

# Natural Gas Technician Certification Pre-Test

This Pre-Test contains 50 questions and while having all the same categories as the actual test, it has an emphasis on the most difficult types of questions; Gas Piping, Combustion Air, Venting & Retrofitting. Since the most difficult questions involve *processes* such as using charts and performing calculations, this Pre-Test has a greater percentage of those types of questions than does the actual test.

Here is a summary of the seven major areas, and subsections, of the 100-question exam.

## **Properties of Natural Gas/ Principles of Combustion**

– 7 knowledge

Properties of Natural Gas – 3

Questions about other fuels – 1

Principles of Combustion – 3

## **Gas Piping Systems**

– 14 knowledge - 7 process

Meter Locations – 1

Service Connections – 1

Gas Piping Materials – 1

Corrugated Stainless Steel Tubing – 2

Installation of Gas Piping – 3

Concealed Piping, Fittings, & Devices – 1

Shut off Valves – 1

Pressure Testing – 1

Meter Spot Testing – 1

Appliance Connectors – 1

Required Gas Piping Size – 1

Gas Line Sizing Process Questions

Gas Line Sizing – 4

Gas Piping Diagram – 3

## **Combustion Air**

– 10 knowledge - 9 process

Air for Combustion & Ventilation – 2

Combustion Air Ducts – 3

Louvers & Grilles – 2

Required Volume Requirements – 3

Combustion Air Sizing Process Questions

Space Sizing with Required Volume Rule – 3

Combustion Air Duct sizing – 6

## **Appliance Installation Codes**

–10 knowledge

Accessibility & Clearances – 2

Special Conditions, Installation in Garages,

Hazardous & Prohibited Locations – 2

Warm Air Furnaces & Unit Heaters – 2

Unvented Room Heaters – 2

Water Heaters, Gas Ranges & Clothes Dryers – 2

## **Deration – 4 knowledge - 3 process**

Deration – 4

Deration Process Questions

Calculating Derated BTUH Input – 1

Calculating Derated CFH Input – 1

Derated Orifice sizing – 1

## **Venting – 18 knowledge - 8 process**

Appliances Required to be vented – 1

Draft Hoods – 1

Vent Materials – 1

Vent Clearances – 3

Vent Connectors – 3

Appliance Venting – 1

Vent Termination – 2

Mechanical Draft Termination – 1

Direct Vent Termination – 2

Masonry Chimneys – 1

Vent System Codes – 2

Venting Process Questions

Single Appliance Venting – 3

Multiple Appliance Venting – 3

Manifold Vent Systems – 2

## **Retrofitting – 10 process**

Retrofitting Gas Distribution Systems – 3

Retrofitting Combustion Air Systems – 4

Retrofitting Venting Systems – 3

## **Properties of Natural Gas – Principles of Combustion**

1. What are the by-products of combustion?
  - a. Carbon Dioxide, Carbon Monoxide, Water Vapor
  - b. Carbon Dioxide, Water Vapor, Heat
  - c. Carbon, Carbon Monoxide, Water Vapor
  - d. Dihydrogen Oxide, Water Vapor, Carbon Dioxide
  
2. What is the proper ratio required for the complete combustion of natural gas?
  - a. 1 part natural gas to 10 parts air
  - b. 1 part air to 10 parts natural gas
  - c. 1 part natural gas to 4 parts air
  - d. 4 parts natural gas to 15 parts air

## **Gas Piping Systems**

3. What is the minimum pipe size to a furnace and water heater location requested by Dominion Energy?
  - a. 1/2"
  - b. 3/4"
  - c. 1"
  - d. 1-1/4"
  
4. On an elevated pressure system, where are shut off valves required?
  - a. An approved shut-off valve shall be installed downstream of the MP regulator & within 6 feet of the appliance.
  - b. An approved shut-off valve shall be installed upstream of the MP regulator & within 16 feet of the appliance and in the same room.
  - c. An approved shut-off valve shall be installed both before and after an MP regulator and in the same room.
  - d. An approved shut-off valve shall be installed upstream of the MP regulator & within 6 feet of the appliance and in the same room.
  
5. How is CSST protected from puncture threats?
  - a. Installed inside schedule 40 iron pipe.
  - b. Protection is not required
  - c. with Striker Plates or being 2 inches from a penetrating edge
  - d. with Striker Plates or being 3 inches from a penetrating edge
  
6. If an 80,000 BTUH furnace is supplied with 890 BTU/Cu. Ft. gas, how many cubic feet of gas are required per hour?
  - a. 80,000 CFH
  - b. 80 CFH
  - c. 890 CFH
  - d. 90 CFH
  
7. If the most remote appliance is 125 ft. from the gas meter, what size branch line is needed for a 150,000 BTUH boiler on a 4 oz. system located in Park City?
  - a. 1/2"
  - b. 3/4"
  - c. 1"
  - d. 1-1/4"

8. On a 2 PSI pressure system, how much gas will a 1 in. line carry 200 ft. to a single appliance?
  - a. 134 CFH
  - b. 144 CFH
  - c. 1,170 CFH
  - d. 1,710 CFH
  
9. On Piping Diagram 1, what minimum pipe size is required for line F to the Furnace?
  - a. 1/2"
  - b. 3/4"
  - c. 1"
  - d. 1-1/4"
  
10. On Piping Diagram 1, what minimum pipe size is required for line K to the Dryer?
  - a. 1/2"
  - b. 3/4"
  - c. 1"
  - d. 1-1/4"
  
11. On Piping Diagram 1, what minimum pipe size is required for line D, that serves lines E & H?
  - a. 1/2"
  - b. 3/4"
  - c. 1"
  - d. 1-1/4"
  
12. If the most distant appliance in Practice Installation 3 is 185 feet and the branch line to the furnace is 10 feet long, what is the minimum branch line size required on a 4 oz. system?
  - a. 1/2"
  - b. 3/4"
  - c. 1"
  - d. 1-1/4"

### **Combustion Air**

13. What is the free area of a metal grill?
  - a. 10% free area
  - b. 25% free area
  - c. 75% free area
  - d. 100% free area
  
14. When is it permissible to screen a vertical combustion air duct?
  - a. When it doesn't terminate in an attic
  - b. When the screen is larger than 1/4"
  - c. When there isn't a fire damper installed
  - d. When supplying combustion air to a room with at least one direct vent appliance
  
15. If a room has a 30,000 BTUH water heater and a 100,000 BTUH furnace, what is the minimum single duct size that would satisfy the code?
  - a. 6 X 7
  - b. 7 X 7
  - c. 7 X 8
  - d. 8 X 10

16. If a basement contains a 75,000 BTUH furnace, a 60,000 BTUH furnace and a 40,000 BTUH water heater, which of the following is the smallest that will satisfy the single combustion air duct requirement?
- 7 X 7
  - 8 X 8
  - 10 X 10
  - 10 X 18
17. What is the smallest size metal grille that will satisfy a 128 sq. in. combustion air requirement?
- 10 X 12
  - 12 X 12
  - 12 X 14
  - 14 X 14
18. For Practice Installation 1, if the room with the furnace obtains combustion air from the family room, which is the smallest metal grille size that can be used for each opening?
- 6" X 6"
  - 6" X 10"
  - 10" X 12"
  - 12" X 12"
19. Practice Installation 1: What are the minimum cubic feet that will satisfy the Required Volume Rule if the building is of ordinary tightness?
- 1,000 sq. ft.
  - 1,333 cu. ft.
  - 2,000 sq. ft.
  - 4,000 cu. ft.
20. For Practice Installation 2: What is the minimum duct size that would satisfy code? (using the one opening method)?
- 5" X 10"
  - 6" X 10"
  - 9" X 10"
  - 10" X 18"
21. If Practice Installation 2 has a furnace without minimum clearance and combustion air is brought in horizontally, which of the following satisfies the minimum free area required?
- 37.00 sq. in.
  - 49.33 sq. in.
  - 74.00 sq. in.
  - 148.00 sq. in.
22. For Practice Installation 3: If combustion air is brought from the attic through 2 vertical ducts, what is the minimum round duct size that would satisfy code?
- 3"
  - 4"
  - 5"
  - 6"

23. For Practice Installation 3: If combustion air is brought in horizontally through a single combustion air duct, what is the minimum size that would satisfy code?
- a. 3" X 3"
  - b. 3" X 5"
  - c. 5" X 5"
  - d. 10" X 10"

### **Appliance Installation Codes**

24. In a private garage, how far above the floor must an appliance's ignition source be located:
- a. 6"
  - b. 8"
  - c. 12"
  - d. 18"
25. What is the required volume criteria for an unvented room heater?
- a. 10 cubic feet of volume for every 890 BTUH of input
  - b. 10 cubic feet of volume for every 1,000 BTUH of input
  - c. 50 cubic feet of volume for every 890 BTUH of input
  - d. 50 cubic feet of volume for every 1,000 BTUH of input

### **Deration**

26. What is the 4% deration multiplier for Kamas?
- a. .74
  - b. .76
  - c. .80
  - d. .83
27. What size orifices are needed for a 75,000 BTUH furnace with three burners and a 3.5 IWC manifold pressure installed in Salt Lake?
- a. 43
  - b. 44
  - c. 45
  - d. 46
28. For Practice Installation 1: What should be the input of the furnace when derated?
- a. 66,400 BTUH
  - b. 80,000 BTUH
  - c. 89,887 BTUH
  - d. 96,385 BTUH
29. For Practice Installation 2: What size orifices should be installed in the furnace to derate it?
- a. 41
  - b. 42
  - c. 43
  - d. 44

## Venting

30. How far should a vent terminate away from a vertical wall?
- 3 Feet
  - 4 Feet
  - 8 Feet
  - 10 Feet
31. How far below a gravity air inlet must a single pipe mechanical draft vent system terminate?
- 3 Feet
  - 4 Feet
  - 8 Feet
  - 10 Feet
32. When can a category I fan assisted furnace be connected to a masonry chimney?
- Never
  - If the vent connector is B Vent and not longer than 4 feet
  - If the masonry chimney is not an exterior chimney
  - When it is common vented with a draft hood equipped appliance
33. What is the distance a 45,000 BTUH direct vent appliance must terminate from any opening where combustion products can enter a building?
- 6"
  - 9"
  - 12"
  - 4 feet
34. What is the maximum length limit for a 4" vent connector on a multiple appliance vent system without taking a reduction in the vent table capacities?
- 3 Feet
  - 4 Feet
  - 6 Feet
  - 8 Feet
35. What is the maximum common vent size that a 4" draft hood can be connected to?
- 4"
  - 6"
  - 8"
  - 10"
36. What is the smallest and cheapest vent connector for an 86,000 BTUH Natural Draft Furnace that has a 5" collar on a 7' lateral with a 15' vent height.
- 4" single wall
  - 4" B Vent
  - 5" single wall
  - 5" B Vent
37. For Practice Installation 1: What is the smallest and lowest cost furnace vent connector?
- 4" single wall
  - 4" B Vent
  - 5" single wall
  - 5" B Vent

38. For Practice Installation 2: What is the smallest & cheapest water heater vent connector?
- 4" single wall
  - 4" B Vent
  - 5" single wall
  - 5" B Vent
39. For Practice Installation 2: What is the smallest and lowest cost furnace vent connector?
- 4" single wall
  - 4" B Vent
  - 5" single wall
  - 5" B Vent
40. For Practice Installation 2: What is the common vent size and type?
- 4" B Vent
  - 5" single wall
  - 5" B Vent
  - 6" B Vent
41. For Practice Installation 3: What is the smallest and lowest cost water heater vent connector?
- 3" single wall
  - 4" single wall
  - 5" single wall
  - 6" single wall

### **Retrofitting – Gas Piping Systems**

42. For Practice Installation 2: The water heater is being replaced with a 145,000 BTUH tankless water heater. What size trunk line to the furnace & water heater is needed if the most distant appliance is 60 feet on a 4 oz. system?
- 3/4"
  - 1"
  - 1-1/4"
  - 1-1/2"
43. For Practice Installation 3: A 200,000 BTUH tankless water heater is replacing the existing water heater to provide hot water to a Jacuzzi bathtub. What size branch line will be required to the water heater if the most distant appliance is 25 feet on a 4 oz system?
- 3/4"
  - 1"
  - 1-1/4"
  - 1-1/2"
44. For Practice Installation 3 – A 250,000 BTUH snow melt boiler is being added to next to the furnace and water heater. What is the minimum trunk line size that will be needed to provide gas to those 3 appliances if the most distant appliance is 30 feet on a 4 oz. system?
- 3/4"
  - 1"
  - 1-1/4"
  - 1-1/2"

## **Retrofitting – Combustion Air**

45. For Practice Installation 1: A 160,000 BTUH snow melt boiler is being added that will obtain combustion air from the mechanical room, which is supplied through two horizontal ducts. How much free area will each duct require? The furnace has zero rear clearance.
- 60 sq. in.
  - 80 sq. in.
  - 120 sq. in.
  - 240 sq. in.
46. For Practice Installation 2: If replacing the furnace with a direct vent 95% condensing furnace, what size single vertical combustion air duct would be correct for the remaining appliance?
- 10 sq. in.
  - 13.33 sq. in.
  - 20 sq. in.
  - 40 sq. in.
47. For Practice Installation 3: The water heater is being replaced with a 150,000 BTUH tankless and the mechanical room obtains combustion air via a single horizontal duct. Which is the smallest round duct size that will meet the combustion air requirements?
- 6"
  - 7"
  - 8"
  - 9"

## **Retrofitting – Venting**

48. For Practice Installation 2: If replacing the furnace with a 97% direct vent condensing furnace, what is the largest acceptable vertical vent suitable for use with just the water heater?
- 4"
  - 6"
  - 7"
  - 8"
49. For Practice Installation 2: If adding a 150,000 BTUH Category 1 boiler in the room with the furnace and water heater, what size will the Common Vent need to be?
- 6"
  - 7"
  - 8"
  - 9"
50. For Practice Installation 3: With the former vent system serving only the water heater when the furnace was upgraded to high efficiency model, what is the smallest size and cheapest vent type it could be if it has a 12 foot lateral?
- 3" single wall
  - 3" B Vent
  - 4" single wall
  - 4" B Vent









