Energy and/or continuity equation (e.g., Bernoulli)		103	VIII. Earth Retaining Structures (ASD or LRFD) 5	D. Flexible retaining wall stability analysis (e.g., soldier pile and lagging, sheet pile, secant pile, tangent pile, diaphragm walls, temporary support of excavation, braced and anchored walls)	
39	VI. Geometrics 3	A. Basic circular curve elements (e.g., middle ordinate, length, chord, radius)		104		E. Cofferdams	
40		B. Basic vertical curve elements		105		F. Underpinning (e.g., effects on adjacent construction)	
41		C. Traffic volume (e.g., vehicle mix, flow, and speed)		106		G. Ground anchors, tie-backs, soil nails, and rock anchors for foundations and slopes	
42	Rest	Rest		107	IX. Shallow Foundations (ASD or LRFD) 5	A. Bearing capacity	
43	VII. Materials 6	A. Soil classification and boring log interpretation		108	Rest	Rest	
44		B. Soil properties (e.g., strength, permeability, compressibility, phase relationships)		109	IX. Shallow Foundations (ASD or LRFD) 5	B. Settlement, including vertical stress distribution	
45		C. Concrete (e.g., nonreinforced, reinforced)		110		A. Single-element axial capacity (e.g., driven pile, drilled shaft, micropile, helical screw piles, auger cast piles)	

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DAY	Topic/ Number of Questions	Knowledge Area	v	DAY	Topic/ Number of Questions	Knowledge Area	v
46		D. Structural steel		111	X. Deep Foundations (ASD or LRFD) 5	B. Lateral load and deformation analysis	
47		E. Material test methods and specification conformance		112		C. Single-element settlement	
48	Rest	Rest		113		D. Downdrag	
49	VII. Materials 6	F. Compaction		114	Rest	Rest	
50	VIII. Site Development 5	A. Excavation and embankment (e.g., cut and fill)		115	X. Deep Foundations (ASD or LRFD) 5	E. Group effects (e.g., axial capacity, settlement, lateral deflection)	
51		B. Construction site layout and control		116		F. Installation methods/hammer selection	
52		C. Temporary and permanent soil erosion and sediment control (e.g., construction erosion control and permits, sediment transport, channel/outlet protection)		117		G. Pile dynamics (e.g., wave equation, high-strain dynamic testing, signal matching)	
53		D. Impact of construction on adjacent facilities		118		H. Pile and drilled-shaft load testing	
54	Rest	Rest		119	I. Integrity testing methods (e.g., low-strain impact integrity testing, ultrasonic cross-hole testing, coring, thermal integrity testing)		
55	VIII. Site Development 5	E. Safety (e.g., construction, roadside, work zone)		120	Rest	Rest	
56	I. Site Characterization 5	A. Interpretation of available existing site data and proposed site development data (e.g., aerial photography, geologic and topographic maps, GIS data, as-built plans, planning studies and reports)		121	Test,Review	Test,Review	
57		B. Subsurface exploration planning		122		Test,Review	
58		C. Geophysics (e.g., GPR, resistivity, seismic methods)		123		Test,Review	
59		D. Drilling techniques (e.g., hollow stem auger, cased boring, mud rotary, air rotary, rock coring, sonic drilling)		124		Test,Review	
60	Rest	Rest		125	Test,Review		
61	I. Site Characterization 5	E. Sampling techniques (e.g., split-barrel sampling, thin-walled tube sampling, handling and storage)		126	Rest	Rest	
62		F. In situ testing (e.g., standard penetration testing, cone penetration testing, pressure meter testing, dilatometer testing, field vane shear)		127	Exam		
63		G. Description and classification of soils (e.g., Burmeister, Unified Soil Classification System, AASHTO, USDA)					
64		H. Rock classification and characterization (e.g., recovery, rock quality designation, RMR, weathering, orientation)					
65		I. Groundwater exploration, sampling, and characterization					