Practice HVAC Licensing Exam

1. A tracer wire buried with plastic gas piping shall be minimum ____AWG
   a) 16
   b) 14
   c) 18
   d) 20

2. The minimum ventilation rate for living area of a residence is the greater of 15 cfm per person or ____ air changes per hour
   a) .5
   b) .35
   c) .40
   d) 1

3. When using a test pressure of 10 psig, the test gauge shall not be capable of reading pressures greater than_____PSIG
   a) 100
   b) 80
   c) 50
   d) 75

4. The use of gypsum boards to for plenums shall be limited to systems where the temperature does not exceed _______ degrees F and the temperature of the conveyed air is kept above the dew point
   a) 125
   b) 110
   c) 250
   d) 95

5. A sauna room shall have a vent opening above the door at least 4 inches by ____ inches
   a) 6
   b) 12
   c) 10
   d) 8

6. Gas piping shall be labeled at intervals not exceeding _______ feet
   a) 8
   b) 5
   c) 4
   d) 3

7. A JOINT OBTAINED BY THE JOINING OF METAL PARTS WITH METALLIC MIXTURES OF ALLOYS WHICH MELT AT 1050 DEGREES F, IS CALLED A ___________ JOINT.
   a) WELDED
b) MECHANICAL
c) BRAZED
d) SOLDERED

8. If an 6" X 10" duct is terminated with a metal louver (75% free area), the louver must be a minimum _____ square inches
   a) 90
   b) 60
   c) 120
   d) 80

9. A gas regulator that reduces incoming pressure between .5 and 5 psig to a lower pressure is called a ___________.
   a) service entrance regulator
   b) low pressure regulator
   c) high pressure regulator
   d) medium pressure regulator

10. Unless otherwise specified by the manufacturer, vents shall terminate not less than _____ feet above the highest connected appliance
    a) 12
    b) 10
    c) 8
    d) 5

11. When obtaining combustion air from a crawl space, the free area of the crawl space vent to the outside must be a minimum _______ the size of the combustion air opening
    a) 4 times
    b) 2.5 times
    c) 3 times
    d) 2 times

12. A type I hood, 5 foot long, wall mounted canopy, serving medium-duty appliances shall have a minimum capacity of _____ CFM
    a) 1000
    b) 2500
    c) 500
    d) 1500

13. Downdraft kitchen exhaust ducts may be constructed of______.
    a) all of the above
    b) sheet metal
    c) aluminum
    d) PVC

14. When combustion air is mechanically forced into a room, a minimum rate of ______ cfm per 1000 btu/h of combined input rating of all installed appliances
must be supplied
   a) .35  
   b) 1.0  
   c) .25  
   d) .40  

15. The maximum cfm of duct leakage allowed with a air handler in place for a 1500 square foot home with .1 inch w.c. is_____.
   a) 75  
   b) 150  
   c) 60  
   d) 80  

16. Plastic pipe shall not be operated at pressures greater than ______ psig for LP gas
   a) 100  
   b) 15  
   c) 30  
   d) 10  

17. Semi-ridgid metallic tubing used as appliance connectors shall not exceed ___ feet
   a) 8  
   b) 3  
   c) 6  
   d) 5  

18. For other than appliances installed in fireplaces, a gas shutoff valve shall be located within ___ feet of the appliance
   a) 3  
   b) 4  
   c) 10  
   d) 6  

19. Appliance pits greater than 12 inches deep shall be lined with masonry extending ___ inches above the adjoining grade
   a) 4  
   b) 2  
   c) 3  
   d) 6  

20. Gas piping may be joined in concealed locations using which of the following methods?
    a) brazing  
    b) compression fittings  
    c) unions
d) swing joints

21. 1/2" copper tubing must be supported a minimum of _______ feet when installed horizontally
   a) 4
   b) 10
   c) 8
   d) 6

22. Equipment, appliances or material included in a list published by a nationally recognized testing laboratory concerned with product evaluation and states that the above item meets recognized standards is said to be _____________
   a) approved
   b) listed
   c) certified
   d) tested

23. A type I hood is not required for ______>
   a) griddles
   b) hot dog cookers
   c) fryers
   d) broilers

24. REFRIGERANTS REMOVED FROM A SYSTEM IN ANY CONDITION WITHOUT NECESSARILY TESTING OR PROCESSING THEM ARE CALLED___________.
   a) RECYCLED REFRIGERANTS
   b) RECEIVED REFRIGERANTS
   c) RECOVERED REFRIGERANTS
   d) RECLAIMED REFRIGERANTS

25. THE MAXIMUM ALLOWABLE HORIZONTAL LENGTH OF A CATEGORY I APPLIANCE SINGLE WALL VENT CONNECTOR IS ______% OF THE HEIGHT OF THE VENT
   a) 50
   b) 25
   c) 75
   d) 100

26. A commercial stainless steel duct must be constructed of _______ gage thickness
   a) 20
   b) 14
   c) 18
   d) 16

27. A NON LOAD BEARING STUD MAY BE NOTCHED ______% OF ITS
DEPTH.
   a) 30
   b) 40
   c) 25
   d) 15

28. CATEGORY I GAS EQUIPMENT MAY BE VENTED WITH WHICH OF THE FOLLOWING TYPES OF VENTS?
   a) ALL THE ABOVE
   b) CHIMNEY WITH CLAY LINER
   c) TYPE B
   d) SINGLE WALL METAL

29. RECLAIMED REFRIGERANTS SHALL NOT BE REUSED IN A DIFFERENT OWNERS EQUIPMENT UNLESS TESTED AND FOUND TO MEET THE PURITY REQUIREMENTS OF
   a) ARI 700
   b) ASTM A53
   c) NFPA 54
   d) ASHRAE 34

30. IF A GALLON OF OIL CONTAINING 140,000 BTU'S SELLS FOR $1.25, HOW MUCH WILL 1,000,000 BTU'S COST WHEN USED IN AN 80% AFUE OIL FURNACE
   a) $8.93
   b) $11.16
   c) $14.00
   d) $12.78

31. For 3/4 inch steel gas pipe hangers or supports shall be spaced not farther than _____ feet apart
   a) 10
   b) 4
   c) 8
   d) 6

32. An auxiliary drain pan must have a minimum depth of ____ inch(es)
   a) 1.5
   b) 1
   c) 1.25
   d) 2

33. A 12" ROUND DUCT HAS A RECTANGULAR EQUIVALENT OF
   a) 16 X 8
   b) 15 X 8
   c) 14 X 8
   d) 17 X 8
34. GAS APPLIANCE CONNECTORS SHALL NOT PASS THROUGH ANY OF THE FOLLOWING EXCEPT
   a) WALLS
   b) APPLIANCE HOUSINGS
   c) FACTORY BUILT FIREPLACES
   d) FLOORS

35. Sauna heaters shall have a thermostat that limits the room temperature to ______ degrees F
   a) 194
   b) 144
   c) 114
   d) 120

36. The minimum R value of duct insulation installed in areas other than the conditioned space or attics is _________
   a) R 5
   b) R 6
   c) R 8
   d) R 4

37. ___________ piping may only be used for gas piping outside and underground.
   a) Aluminum
   b) Copper
   c) Steel
   d) Plastic

38. The maximum length allowed for a 4 inch dryer duct with two 90 degree bends is ______ feet
   a) 25
   b) 35
   c) 30
   d) 40

39. The minimum return opening to an 80,000 btuh (output rating) forced air furnace shall be _____ square inches.
   a) 160
   b) 80
   c) 140
   d) 100

40. A location that cannot be accessed without damageing permanent parts of a building is called a/an _____ location
   a) inaccessible
   b) assessible
41. AN APPLIANCE RATED AT 75,000 BTUH INPUT MUST BE PLACED IN A ROOM CONTAINING A MINIMUM ______ CUBIC FEET IN ORDER TO BE IN AN UNCONFINED SPACE.
   a) 3750  
   b) 7500  
   c) 1500  
   d) 75000

42. A FUEL FIRED FURNACE, MEASURING 22 CUBIC FEET MUST BE PLACED IN A ROOM GREATER THAN __________ CUBIC FEET IF IT IS NOT APPROVED FOR CLOSET INSTALATION
   a) 264  
   b) 352  
   c) 220  
   d) 564

43. The ignition source of an appliance shall be elevated not less than _____ unless it is listed as flammable ignition resistant
   a) 6 feet  
   b) 18 inches  
   c) 4 feet  
   d) 24 inches

44. Transition ducts used to connect commercial dryers to exhaust duct shall be limited to ___ feet in length
   a) 4  
   b) 3  
   c) 6  
   d) 8

45. A label shall be affixed to a gas appliance with all the following information except _______
   a) BTUH rating  
   b) manufacture date  
   c) type of fuel used  
   d) minimum clearances

46. The minimum size supply line to an oil furnace shall be ______ inch.
   a) 1/8  
   b) 1/16  
   c) 3/8  
   d) 1/4

47. A BLOWER WITH AN EXTERNAL STATIC PRESSURE OF .55" WC IS
CONNECTED TO A 70 FT. LONG DUCT. THE SYSTEM INCLUDES
REGISTERS AND GRILLS (.03" WC EACH), A COOLING COIL (.15" WC) AND
FILTER (.10" WC). WHAT IS THE TOTAL AVAILABLE STATIC PRESSURE
REMAINING FOR SIZING THE DUCT?
   a) .15" WC
   b) .17" WC
   c) .30" WC
   d) .24" WC

48. WHAT IS THE VELOCITY OF 1400 CFM OF AIR IN A DUCT MEASURING
12" X 30"?
   a) 467 FPM
   b) 560 FPM
   c) 3.8 FPM
   d) 360 FPM

49. A system designed to shut off the gas supply to the burners if the oxygen in
the surrounding atmosphere is reduced to a predetermined level is called a
   a) carbon dioxide detector
   b) oxygen depletion shutoff system
   c) automatic shut off valve
   d) air regulator system

50. A 75,000 BTUH (INPUT RATING) 80% AFUE FURNACE HAS A
TEMPERATURE RISE OF 45-DEGREES. WHAT IS THE CFM?
   a) 1667
   b) 1212
   c) 1515
   d) 1175

51. Appliances installed on roofs greater than ______ feet high must have a
permanent means of access.
   a) 18
   b) 20
   c) 16
   d) 24

52. A fire damper install at a 2 hour fire rated wall shall have a minimum rating of
   ________ hours
   a) 2
   b) 1.5
   c) 3
   d) 1

53. Shield plates placed on studs to protect gas piping shall extend ______ inches
to each side of the stud.
a) 1.5  
b) 3  
c) 4  
d) 2

54. The minimum diameter of a close dryer duct shall be ______ inches  
   a) 6  
   b) 5  
   c) 3  
   d) 4

55. A location that cannot be accessed without damaging permanent parts of a building is called a/an _____ location  
   a) concealed  
   b) assessable  
   c) inaccessible  
   d) ready access

56. Screens used to protect intake openings for ventilation may not have a mesh less than____ inch.  
   a) 1/16  
   b) 1/2  
   c) 1/8  
   d) 1/4

57. THE MINIMUM INSULATION R-VALUE FOR REFRIGERANT LINES FOR A RESIDENCE IS ____.  
   a) R-3  
   b) R-2  
   c) 5-5  
   d) R-4

58. Close dryers exhausting more than ____ cfm must be provided with make up air  
   a) 150  
   b) 100  
   c) 200  
   d) 75

59. Which of the follow shall not share a type I hood  
   a) charcoal grille  
   b) griddle  
   c) deep fat fryer  
   d) pizza oven

60. Underfloor accesses must be a minimum 22 inches high by _______ inches wide
61. Closets containing close dryers must have a make up air opening not less than ____ square inches
   a) 75
   b) 100
   c) 150
   d) 50

62. Grease ducts in enclosures shall have a clearance of _________ inches to construction of non combustible gypsum attached to non combustible structures
   a) 18
   b) 12
   c) 6
   d) 3

63. Which of the following heating systems must have its efficiency posted on a certificate placed on or inside the electrical distribution panel of new residential construction
   a) Electric baseboard
   b) unvented room heater
   c) gas furnace
   d) electric furnace

64. A ventilation system in a 10,000 square foot enclosed parking garage shall be capable of producing a minimum of _____ cfm
   a) 10,000
   b) 20,000
   c) 5000
   d) 15,000

65. IN ORDER TO SUPPLY OUTDOOR COMBUSTION AIR USING THE TWO OPENING METHOD WITH HORIZONTAL DUCTS, WHAT DUCT SIZE BELOW WOULD BE THE MINIMUM NEEDED TO HANDLE A 140,000 BTUH FURNACE
   a) 3.5" X 10"
   b) 8.5" X 10"
   c) 7" X 10"
   d) 14' X 10"

66. Factory built fireplaces must be listed and labeled according to __________.
   a) UL 348
   b) UL127
   c) UL 187
   d) UL 124
67. A single wall oil heat chimney connector shall have ______ clearance from combustibles
   a) 9
   b) 18
   c) 36
   d) 12

68. A plastic condensate pan must have a minimum thickness of ______ inch
   a) .0250
   b) .0625
   c) .0375
   d) .0276

69. If natural ventilation is used, a building, measuring 3000 square feet, must have a minimum openable area of ______ square feet.
   a) 120
   b) 150
   c) 300
   d) 450

70. Duct smoke detectors shall comply with______.
   a) UL 268
   b) UL 181
   c) ASTM 34
   d) NFPA 72

71. A 2 inch diameter gas pipe must be purged with an inert gas before opening if it is greater than _____feet long.
   a) all of the above
   b) 30
   c) 50
   d) 40

72. Unless protected by approved area smoke detectors, smoke detectors are required in the return air duct or plenum on any system with a design capacity greater than ______ cfm.
   a) 1500
   b) 2000
   c) 4000
   d) 3000

73. IF A CONTRACTOR WORKS ON 15% PROFIT, WHAT WOULD HIS SALES HAVE TO BE TO MAKE $75,000?
   a) $600,000
   b) $112,000
   c) $500,000
d) $862,500

74. A single wall low heat 6 inch diameter chimney connector shall have a minimum thickness of ______
   a) 22
   b) 16
   c) 26
   d) 24

75. The vertical distance between the front lower lip of a type I or II hood and the surface of the appliance shall not extend more than ______ feet
   a) 3.6
   b) 4
   c) 2
   d) 3

76. Vented wall furnaces shall be located so that a door cannot swing within _____ inches of the air inlets or outlets of such furnace measures at right angles to the openings
   a) 12
   b) 18
   c) 36
   d) 24

77. FUEL FIRED APPLIANCES SHALL NOT BE LOCATED IN _______.
   a) BASEMENTS
   b) BEDROOMS
   c) LIVING ROOMS
   d) KITCHENS

78. THE VELOCITY OF 250 CFM OF AIR IN A FLEXIBLE, SPIRAL WIRE HELIX CORE DUCT SIZED AT .08" WC STATIC PRESSURE IS ______.
   a) 500 FPM
   b) 900 FPM
   c) 400 FPM
   d) 750 FPM

79. Which of the following is not required for a heat pump installation
   a) load calculation
   b) programmable thermostat
   c) a permit
   d) a means of controlling electric resistance heat from operating when the heat pump can handle the load

80. Type I exhaust outlets that terminate above a roof shall have a discharge outlet not less than ____ inches above the roof surface
   a) 36
81. A CUSTOMER MOVES UP FROM AN 8 SEER TO A 13 SEER AIR CONDITIONER. WHAT WOULD HIS YEARLY SAVING BE IF HE WAS PAYING $650 PER YEAR FOR AIR CONDITIONING
    a) $197
    b) $325
    c) $250
    d) $260

82. A CEILING HAS A TOTAL U-VALUE OF .07. WHAT IS THE NEW R-VALUE IF R-19 IS ADDED?
    a) 33.28
    b) 32.28
    c) 30.28
    d) 31.28

83. The control side of a floor furnace must have a minimum _____ inches clearance
    a) 24
    b) 18
    c) 20
    d) 12

84. Which of the following must have a flame spread rating no greater than 5 feet when installed in plenums.
    a) pneumatic tubing
    b) wiring
    c) all the above
    d) fire sprinkler piping

85. The maximum size unvented gas heater that may be installed in a residential bathroom measuring 1600 cubic feet is_________btuh
    a) 8000
    b) 4000
    c) 3000
    d) 6000

86. The slope of a 24 foot horizontal grease duct must be at least ___ inch.
    a) 1/8
    b) 1/4
    c) 3/4
    d) 1/2
87. If a water level detection device is used in an auxiliary drain pan it must conform to_______.
   a) ASTM 243
   b) UL 508
   c) UL 181
   d) ASI 84

88. The vent cap of an oil tank must have a screen mesh no finer than No._______.
   a) 10
   b) 4
   c) 6
   d) 8

89. WHAT IS THE DESIGN FRICTION RATE WHEN THE AVAILABLE STATIC PRESSURE FOR THE DUCT SYSTEM IS .36" WC AND THE RUN WITH THE LONGEST EFFECTIVE LENGTH IS 375 FEET?
   a) .05" WC
   b) .08" WC
   c) .15" WC
   d) .10" WC

90. Passageways in attics shall not be less than _____ inches wide
   a) 24
   b) 20
   c) 30
   d) 22

91. IN A ROOM THAT IS LARGE IN COMPARISON WITH THE SIZE OF THE EQUIPMENT, AN APPLIANCE THAT REQUIRES 18" CLEARANCE ON ITS SIDES, MAY HAVE ITS CLEARANCE REDUCED TO ______ IF .024" SHEETMETAL WITH A VENTILATED AIR SPACE IS USED TO PROTECT THE COMBUSTIBLE SURFACE.
   a) 6
   b) MAY NOT HAVE CLEARANCE REDUCED
   c) 12
   d) 9

92. A vertical pipe supplying gas is a__________
   a) riser
   b) leader
   c) upright
   d) standpipe

93. Copper piping shall not be used if the gas contains more than __ grains of hydrogen sulfide per 100 standard cubic feet.
   a) .3
b) 3 

c) .5 

d) 6 

94. Brazing alloys used on gas piping shall not contain more than____ percent phosphorus  
   a) .005  
   b) .5  
   c) 5  
   d) .05  

95. Duct insulation installed within ____ inches of a type I hood shall be noncombustible or be listed for the application  
   a) 18  
   b) 6  
   c) 12  
   d) 24  

96. The minimum distance between the cooking surface and a grease filter serving burners with flames is ____ feet  
   a) 1  
   b) 3.5  
   c) .5  
   d) 2  

97. The minimum gage for a 14 inch round galvanized air duct is ___.  
   a) 30  
   b) 28  
   c) 26  
   d) 24  

98. FOR A BUILDING TO BE MAINTAINED AT 70 F, HOW MANY BTUH ARE REQUIRED TO OFFSET 300 CFM OF 20 F OUTDOOR VENTILATION?  
   a) 16,500  
   b) 6,600  
   c) 6,000  
   d) 1,400  

99. The maximum operating pressure of LP gas systems shall not exceed ____ unless the building or area is constructed according to NFPA 58, Chapter 10  
   a) 10  
   b) .5  
   c) 5  
   d) 20  

100. THE AMERICANS WITH DISABILITIES ACT APPLIES TO ALL EMPLOYERS WHO HAVE _______ OR MORE EMPLOYEES
101. Flexible air ducts______.
   a) shall not be limited in length
   b) shall be limited to 14 feet in length
   c) shall be labeled 181-B
   d) May convey air at up to 275 degrees

102. The minimum allowable HSPF rating of an air cooled residential heat pump
     is _________
     a) 7.0
     b) 8.2
     c) 6.8
     d) 7.7

103. A 500 SQUARE FOOT CONFERENCE ROOM REQUIRES _______CFM
     OF OUTDOOR VENTILATION
     a) 500
     b) 250
     c) 750
     d) 150

104. When mechanically ventilating a 1500 square foot conference room in an
     office building, how many CFM of outdoor air are required?
     a) 1500
     b) 1000
     c) 50
     d) 3000

105. Access points for inspecting and servicing fire dampers shall be labeled
     FIRE DAMPER with letter no less than _____ inch/s high
     a) .5
     b) .75
     c) 2
     d) 1

106. Unless protected from vehicle impact, appliances shall be installed a
     minimum______ feet above the floor of a private garage
     a) 6
     b) 5
     c) 8
     d) 9

107. Cleanouts located on horizontal grease ducts shall be placed not more than
108. Unless otherwise approved, ducts shall not be installed within ____ inches of earth.
   a) 4
   b) 3
   c) 5
   d) 6

109. THE DISTANCE FROM A METER TO A NATRUAL GAS WATER HEATER (40,000 BTUH) IS 30 FEET. 20 FEET FURTHER DOWN THE LINE IS A FURNACE (120,000 BTUH). WHAT IS THE MINIMUM PIPE SIZE THAT MUST BE USED BETWEEN THE WATER HEATER AND FURNACE? (PRESSURE LESS THAN 2 LBS, PRESSURE DROP = .05)?
   a) 1/2"
   b) 3/4"
   c) 1"
   d) 3/8"

110. A gas regulator that reduces incoming pressure between .5 and 5 psig to a lower pressure is called a __________.
   a) low pressure regulator
   b) service entrance regulator
   c) high pressure regulator
   d) medium pressure regulator

111. A HEAT PUMP IN A RESIDENCE MUST BE CONTROLLED BY WHICH OF THE FOLLOWING?
   a) A PROGRAMABLE THERMOSTAT
   b) A DEVICE TO PREVENT SUPPLEMENTARY HEAT FROM COMING ON IF HEAT PUMP CAN HANDLE THE LOAD ALONE
   c) A DEVICE THAT ALLOWS SUPPLEMENTARY HEAT OPERATION DURING DEFROST CYCLES EXCEEDING 15 MINUTES
   d) A FOSSIL FUEL KIT

112. When bending metallic gas pipe, the inside radius shall not be less than _____ times the diameter
   a) 6
   b) 10
   c) 5
   d) 25

113. THE LARGEST A BORED HOLE MAY BE IN A 2' x 9.5" joist is
114. When aluminum foil is used as a vapor retarder for duct insulation it must be minimum _____ mils thick
   a) 4
   b) 2
   c) 1
   d) 6

115. A label shall be affixed to the gas appliance with all the following information except _______
   a) BTUH rating
   b) type of fuel used
   c) manufacture date
   d) minimum clearances

116. Exhausted environmental air must be _____ feet from mechanical intakes
   a) 12
   b) 8
   c) 3
   d) 10

117. THE MAXIMUM BTUH RATING OF AN UNVENTED GAS HEATER INSTALLED IN A 15 X 20 ROOM WITH 8 FOOT CEILINGS IS (infiltration rate is greater than .40 ACH)?
   a) 48,000
   b) 40,000
   c) 24,000
   d) 6,000

118. Liquid adhesive used on air filters shall have a flash point no lower than ______ degrees F
   a) 230
   b) 275
   c) 250
   d) 325

119. Unless welded or placed in a ventilated shaft, the maximum operating pressure of gas piping in a residence shall not exceed ________ psig
   a) .5
   b) 10
   c) 2
   d) 5
120. Duct lining shall be interrupted _____ inches downstream of a duct heater
   a) 6
   b) 12
   c) 10
   d) 4

121. TWO NATURALLY VENTILATED APPLIANCES WITH A COMBINED CAPACITY OF 130,000 BTUH ARE CONNECTED TO A COMMON B-VENT, 18' HIGH WITH TWO 90-DEGREE ELBOWS. WHAT SIZE COMMON VENT SHOULD BE USED?
   a) 5"
   b) 7"
   c) 4"
   d) 6"

122. Shield plates on studs must be a minimum _____ - inch thick
   a) .087
   b) .025
   c) .075
   d) .062

123. A floor furnace shall be placed such that a drapery can be no nearer than _______ to the register of the furnace
   a) 18
   b) 12
   c) 6
   d) 8

124. Corridors are generally not permitted to be used as return ducts, however the hallway of a tenant space _______ square feet or less may be used for return air.
   a) 1200
   b) 500
   c) 750
   d) 1000

125. Where holes or notches for gas tubing are less than 1.5 inches from the nearest edge of a wood stud, they must be protected by metal shields not less than _____ inch thick.
   a) 1/8
   b) 1/32
   c) 1/16
   d) 1/4

126. The minimum cross-sectional dimension of a combustion air duct shall be ________ inches
127. The highest point of an attic must be at least ___ inches in order to be used as a source for combustion air
   a) 28
   b) 30
   c) 24
   d) 36

128. A gas line serving a grill may be installed a minimum ______ inches as long as it is approved and not susceptible to physical damage
   a) 8
   b) 12
   c) 6
   d) 16

129. Which rooftop appliance does not require guardrail protection?
   a) one located 3 feet form roof edge
   b) one located 6 feet from roof edge
   c) one located 4 feet from roof edge
   d) one locate 8 feet from roof edge

130. When obtaining combustion air from an attic, a minimum 26 gage galvanized sheet metal sleeve must be used and extended ______ inches above the joists and insulation
   a) 6
   b) 2
   c) 8
   d) 4

131. A HOUSE HAS A HEAT LOSS OF 48,000 BTUH AT 20-DEGREE OUTDOOR TEMPERATURE. WHAT IS THE HEAT LOSS AT 40-DEGREE OUTDOOR TEMPERATURE?
   a) 18,000 BTUH
   b) 124,000 BTUH
   c) 19,200 BTUH
   d) 28,800 BTUH

132. Duct insulation shall have the R value printed every_________ inches
   a) 60
   b) 36
   c) 48
   d) 24
133. A CONTRACTOR PAYS $750 FOR A FURNACE PLUS 7% TAX. WHAT WOULD HIS SALES PRICE BE IF HE WISHED TO MAKE 30% GROSS PROFIT?
   a) $1028
   b) $1146
   c) $1043
   d) $975

134. A 30' X 8' PARTITION (2 X 4 STUDS, GYPSUM ON BOTH SIDES, NO INSULATION) SEPARATES TWO ROOMS HAVING A TEMPERATURE DIFFERENCE OF 20 DEGREES. WHAT IS THE WINTER HEAT LOSS THROUGH THE PARTITION?
   a) 3,535 BTUH
   b) 15,360 BTUH
   c) 1,500 BTUH
   d) 2,609 BTUH

135. Which of the following gas piping materials shall not be used in exterior locations or underground?
   a) steel
   b) plastic
   c) brass
   d) aluminum

136. This question eliminated
   a) ?
   b) ?

137. Gas piping installed underground beneath building may not be incased in ________.
   a) cement
   b) steel pipe
   c) plastic pipe
   d) wrought iron conduit

138. Floor registers must support ______lbs concentrated load on a 2 inch disk applied at its most critical area
   a) 100
   b) 250
   c) 150
   d) 200

139. AN AIR CONDITIONER HAS HIGH SUCTION AND A LOW HEAD PRESSURES. WHAT WOULD BE A LIKELY CAUSE?
   a) DIRTY CONDENSER COIL
   b) DIRTY FILTERS
   c) CLOGGED METERING DEVICE
d) BAD OR WEAK COMPRESSOR VALVES

140. When cutting threads, a 3/4 inch pipe shall have approximately _______ treads cut
   a) 12
   b) 11
   c) 10
   d) 13

141. Type I grease ducts shall have a clearance of _____ inches to combustible construction
   a) 18
   b) 3
   c) 6
   d) 12

142. Grease ducts shall provide an air velocity not less than _______ feet per minute
   a) 400
   b) 750
   c) 250
   d) 500

143. IF PROTECTION FROM VEHICLE IMPACT IS NOT PROVIDED, APPLIANCES INSTALLED IN PRIVATE GARAGES MUST BE INSTALLED _____ FEET ABOVE THE FLOOR.
   a) 7
   b) 6
   c) 8
   d) 5

144. THE MAXIMUM HORIZONTAL LENGTH OF A SINGLE WALL CONNECTOR IS _____% OF THE HEIGHT OF THE CHIMNEY OR VENT.
   a) 50
   b) 100
   c) 75
   d) 150

145. Condensate piping must no be less than _____ inch diameter
   a) 3/4
   b) 1/2
   c) 5/8
   d) 1

146. The unthreaded portion of a gas piping outlet shall not extend less then ______ through a slab floor
   a) 1.5
147. A DOUBLED UP STUD IN A LOAD BEARING WALL MAY HAVE A HOLE BORED UP TO ______% OF IT DEPTH
   a) 25
   b) 40
   c) 60
   d) 15

148. A vent is not _____
   a) site made
   b) a passage way for carrying combustion products
   c) factory made
   d) listed and labeled

149. A HOUSE HAS A HEATING LOAD OF 48,000 BTUH. HOW MANY CFM ARE REQUIRED FOR A ROOM WITH A HEAT LOAD OF 5200 BTUH, USING A FURNACE WITH A 1200 CFM BLOWER?
   a) 468
   b) 112
   c) 130
   d) 1112

150. A home must be provided with a space heating system capable of maintaining a minimum indoor temperature of _____ degree at a point 3 feet above the floor level on a design heating day
   a) 78
   b) 70
   c) 75
   d) 68

151. An appliance that causes a positive vent pressure and produces excessive condensation in the vent is a Catagory ______ appliance
   a) II
   b) IV
   c) I
   d) III

152. Pressure sensitve tapes used on flexible ducts shall be labeled as conforming to ______
   a) UL 181 A
   b) UL 181-FX
   c) UL 181 A-P
   d) UL 181 B
Answers

1. c 404. Tracer
2. b Table 403.3
3. c section 406 (5 x test pressure)
4. a section 601
5. d section 914
6. b section 401
7. c Chapter 2 Definitions
8. d section 709 (6 x10 = 60 sq. in., 60/.75 = 80 sq. in.)
9. d Chapter 2 definitions of "regulator, medium pressure"
10. d section 802 imc
11. d section 701 imc (2006 and earlier, Not in 2009 or 2012 codes)
12. d section 507 (300 X 5 ft = 1500 cfm)
13. a section 505 (exception includes PVC in some cases)
14. a section 304.9 Gas code(This answer is not found in some codes)
15. c 403.2.2 Energy Code (2009 code only, answer not in 2012 Code)
1500 sq. ft. / 100 = 15
15 x 6 = 90 cfm

16. c 404.14 Limitations. IFGC
17. c 411.1 gas code
18. d 409 gas code IFGC
19. a section 303 IMC
20. a 404 gas code
21. d Table 305.4 IMC
22. b definitions-listed
23. b section 507 IMC
24. c Chapter 2 definition "recovered refrigerant" mech code
25. c SECTION 503 LENGTH OF VENT CONNECTOR, GAS CODE
26. c section 506 IMC
27. b 302 MECH CODE
28 a TABLE 503.4 gas code
29. a 1102. mech code
30. b 1,000,000/140,000 = 7.143 gals
   7.143/.80 = 8.928 gals @ 80% efficiency
   8.928 x $1.25 = $11.60
31. c Table 415.1 gas code
32. a section 307 IMC
33. a Manual D rectangular to round tables or use duct calculator.
34. c 411 gas code
35. a section 914 IMC
36. b section R403 energy code

37. d 403 gas code

38. a section 504 IMC (35 feet minus 5 feet for each 90 degree bend)
   Note: some older code allow for a max of 45 feet with a penalty of 10 feet
   for each 90 degree bend

39. a section 918 IMC(80000/1000 = 80, 80 x 2" = 160 square inches)

40. c Chapter 2, definitions gas code

41. a See "confined space" definition, 2006 IFGC. Note: confined space is no
   longer a defined term in the 2009 or later codes

42. a 303 gas code, room must be 12 times larger than the appliance. Note this
   provision is not in all codes

43. b 305 gas code

44. d. section 504 IMC

45. b section 301

46. c section 1305 IMC

47. d .55 - .03- .03 - .15 -.10 = .24' wc

48. b vel - cfm/ area in sq. ft.
   12" x 30" = 360 sq. in.
   360 sq. in / 144 = 2.5 sq. ft.

49. b chapter 2 definitions, gas code

50. b CFM = BTUH / (TR x 1.1)
   bthu = 75,000 x .80 = 60,000

51. c 306 mech code

52. b Table 607
c 404 gas code

d section 504 IMC

Chapter 2 mech code "concealed location" definition

Table 404 IMC

section 403 energy code

c section 504 IMC

Section 507 IMC (charcoal grille is extra heavy duty, see definitions)

section 306 IMC

c section 504 IMC

c section 506 Grease duct enclosure

c section R401 energy code

d section 404 IMC (10,000 x 1.5 = 15,000)

c 304 IMC, 140,000/2000 = 70 square inches, 7 x 10 = 70 square inches (Gas Code)

b section 903 IMC

Table 803.10.6 IMC

b section 307

section 402 IMC (3000 X .04 = 120)

a section 606 IMC

table 406.7.1 gas code

b section 606 IMC

c $75,000/.15 = $500,000

d Table 803.9(1) IMC

b section 507 IMC

a section 909 IMC
77. b 303 mechanical code

78. a use friction chart or ductulator

79. b section 403 energy code

80. d Section 506 IMC

81. c 8/13 = .615

\[ .615 \times 650 = 400 \text{ op cost of new a/c} \]

\[ 650 - 400 = \$250 \text{ savings} \]

82. a Only R values can be added or subtracted, therefore, convert the U value to R value \( \frac{1}{.07} = 14.28 \)

\[ \text{add } R \ 19 + R \ 14.28 = R \ 33.28 \]

83. b section 910 IMC

84. c section 602 IMC

85. d 303.3 exception 3, and 304.5.1 gas code

\[ \frac{6000}{1000} \times 50 = 300 \text{ cubic feet minimum bath size} \]

86. d section 506 IMC \( \frac{24}{12} = 2, \ 2 \times 1/4" = 1/2" \)

87. b section 307 IMC

88. b section 1305 IMC

89. d \( .36 \times 100/375 = .096 \) (rounded to .10) manual d

90. d section 306 IMC

91. a Table 308.6

92. a Definitions, gas code

93. a section 403 IFGC

94. d section 403 IFGC

95. a section 506 IMC
96. d  Table 507 IMC
97. b  Table 603.4
98. a  70F-20F = 50F TD
       \[ \text{BTUH} = \text{CFM} \times 1.1 \times \text{TD} \]
       \[ = 300 \times 1.1 \times 50 \]
99. d  402 gas code
100. b  NASCLA business book or look up ADA
101. a  section 603 IMC (flexible connectors must be limited to 14 feet, not ducts)
102. d  Table C403.2.3 (2) energy code
103. a  Table 403.3 mech code
       table assumes 50 people /1000 sq ft
       Therefore 25 people would occupy 500 sq ft
       25 people \( \times \) 20 cfm/person = 500 cfm
104. a  Table 403.3 IMC (1500/1000 = 1.5, 1.5 \( \times \) 50 people = 75 people, 75 \( \times \)
       20 cfm = 1500 cfm)
105. a  section 607 IMC
106. a  section 304 IMC
107. c  section 506 IMC
108. a  Section 603 IMC
109. b  See "longest length method" in gas code appendix
110. d  section 202 IFGC
111. b  2012 energy code only
112. a  405 gas code
113. a  302 mech code
114. b section 604 IMC
115. c 301 gas code
116. d section 501 IMC
117. a 304.5.1 gas code

\[ 15 \times 20 \times 8 = 24,000 \text{ cubic ft.} \]
\[ 24,000 / 50 = 48 \]

118. d section 605 IMC
119. d section 402 IFGC
120. a section 604 IMC
121. d Use Table 504.3(1), IFGC, Remember to use the 15 ft. height not 20 ft.
122. d section 305 IMC (2009-2012 says .0575)
123. b section 910 IMC
124. d section 601 IMC
125. c 404.5 gas code
126. a section 708 IMC, also 304.6 IFGC
127. b section 701 IMC
128. a 404.9.1 gas code
129. d section 304 IMC, says "within" 6 feet
130. a section 701 IMC
131. d 48,000 btuh/ 50 degree TD = 960 btuh heat loss per degree TD

\[ \text{new TD } 70F-40F = 30 \]
\[ 30 \text{ DTD} \times 960 \text{ btuh/DTD} = 28,800 \text{ btuh} \]
132. b section 604 IMC
133. b \$750 \times .07 = \$52.50
$750.00 + 52.50 = $802.50

100%-30% = 70% or .70

802.50/.70 = $1146.42

134. c still air surface = .68
gypsum = .45
air space = .91
gypsum = .45
still air surface = .68
Total R = 3.17
U = 1/3.17 = .315
wall is 240 square feet (30 x 8)
BTUH = area x U x td
240 x .315 x 20 = 1512 (close enough)still air surface = .68

135. d 403 gas code

136. This question eliminated

137. a 404 gas code

138. d section 603 IMC

139. d see any service manual

140. c Table 403.9.2 gas code

141. a section 506 IMC

142. d section 506 IMC

143. b 305 gas code

144. c 503.10_ gas code

145. a section 307 IMC
146. c  404 gas code
147. c  302 mech code
148. a  see definition "vent", gas code
149. c Room cfm = HF X room heat lose
    HF factor = 1200/48,000
    HF= .025
    Therefore: .025 x 5200 = 130 cfm
150. d  section 309 IMC
151. b  Gas Code definitions "vented appliance categories"
152. a  Section 603 IMC