

# National Construction Career Tests COMPREHENSIVE OBJECTIVES

## Construction Technology (NCCT68)

*Version 2, for Construction Technology, 2<sup>nd</sup> edition, released 2006*

**Overview:** This NCCT is a two-hour, closed-book examination. You will be permitted to use a nonprogrammable, nonprinting calculator during the examination. The test center will provide any necessary pencils. No extra papers, books, notes or study material are allowed in the testing area. The test center will provide a list of any additional material that is approved for reference during the testing session.

**Study Material:** All NCCTs are aligned to national industry skill standards and referenced to *Contren<sup>®</sup> Learning Series* modules. You may order modules from Prentice Hall by calling (800) 922.0579 or by logging on to [www.crafttraining.com](http://www.crafttraining.com).

**NCCT Development:** All questions on each NCCT have been developed and validated by a team of industry and academic experts from the respective craft. NCCTs measure the nation's 10 foundation knowledge and skill areas for the national Career Clusters initiative, and they meet the standards of the American Psychological Association. NCCT development and administration operates under the direction of Prov, NCCER's testing partner.

**NCCT Administration and Scoring Results:** All tests are proctored by paper/pencil or web-based testing under strict security. Each student will be provided an individualized test report by the test center. This test report will provide the overall score and results by topic area. Paper/pencil scoring results via fax are available in 30 minutes. Web-based scoring results are available within two minutes. Custom student/test site reports are generated instantly.

**Focus Statement:** The candidate in Construction Technology will use safe construction practices; properly use and care for hand and power tools; interpret blueprints and site layout; understand common construction methods, materials and practices; and perform the basics of four general trade areas (electrical, plumbing, masonry, carpentry).

**Note:** Please see "Topic Area" for module references in previous editions, where applicable. You may also reference the equivalency matrix to find out which older modules apply.

Module Number	Topic Area	# of Questions
00101-04 00106-04	Basic Construction and Rigging Safety	10
00102-04	Introduction to Construction Math	5
00103-04 00104-04	Hand and Power Tools	6
00105-04	Introduction to Blueprint Reading	4
00107-04 00108-04	Communication and Employability	4
68101-06	Site Layout	5
68102-06 68103-06	Concrete Properties, Handling, and Placing	5
68104-06 68105-06	Masonry	5
68106-06	Floor Systems	5
68107-06	Wall and Ceiling Framing	5
68108-06 68109-06	Roofing	5
68110-06	Exterior Finishing	5
68111-06	Stairs	4
68112-06	Electrical Safety	6
68113-06	Wiring: Commercial and Industrial	5
68114-06	Introduction to Drain, Waste, Vent (DWV) Systems	4
68115-06 68116-06	Water Supply Systems	5
<b>Total Number of Questions</b>		<b>88</b>

There are no approved references for this test.

The cut score for this assessment is 66%.

This form was last updated May 2006.



## CONSTRUCTION TECHNOLOGY

### Competencies / Objectives

#### MODULE 68101-06 – SITE LAYOUT ONE: DISTANCE MEASUREMENT AND LEVELING

1. Describe the major responsibilities of the carpenter relative to site layout.
2. Convert measurements stated in feet and inches to equivalent measurements stated in decimal feet, and vice versa.
3. Use and properly maintain tools and equipment associated with taping.
4. Use taping and/or chaining equipment and procedures to make distance measurements and perform site layout tasks.
5. Determine approximate distances by pacing.
6. Recognize, use, and properly care for tools and equipment associated with differential leveling.
7. Use a builder's level or transit and differential leveling procedures to determine site and building elevations.
8. Record site layout data and information in field notes using accepted practices.
9. Check and/or establish 90° angles using the 3/4/5 rule.

#### MODULE 68102-06 – INTRODUCTION TO CONCRETE AND REINFORCING MATERIALS

1. Identify various types of cement and describe their uses.
2. Identify types and sizes of concrete aggregates.
3. Identify types of concrete admixtures and describe their uses.
4. Identify special types of concrete and describe their uses.
5. Identify concrete curing methods and materials.
6. Identify concrete testing methods.
7. Demonstrate sampling methods used for the testing of concrete.
8. Perform slump testing of concrete.
9. Perform casting of specimens for strength testing of concrete.
10. Perform volume estimates for concrete quantity requirements.
11. Identify types of concrete reinforcement bars and describe their uses.
12. Identify types of reinforcement bar supports and describe their uses.
13. Identify types of welded-wire fabric (WWF) reinforcement material and describe their uses.

## **MODULE 68103-06 – HANDLING AND PLACING CONCRETE**

1. Identify and state the purpose of different types of concrete joints.
2. Recognize the various equipment used to transport and place concrete.
3. Describe the factors that contribute to the quality of concrete placement.
4. Demonstrate and/or describe the correct methods for placing and consolidating concrete into forms.
5. Demonstrate and/or describe how to use a screed to strike off and level concrete to the proper grade in a form.
6. Demonstrate and/or describe how to use a bullfloat and/or darby to level and smooth concrete.
7. Determine when conditions permit the concrete finishing operation to start.
8. Demonstrate and/or describe how to use a hand float and finishing trowel.
9. Demonstrate and/or describe how to use an edger.
10. Demonstrate and/or describe how to use a jointer.
11. Name the factors that affect the curing of concrete and describe the methods used to achieve proper curing.
12. Properly care for and safely use hand and power tools used when working with concrete.

## **MODULE 68104-06 - INTRODUCTION TO MASONRY**

1. Discuss the history of masonry.
2. Describe modern masonry materials and methods.
3. Explain career ladders and advancement possibilities in masonry work.
4. Describe the skills, attitudes, and abilities needed to work as a mason.
5. State the safety precautions that must be practiced at a work site, including the following:
  - Safety practices
  - Fall-protection procedures
  - Forklift-safety operations
6. Perform the following basic bricklaying procedures:
  - Mixing of mortar
  - Laying a mortar bed
  - Laying bricks
7. Put on eye protection, respiratory protection, and a safety harness.
8. Use the correct procedures for fueling and starting a gasoline-powered tool.

## **MODULE 68105-06 - MASONRY UNITS AND INSTALLATION TECHNIQUES**

1. Describe the most common types of masonry units.
2. Describe and demonstrate how to set up a wall.
3. Lay a dry bond.
4. Spread and furrow a bed joint, and butter masonry units.
5. Describe the different types of masonry bonds.
6. Cut brick and block accurately.
7. Lay masonry units in a true course.

## MODULE 68106-06 – FLOOR SYSTEMS

1. Identify the different types of framing systems.
2. Read and understand drawings and specifications to determine floor system requirements.
3. Identify floor and sill framing and support members.
4. Name the methods used to fasten sills to the foundation.
5. Given specific floor load and span data, select the proper girder/beam size from a list of available girders/beams.
6. List and recognize different types of floor joists.
7. Given specific floor load and span data, select the proper joist size from a list of available joists.
8. List and recognize different types of bridging.
9. List and recognize different types of flooring materials.
10. Explain the purposes of subflooring and underlayment.
11. Match selected fasteners used in floor framing to their correct uses.
12. Estimate the amount of material needed to frame a floor assembly.
13. Demonstrate the ability to:
  - Lay out and construct a floor assembly
  - Install bridging
  - Install joists for a cantilever floor
  - Install a subfloor using butt-joint plywood/OSB panels
  - Install a single floor system using tongue-and-groove plywood/OSB panels

## MODULE 68107-06 – WALL AND CEILING FRAMING

1. Identify the components of a wall and ceiling layout.
2. Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and firestops.
3. Describe the correct procedure for assembling and erecting an exterior wall.
4. Describe the common materials and methods used for installing sheathing on walls.
5. Lay out, assemble, erect, and brace exterior walls for a frame building.
6. Describe wall framing techniques used in masonry construction.
7. Explain the use of metal studs in wall framing.
8. Describe the correct procedure for laying out a ceiling.
9. Cut and install ceiling joists on a wood frame building.
10. Estimate the materials required to frame walls and ceilings.

## MODULE 68108-06 – ROOF FRAMING

1. Understand the terms associated with roof framing.
2. Identify the roof framing members used in gable and hip roofs.
3. Identify the methods used to calculate the length of a rafter.
4. Identify the various types of trusses used in roof framing.
5. Use a rafter framing square, speed square, and calculator in laying out a roof.
6. Identify various types of sheathing used in roof construction.
7. Frame a gable roof with vent openings.
8. Frame a roof opening.
9. Construct a frame roof, including hips, valleys, commons, jack rafters, and sheathing.
10. Erect a gable roof using trusses.
11. Estimate the materials used in framing and sheathing a roof.

## MODULE 68109-06 – ROOFING APPLICATIONS

1. Identify the materials and methods used in roofing.
2. Explain the safety requirements for roof jobs.
3. Install fiberglass shingles on gable and hip roofs.
4. Close up a valley using fiberglass shingles.
5. Explain how to make various roof projections watertight when using fiberglass shingles.
6. Complete the proper cuts and install the main and hip ridge caps using fiberglass shingles.
7. Lay out, cut, and install a cricket or saddle.
8. Install wood shingles and shakes on roofs.
9. Describe how to close up a valley using wood shingles and shakes.
10. Explain how to make roof projections watertight when using wood shakes and shingles.
11. Complete the cuts and install the main and hip ridge caps using wood shakes/shingles.
12. Demonstrate the techniques for installing other selected types of roofing materials.

## MODULE 68110-06 – EXTERIOR FINISHING

1. Describe the purpose of wall insulation and flashing.
2. Identify the types and parts of common cornices.
3. Demonstrate the installation of selected common cornices.
4. Demonstrate lap and panel siding estimating methods.
5. Describe the types and applications of common wood siding:
  - Beveled
  - Tongue-and-groove
  - Shiplap
  - Board-and-batten
  - Shake or shingle
  - Plywood
  - Hardboard and particleboard
6. Install selected types of wood siding.
7. Describe fiber-cement siding and its uses.
8. Demonstrate the installation of fiber-cement siding.
9. Describe the types and styles of vinyl and metal siding.
10. Install selected types of vinyl or metal siding.
11. Describe the types and applications of stucco and masonry veneer finishes.
12. Describe the types and applications of special exterior finish systems.
13. Describe the types and styles of gutters and downspouts and their accessories.
14. Install selected types of metal or vinyl gutters and downspouts.

## **MODULE 68111-06 – STAIRS**

1. Identify the various types of stairs.
2. Identify the various parts of stairs.
3. Identify the materials used in the construction of stairs.
4. Interpret construction drawings of stairs.
5. Explain the methods of constructing various types of stairs.
6. Understand the various terms and definitions relating to stairs.
7. Lay out and cut stringers.
8. Determine the number and sizes of risers and treads required for a stairway.
9. Build a small stair unit with a handrail.
10. Lay out a skirt board.

## **MODULE 68112-06 – ELECTRICAL SAFETY**

1. Demonstrate safe working procedures in a construction environment.
2. Explain the purpose of OSHA and how it promotes safety on the job.
3. Identify electrical hazards and how to avoid or minimize them in the workplace.
4. Explain safety issues concerning lockout/tagout procedures, personal protection using assured ground-ing and isolation programs, confined space entry, respiratory protection, and fall protection systems.

## **MODULE 68113-06 – WIRING: COMMERCIAL AND INDUSTRIAL**

1. Identify and state the functions and ratings of single-pole, double-pole, three-way, four-way, dimmer, special, and safety switches.
2. Explain NEMA classifications as they relate to switches and enclosures.
3. Explain the NEC® requirements concerning wiring devices.
4. Identify and state the functions and ratings of straight blade, twist lock, and pin and sleeve receptacles.
5. Identify and define receptacle terminals and disconnects.
6. Identify and define ground fault circuit interrupters.
7. Explain the box mounting requirements in the NEC®.
8. Use a wire stripper to strip insulation from a wire.
9. Use a solderless connector to splice wires together.
10. Identify and state the functions of limit switches and relays.
11. Identify and state the function of switchgear.

## **MODULE 68114-06 – INTRODUCTION TO DRAIN, WASTE, AND VENT (DWV) SYSTEMS**

1. Explain how waste moves from a fixture through the drain system to the environment.
2. Identify the major components of a drainage system and describe their functions.
3. Identify the different types of traps and their components, explain the importance of traps, and identify the ways that traps can lose their seals.
4. Identify the various types of drain, waste, and vent (DWV) fittings and describe their applications.
5. Identify significant code and health issues, violations, and consequences related to DWV systems.

## **MODULE 68115-06 – PLASTIC PIPE AND FITTINGS**

1. Identify types of materials and schedules of plastic piping.
2. Identify proper and improper applications of plastic piping.
3. Identify types of fittings and valves used with plastic piping.
4. Identify and determine the kinds of hangers and supports needed for plastic piping.
5. Identify the various techniques used in hanging and supporting plastic piping.
6. Properly measure, cut, and join plastic piping.
7. Explain proper procedures for the handling, storage, and protection of plastic pipes.

## **MODULE 68116-06 – COPPER PIPE AND FITTINGS**

1. Identify the types of materials and schedules used with copper piping.
2. Identify the material properties, storage, and handling requirements of copper piping.
3. Identify the types of fittings and valves used with copper piping.
4. Identify the techniques used in hanging and supporting copper piping.
5. Properly measure, ream, cut, and join copper piping.
6. Identify the hazards and safety precautions associated with copper piping.