

Professional Geophysicist Examination

Test Plan 2020

Definition of Professional Geophysics:

“Geophysics” refers to that science which involves study of the physical earth by means of measuring its natural and induced fields of force, including, but not limited to, electric, gravity, and magnetic, and its responses to natural and induced energy and the interpreting of these measurements and the relating of them to the physics of the earth.

This area of practice is structured into three primary content areas:

- I. Project Planning (35%)
- II. Methods and Data Collection (35%)
- III. Data Processing, Analysis, Interpretation, and Presentation (30%)

BPELSG Professional Geophysicist Test Plan-2018

	Percentage of Questions on the Exam
<p>I. Project Planning</p> <p><u>Professional Activities:</u></p> <ol style="list-style-type: none"> 1. Determine applicability of geophysical methods for projects by evaluating targets of interest and project objectives 2. Identify the site characteristics that may impact the geophysical investigation (e.g., geology, infrastructure, cultural features, site history) 3. Develop conceptual geophysical models 4. Select geophysical investigation methods in accordance with site conditions, geology, and equipment in accordance with targets of interest, project objectives, site conditions, and applicable regulations 5. Identify the limitations of the planned geophysical approach 6. Identify and evaluate environmental hazards, operational hazards, and public safety concerns related to geophysical work 7. Identify and apply relevant laws and regulations to geophysical projects 8. Develop quality assurance (QA) and quality control (QC) plans and procedures 	35%
<p>Test questions on these professional activities may include one or more of the following:</p>	
A. Geophysical investigation methods and their applications	
B. Methods used to estimate geologic and geophysical parameters	
C. Sources of existing geologic, geophysical, and other relevant data	
D. Noise sources that affect geophysical data quality	
E. How site conditions relate to the geophysical project (e.g., geology, infrastructure, terrain, weather, cultural activities)	
F. Geophysical characteristics that differentiate targets from their surroundings	
G. Magnetic measurement methods: applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	
H. Seismic measurement methods (e.g., surface wave analysis, seismic refraction/reflection, ground vibration analysis, seismic tomography): applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	
I. Earthquake seismology: applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	
J. Gravity measurement methods: applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	
K. Electrical measurement methods (e.g., resistivity, spontaneous potential, induced polarization): applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	
L. Electromagnetic measurement methods (e.g., VLF, GPR, TDEM): applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	

M. Heatflow measurement methods: applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	
N. Radiological measurement methods: applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	
O. Borehole geophysical methods (e.g., borehole seismics, electrical, neutron, gamma): applications, limitations, and appropriate quality assurance (QA)/quality control (QC)	
P. Safety risks associated with geophysical methods	
Q. Alquist-Priolo Earthquake Fault Zoning Act	
R. California Building Code related to site classification (Vs30)	
S. Methods for minimizing interference and instrument error when collecting geophysical data	
II. Methods and Data Collection	
<u>Professional Activities:</u>	
1. Determine the field layout for the data collection	
2. Document site conditions and data collection parameters	
3. Initialize, calibrate, and set recording parameters on geophysical instruments	
4. Verify that geophysical data has been collected in accordance with applicable standards and work plans	
5. Verify the geophysical data is reasonable and representative	
	35%
Test questions on these professional activities may include one or more of the following:	
A. Environmental impacts (e.g., geology, infrastructure, terrain, weather, cultural activities) on geophysical data quality	
B. The evaluation of quality control (QC) results for compliance to project requirements	
C. Basic field techniques (e.g., map reading, grid layout, compass use, GPS use) and their applications for geophysical projects	
D. Magnetic instrumentation: set-up, field procedures, acquisition, and documentation	
E. Seismic instrumentation: set-up, field procedures, acquisition, and documentation	
F. Earthquake seismology instrumentation: set-up, field procedures, acquisition, and documentation	
G. Gravity instrumentation: set-up, field procedures, acquisition, and documentation	
H. Electrical instrumentation: set-up, field procedures, acquisition, and documentation	
I. Electromagnetic instrumentation: set-up, field procedures, acquisition, and documentation	
J. Heatflow instrumentation: set-up, field procedures, acquisition, and documentation	
K. Radiological instrumentation: set-up, field procedures, acquisition, and documentation	

L. Borehole instrumentation: set-up, field procedures, acquisition, and documentation	
III. Data Processing, Analysis, Interpretation, and Presentation	30%
<u>Professional Activities:</u> 1. Process geophysical data using appropriate techniques 2. Analyze geophysical data using appropriate principles 3. Interpret geophysical results by integrating other data (e.g., geology, site conditions, aerial photos, historical records) and considering project objectives 4. Prepare technical documents to communicate the findings of geophysical projects 5. Conduct professional work in compliance with legal standards and requirements	
Test questions on these professional activities may include one or more of the following:	
A. Magnetic data: processing, analysis, interpretation, and presentation (e.g., diurnal corrections, filtering, geologic/cultural effects)	
B. Seismic data: processing, analysis, interpretation, and presentation (e.g., normal moveout corrections, velocity analysis, elevation correction)	
C. Earthquake seismology data: processing, analysis, interpretation, and presentation (e.g., filtering, station corrections, magnitude)	
D. Gravity data: processing, analysis, interpretation, and presentation (e.g., terrain, free-air, Bouguer)	
E. Electrical data: processing, analysis, interpretation, and presentation (e.g., electrode array types and spacings)	
F. Electromagnetic data: processing, analysis, interpretation, and presentation (e.g., time domain, frequency domain, skin depth)	
G. Heatflow data: processing, analysis, interpretation, and presentation (e.g., heat flow units, groundwater effects, regional geology)	
H. Radiological data: processing, analysis, interpretation, and presentation (e.g., subtraction of background)	
I. Borehole data: processing, analysis, interpretation, and presentation	
J. Geophysical modeling techniques and their limitations	
K. Methods for evaluating error and uncertainty	