

Code _____

COUNTY OF ONONDAGA

MASTER PLUMBER EXAMINATION PART II

October 28, 2023

1. The time limit for Part II is 5 hours.
2. The total point value of Part II is 100 points. The point value of each drawing or calculation is indicated in the instructions below. The minimum passing grade is 75%. Partial credit is allowed.
3. A passing grade for Part II may be carried for a period of one year (a maximum of two (2) additional exams) before that part must be re-taken.
4. This is a partial open book exam. Other than the 2020 PCNYS, no books, papers or other materials are allowed in the examination room. A calculator will be provided. Candidates are not allowed to bring their own calculators. **Cell phones are not allowed in the exam room.**
5. Examination papers, drawings, all worksheets and material issued shall be turned in upon completion of the examination.
6. **NO** questions regarding interpretation of examination material will be allowed. If there is an objection to any part of the examination, indicate objection and reasons in writing and turn in at the end of the examination period.
7. All exams will be graded and results mailed within approximately 60 days of the exam date.
8. Any requests for examination review must be made in writing within **30** days of being notified of the results.
9. **Master examination reviews will only be granted for the drawing portion (Part II) of this exam.** To qualify for this review, the unsuccessful candidate must achieve a score between 65 and 74.5 on Part II.

Master Plumber Exam – October 28, 2023
Part II
Instructions for Drawings

This exam consists of two (2) separate parts to two separate unrelated buildings which may have different features:

Part IIa: Calculations for: Towne Student Apartments, four (4) pages total

Part IIb: Drawings and supporting calculations for: Dewey Dentist Office, four (4) pages of instructions and four (4) full size drawings

P1 - Underfloor Drainage Plan

P2 - First Floor Plan & Detail

P3 - Roof Plan

P4 - Plumbing Isometrics

IMPORTANT NOTE #1

You may complete this exam in any order you choose. You should look at all of the drawings and read all of the instructions and questions before starting work. Make note of the point values of the various questions and apply your time properly to complete the test.

Part IIa - Towne Student Apartments

Per the instruction sheets, you must fill in and total the attached Fixture List Chart. Using the completed chart and appropriate Reference Tables, you must answer the sizing questions in the packet and show the method for sizing (ie. state assumptions, if any, and reference table numbers that you use).

Part IIb - Dewey Dentist Office

Instructions are included as part of this exam. Complete the drawings as indicated and, using appropriate Reference Tables, provide sizing as indicated. You are required to show your method for sizing (ie. state assumptions, if any, and reference table numbers that you use).

Part IIa

Towne Student Apartments Instructions

A customer has asked you to prepare calculations and pipe sizing for a possible Student Apartment complex. The complex is four floors, with an 18,000 sq ft footprint, in Onondaga County on the combined sewer system. The roof covers the entire fourth floor, has a two (2) inch perimeter gravel stop, and is internally drained for a three (3) inch per hour rainfall rate (provided with roof drains and an internal storm piping system).

The complex is to include the following plumbing features: (See the provided Fixture List Chart)

Twelve apartments per floor on floors 2, 3 and 4:

- a. Each apartment to have a single bathroom with water closet, two lavatories, one tub/shower.**
- b. Each apartment to have a kitchen with dual bowl sink, dishwasher.**

On each floor there is a community laundry including:

- a. Three standard residential clothes washers on standpipe**
- b. one laundry tray.**

On the ground floor (slab on grade) there are the following rooms:

- a. A women's public toilet room with two water closets, two lavatories, and one floor drain**
- b. A men's public toilet room with one water closet, one urinal, two lavatories and one floor drain**
- c. A custodians room with a floor drain and a mop receptor.**

- d. one bottle filler / drinking fountain –1-1/4” Waste.

On the ground floor (slab on grade) there is a commercial kitchen with the following fixtures:

- a. One Three bay sink. Three 2” individual wastes
- b. Two Two-Bay food sinks, 2” waste each
- c. One Commercial Dishwasher, 9 gpm maximum demand and waste, 1” Hot Water Supply.
- e. One Service sink, 2” waste
- f. One mop receptor 3” waste
- g. Six floor drains.
- h. Four floor sinks serving soda islands with two 1-1/4” waste each.

Towne Student Apartments – Calculations – Total 15 Points

1. Complete the attached Fixture List Chart using the reference pages from the 2020 PCNYS. Itemize the loads and identify the drainage fixture unit and water supply fixture unit requirements for each line. Provide on line 26 the totals for DFU, CWSFU, HWSFU and WSFU. This work is valued at 7.5 Points

Show methodology and calculations and identify the required size for copper supply pipe and PVC drain / sewer on the answer sheet attached to the fixture list for the following:
(Each item valued at 1.5 points)

2. Water service size at proper size and velocity not greater than 5 fps based on the WSFU load developed in item 1 above.
3. Hot Water main size at proper size and velocity not greater than 5 fps based on the HWSFU developed in item 1 above.
4. Cold Water main size at proper size and velocity not greater than 5 fps based on the CWSFU developed in item 1 above.

5. Sanitary sewer lateral size at minimum code allowed pitch based on the DFU developed in item 1 above.
6. Storm sewer lateral size at minimum code allowed pitch based on the calculate rainfall rate and gpm produced.

Part IIb

Dewey Dentist Office Instructions

Dr. Dewey is expanding his dental practice and is constructing a new building located in the City of Syracuse, served by City water and a combined sewer. The building will be slab-on-grade, insulated concrete block walls, bar joist roof with tapered insulation to central roof drainage, with lay-in ceiling tiles providing ceiling space with sufficient heat for routing of domestic water lines and location of the building heating/cooling system which is a gas-fired roof top air handler with VAV boxes. Building is considered by the water supplier to be high hazard.

Each patient exam room shall be equipped with side-wall mounted dental service equipment, located as shown on the wall opposite the entry door to the patient room. This equipment requires water supply, vacuum, compressed air, but no drain. There is no cuspidor at the chair locations.

The dental equipment vendor will provide the vacuum system piping design for construction by a specialty contractor and the compressed air equipment piping design for construction by a specialty contractor. The Plumbing Contractor will not need to show this piping on P1 and P2, or provide this piping.

Sewer, water and gas supplies enter the building from the south.

You are required to complete four drawings showing your proposed design for the plumbing systems for this building. The drawings have blank spaces for you to include required details or calculations. If you run out of space, you may put additional information on the calculation sheets furnished with your drawings.

IMPORTANT NOTES #2

You are required to provide a system which meets code but with no elements that are oversized above the code required minimum.

Points will be deducted for omissions of piping for shown or required fixtures, omission of code required items, piping for which sizing is not shown, oversized piping, incorrect pitch, lack of supporting calculations of pipe sizing.

Since this is an open book test, you must state where or what table you are obtaining the sizing from and what caused you to select that sizing. Sizing without written indication of methods will not receive credit.

If you make assumptions, list your assumptions in writing on the drawing. Completed drawing should depict a constructible plumbing system that will work and pass inspection in Onondaga County NY.

Dewey Dentist Office

Drawing P1 – Total 25 Points

On Drawing P1:

- 1. Show the underfloor waste and storm lines and extension to building sewer.**
- 2. Show the invert elevation in USGS at the beginning of the sanitary and if applicable storm underfloor runs and at the exit from the building and the pipe pitch for each section of underfloor pipe.**
- 3. Show the storm and sanitary extended to the municipal sewer connected in accordance with 2020 PCNYS requirements.**
- 4. Show the pipe sizing and identify the means and calculations to establish this sizing by showing the DFUs for sanitary and the gpm for storm.**
- 5. Assume base finished floor is Elevation USGS as shown on the drawing.**

Drawing P2 – Total 25 Points

On Drawing P2:

- 1. Show the domestic water piping, routing and sizing to all fixtures. Identify your means and show calculations to establish this sizing.**
- 2. Provide a separate detail showing the incoming water service, meter and code required appurtenances, and clearances.**
- 3. Show a detail of the domestic water heater installation, piping and code required items. Size the water heater piping and show the basis of sizing. Show the stack and means of providing combustion air.**
- 4. Show above floor waste and vent. Show vent with a dashed line. Show all sizing.**
- 5. Show roof drainage piping, show sizing and all code required items for roof drainage. Show calculations based on a three (3) inch per hour rainfall rate.**

Drawing P-3 – 10 Points

On Drawing P3:

- 1. Show location of roof drains and code required items.**
- 2. Show location of roof vents.**
- 3. Arrange your design to minimize roof penetrations.**

Drawing P-4 - 25 Points

On Drawing P4:

- 1. Provide an isometric drawing of the water supply piping for the staff toilet rooms and the staff sink and dishwasher. This item is valued at 5 points**
- 2. Provide an isometric drawing of the waste and vent piping for the staff toilet rooms and staff sink and dishwasher. This item is valued at 5 points**
- 3. Provide an isometric drawing for the water heater system assuming a single 100 gallon gas water heater with a two temperature loop providing 135 degree water to sinks and 110 degree water to lavatories. Show water piping, gas piping and venting details. This item is valued at 15 points**