

# LEVEL II Qualifications

FIELD: 1.5 years of surveying experience

OFFICE: 1.5 years of surveying experience

OR 65 transcribed semester hours, or quarterly equivalent, of which 18 semester hours are surveying/engineering related plus six months of work experience or any combination of education and work experience equivalent to 1.5 years.

## LEVEL II

### CERTIFIED SURVEY TECHNICIAN

*POSITION DESCRIPTION, WORK ELEMENTS AND NUMBER OF QUESTIONS*

**This is an open book exam.**

#### *POSITION DESCRIPTION*

In addition to the Level I knowledge and skills, Level II Technicians are required to demonstrate more detailed knowledge of survey computations, types of surveys and field operations. The individual in this position is familiar with comprehensive field note taking, plan reading and preparation. The field track technician possesses a detailed working knowledge and application of standard field equipment. The office track technician possesses a detailed working knowledge and application of related computer hardware and software. The technician has a basic knowledge of the principles of the profession. Work Elements further describes the requirements related to this position.

#### *WORK ELEMENTS*

Test problems will be taken from the following work elements:

(The number of questions from each Work Element (F = Field Exam) (O = Office Exam))

- 1) *Survey Types and History (F=7; O=10)*  
Knowledge of the different types of surveying and the basic differences between them.  
Knowledge of the historical development of survey procedures and practices
  
- 2) *Field Equipment & Operations (F=56; O=25)*  
Knowledge of the principles of performing basic surveys: leveling, traversing,

triangulation, trilateration, public land surveys, metes and bounds surveys, construction surveys, photo control surveys, and GPS surveys.

Knowledge of the operation, checking, and basic field adjustments on transits, theodolites, total stations, robotic total stations, data collectors, levels, compass, tribrachs, tripods, and GPS equipment. Some knowledge on newer technologies such as Scanning/LIDAR, UAV, Mobile Mapping, GIS and BIM is expected. Some historical knowledge is also required.

Know how to keep neat and orderly field notes and data collectors files for standard surveying operations: leveling, traversing, topographic mapping, layout, as-built surveys, boundary surveys, profile and cross-section surveys.

Under the supervision of a party chief, be able to coordinate field work for a variety of standard types of surveys. Know basic sources of measurement errors. Know principles of staking and stake markings. Know procedures for GPS surveys.

3) *Survey Control (F=7; O=7)*

Know how to interpret control point records and data sheets, as well as create and locate points in the field.

4) *Survey Computations (F=30; O=40)*

Knowledge of trigonometry, geometry, algebra, coordinate geometry, and basic surveying computations. A familiarity with hand-held calculators and computers is important. With either a hand-held calculator or computer/data collector software, be able to enter field data and produce positional information (i.e. leveling, traversing, stadia, topographic mapping and construction stakeout). Demonstrate lot, area, and intersection (bearing-bearing, distance-distance, bearing-distance) computations. Knowledge of the reduction and checking of field notes for determination of positions and elevations as well as the adjustment of that data. Have an elementary comprehension of computer operating systems and GIS.

5) *Office Operations, Plan Reading and Preparation (34)*

Knowledge and understanding of the basic plan reading and preparation (i.e. site plans, boundary plans, highway plans, profile and cross sections, horizontal and vertical curves, pipeline plans, foundation plans, and developing existing and finished contours). A basic knowledge of the terminology and principles of drafting, including computer-aided drafting (CAD). Some knowledge of computer operating systems and hardware peripherals.

6) *First Aid & Safety (F=10; O=10)*

Basic knowledge of treatment practices for a variety of medical emergencies. Knowledge of traffic control and safety procedures for surveying and construction operations, including Occupational Safety and Health Administration (OSHA) standards.

7) *Principles of the Profession (F=10; O=7)*

Knowledge of surveying ethics and technical standards. Show responsibility in the profession (i.e. attire, honesty, respect for personal property), awareness of related professional association.

**TOTAL NUMBER OF QUESTIONS = 130,    TIME = 4 hours**