## 1 Exam Prep

## Air Conditioning "A", "B" and Mechanical Practice Exam 8

When a control mechanism is used on an air conditioning system, the simplest control action is?

A A switch
B Two position or on-off
C Proportioning
D The single-function on-off control
of the single function on our condition
2 Methods of air cooled condenser capacity control currently used include all of the following except?
A Relay
B Damper
C Fan cycling
D Flood-back
D 1 100d blek
3 A normal start-up sequence of an R-22 system is initiated at psig condensing
pressure when the motor starts to open the blades.
prosecute when the character of the character
A 155
B 165
C 175
D 185
4 Damper control is adequate for condensing ambient air temperatures down to
approximatelydegrees Fahrenheit.
A 50
B 45
C 40
D 35
5 Starters that make use of separate circuits in the motor to reduce the starting current are
calledstarters.
A Full winding
B Across-the-line
C Winding
D Part winding
6 Gauges used for air conditioning work should be?
A Designed for commercial use
B Designed for refrigeration service
C Generic

7 Compound gauges used for refrigeration service should be calibrated from 0 psi pressure to no less than psi above the normal working suction and discharge pressures of the system.
A 50 to 75 B 50 to 100 C 75 to 100 D 75 to 110
8 Suction line is being sized for a job. Chilly Pete notes a 90 degree Fahrenheit condensing temperature and a 10 degree Fahrenheit suction temperature. Using R-22, the suction line correction factor is?
A 1.69 B 1.49 C 1.31 D 1.29
9 Refrigerant 12 and 22 are solvents.
A Poor B Fair C Good D Excellent
10 When using refrigerant 12 or 22, the refrigerant piping in the system must be?
A Pre-treated B Lubricated C Made of refrigerant tubing which has been cleaned by the manufacturer D Absolutely clean
11 The amount of friction loss in a water pipe is dependent upon the?
A Pipe size B Pipe length C The condition of the pipe and the velocity of the water D The condition of the pipe, the course taken by the pipe run and the velocity of the water.
12 A compressor fails to start for all of the following reasons except?
A Power failure B Low voltage C Burned out motor D Lack of refrigerant

D Easy to install and work with

13 The recommended action to take when a compressor freezes due to a damaged mechanism is to the compressor?
A Overhaul the compressor B Replace C Repair or replace D Clean and check
14 While troubleshooting a refrigeration system, Chilly Pete observes bubbles in the sight glass and determines the system needs refrigerant Chilly Pete will?
A Repair or replace the valve, then charge the system B Find and repair the leak, then charge the system C Reset the compressor capacity control range D Add refrigerant, then run a test
15 In a refrigeration system, bubbles in the sight glass and a lack of refrigerant indicate the?
A Discharge pressure is too high B Discharge pressure is too low C Suction pressure is too high D Suction pressure is too low
16 A device used to measure gas pressures both above and below atmospheric pressure is called a gauge?
A Pressure B Multi-purpose C Convex D Compound
**EXAM QUESTIONS 17, 18, 19, 20 AND 21 ARE FOR AIR CONDITIONING "A" AND MECHANICAL CANDIDATES ONLY**
17 Polyethylene pipe is joined by means of?
A Threading and stainless steel clamps B Plastic fittings and clamps C Stainless steel fittings and clamps D Plastic fittings and stainless steel clamps
18 At 72 degrees Fahrenheit, a type 2 polyvinyl chloride thermoplastic has a chemical resistance to wet chlorine.
A Limited B Unlimited C Satisfactory D Unsatisfactory

resistance to ammonium c	hloride.	cnemical
A Limited B Unlimited C Satisfactory D Unsatisfactory		
20 Given a pressure of 175 valve has a laying length of	5 pounds per square inch, a 2-inch nominal size cast iron double disc flat flow many inches?	anged gate
A 7 B 7.25 C 7.5 D 8		
21 A piping system is colo	ored yellow or orange to indicate its contents are classified	_materials.
A Extra valuable B Dangerous C Safe D Protective		
22 Thestart.	allows the oil pressure to build up to preset operating pressure on com	pressor
A Time delay switch B Control circuit C Thermostat D Pressure control		
23 Theshort time.	_ prevents nuisance shutdown of the compressor if the oil pressure drop	os for a
A Time delay switch B Control circuit C Thermostat D Pressure control		
<del>`</del>	of an oil failure control unit (used to protect a compressor from impropo of 240 volts ac applied in an ambient temperature of 75 degrees Fahr	
A Sensitivity B Reading C Time delay D Sequencing		

5 The time delay of an oil failure control (used to protect the compressor from improper lubrication) is ased on with the cover in place.
120 volts ac applied in an ambient temperature of 75 degrees Fahrenheit 240 volts ac applied in an ambient temperature of 25 degrees Celsius 2120 or 240 volts ac applied in an ambient temperature of 75 degrees Fahrenheit 2120 or 240 volts ac applied in an ambient temperature of 25 degrees Celsius
6 In refrigeration, controls used to open the control circuit when the refrigerant pressure in ne low side of the system falls below a given pressure are called pressure controls.
A Suction B Discharge C Low D Dual
7 The voltage rating of any capacitor must be the one being replaced?
Equal to or greater than Equal to Compared to Comparable to
8 Relays operating on the electromagnetic principle are called relays.
A Starting B Potential C Solid-state D Self-regulating
9 The most common type of flow control device used on units of 5-ton capacity and above is expansion valve?
A Heat  B Temperature C Adjustable D Thermostatic
O Thermostatic expansion valves operate as a result ofinside the evaporator.
A Pressure and temperature  B Superheat  C Feeler bulbs  O Flow control devices

31 Free moisture in a refrigeration system createscontrol device.	in the orifice of a refrigerant flow
A Water droplets B Frost C Ice D Dampness	
32 Ice in the orifice of a refrigerant flow control device is usua	ally indicated by?
A Poor operation B Poor operation and a lower than normal suction C Poor operation, a lower than normal suction and low dischar D Poor operation, a lower than normal suction, noise and low	
33 The temperature at which the defrost period ends is called to	the defrost point?
A Termination B End C Cut-off D Finish	
34 When the defrost termination point is too low?	
A The system will shut down B The system will not go into the defrost cycle C Proper refrigeration will not occur D The defrost period will be too long and the temperature with	hin the cabinet will go too high
35 A starting switch that is pitted or stuck open will?	
A Allow the motor to start briefly B Allow the motor to start but prevent it from reaching its run C Allow the motor to start but cause it to run too fast D Not allow the motor to start	ning speed
36 If a motor hums and tries to start because the starting switc	th is stuck open?
A The motor will not start B Do not attempt to start the motor C Start the motor turning while it is humming D Adjust the starting switch and start the motor	

37 Main burners include all of the following types except?
A Slotted port B Dual port C Ribbon D Inshot
38 When joining steel to bronze, use to form the joint?
A Silver brazing alloys B Filler metal C Phos-copper brazing alloys D Mixed brazing. alloys
39 Total belt deflection should not be more than how many inches?
A 2 B 1 C 7/8 D 1/2
40 Run capacitors are continuously in the operating circuit and are normally thefilled type
A Water B Oil C Pressure D Manually
41 When using PSC or capacitor-start, capacitor-run motors, the identified terminal should always be connected to the?
A Supply line or "S" terminal B "R" or "S" terminal C Supply line or "R" terminal D "S" terminal
42 High voltage measurements involvevolts or more of electricity.
A 500 B 550 C 600 D 650

- 43 Do not attempt to take high voltage measurements?
- A Without taking extra safety precautions as outlined by OSHA
- B With hand-held instruments
- C With hand-held instruments unless extra safety precautions are taken as outlined by OSHA
- D By yourself

## \*\*QUESTIONS 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56 AND.57 ARE FOR MECHANICAL CANDIDATES ONLY\*\*

44 A bulk nitrous oxide system has a storage capacity of	of nitrous oxide at normal
temperature and pressure.	

- A 3,200 pounds
- B More than 3,200 pounds
- C 29,000 feet
- D More than 29,000 feet
- 45 A hypobaric structure is used to house chambers and all auxiliary service equipment for medical applications and procedures?
- A That are affected by subtle changes in atmospheric pressure
- B At pressures below atmospheric pressures
- C At pressures above normal atmospheric pressures
- D At pressures that deviate from normal atmospheric pressures
- 46 No flammable materials, cylinders containing flammable gases or containers containing flammable liquids shall be stored?
- A Within the main facility of any commercial building
- B Within medical buildings
- C In rooms with gas cylinders
- D In rooms with medical gas cylinders
- 47 Cylinders in use and in storage shall be prevented from reaching temperatures in excess of?
- A 130 degrees Fahrenheit
- B 120 degrees Fahrenheit
- C 55 degrees Celsius
- D 50 degrees Celsius

48 Tubes used in medical gas systems shall be hard-drawn seamless copper ASTM B 819 medical gas tube, Type?
A L B L or K C K or M D M
49 ASTM B 819 medical gas tube must be identified?
A By the manufacturer's markings B By the universal identifiers "OXY", "MED", or "ACR/MED" C By the colors blue or green D By the manufacturer's markings in blue (Type L) or green (Type K)
50 Drops to individual station outlets and inlets in medical-surgical piping systems shall be not less than size.
A DN15 B DN20 C 3/80.D D 7/8 0.D
51 The minimum backfilled cover above the top of the enclosure for buried piping outside of a health care facility shall beinches, where physical damage is otherwise prevented.
A 36 B 30 C 24 D 18
52 When pressure testing a medical gas or vacuum system, the test pressure?
A Shall equal the system working pressure B Shall be not less than 150 PSI gauge C Is the standard measure D Shall be 1.5 times the working pressure but not less than 150 PSI gauge
53 A medical gas or vacuum system is verified by testing conducted by a in the field of medical gas and vacuum pipeline testing.
A Technician trained B Competent party C Party technically competent and experienced D Supervisor or manager trained

have a total minimum free area of?
A 5,184 square inches B 10,368 square inches C 20,736 square inches D 72 inches squared
55 Where multiple pumps discharge through a common pipe in a medical piping system, each pump shall be?
A Fitted with a check valve B Fitted with a manual isolation valve C Arranged to permit capping the individual pump exhausts when a pump is removed for service D Fitted with a check valve, a manual isolation valve, or arranged to permit capping the individual pump exhausts when a pump is removed for service
56 Flared and compression joint connections are prohibited throughout medical gas pipeline systems.
A Category 1 only B Category 2 only C Category 3 D Category 2 or 3 only
57 Unions are prohibited throughout medical gas pipeline systems.
A Category 1 only B Category 2 only C Category 3 D Category 2 or 3 only
58 Deep fat fryers in commercial establishments must have a separate high-limit control to shut off fuel or energy when the fat temperature reachesbelow the surface.
A 475 degrees Fahrenheit at 1 inch B 475 degrees Fahrenheit at 2 inches C 245 degrees Celsius at 1 inch D 245 degrees Celsius at 2 inches
59 A central warm air heating system that is equipped with a fan or blower providing the primary means for circulation of air is called a system.
A Standard B Forced air C Gravity D Blowing air

60 Central warm air heating systems where air is circulated by gravity is a	system.
A Standard B Forced air C Gravity D Self-perpetuating air	
61 An unlisted automatically fired system with a temperature limit control that cannot be 250 degrees Fahrenheit burns gas fuel and is installed in a room that is large in comparison the appliance. For safety reasons, this system must have a minimum clearance of	on with the size of
A 18 B 20 C 22 D 24	
62 Service openings in air ducts must be identified with letters having a minimum height inches?	of how many
A 1/2 B 3/4 C 7/8 D 1	
63 Service openings in air ducts must be identified with letters to?	
A Identify them as service openings B Indicate the location of the fire protection device(s C Indicate compliance with safety standards outlined in the ASHRAE Handbook D Indicate compliance with safety standards outlined in ASTM C 411	) within
**QUESTIONS 64, 65, 66, 67 AND 68 ARE FOR MECHANICAL CANDIDAT	ES ONLY**
64 Buildings utilizing gas equipment requiring air supplied by mechanical means, for conshall be supplied?	nbustion, the air
A When a draft hood is not present B From the outdoors C For ventilation, including all air required for comfort and proper working conditions fo D To all storage closets, bathrooms and toilet rooms	r personnel
65 The temperature for undiluted LP-Gas systems shall not exceed?	
A - 5 F B + 5 F C - 5 C D + 5 C	

66 Plastic pipe shall not be used within or under any building or slab or be operated at pressures greater than psig for natural gas.
A 30 B 70 C 100 D 110
67 Plastic pipe shall not be used within or under any building or slab or be operated at pressures greater than psig for LP-gas.
A 30 B 70 C 100 D 110
68 Some gas piping is to be opened for servicing. If the nominal pipe size is six inches, the minimum length of piping that must be purged is feet.
A 50 B 30 C 15 D 10
69 Air duct designed for a duct pressure class of 1/2 inch (w.g.) has an operating pressure up to inch (w.g.).
A Up to 1/2 B 1/2 up to 1 C 1 up to 2 D 2 up to 3
70 For a metal duct Joint T-1, flat drive slip, use gauge not less than two gauges less than duct gauge, with gauge minimum.
A 16 B 20 C 22 D 24
71 For a Type L-1, metal duct seam, the pocket depth varies from 1/4 inch to 5/8 inch, depending on the gauge of metal and the roll form equipment.
A Grooved B Pittsburgh C Standing

D Slide lock

A 1/4 inch and 5/8 inch B 1/4 inch and 3/8 inch C 5/16 inch and 5/8 inch D 5/16 inch and 3/8 inch
73 When using a button punch snaplock for metal duct work, the seam may be used forinch w.g. static or less.
A 2 B 3 C 4 D 6
74 Type L-4 metal duct standing seams used on duct-interiors should be fastened together at the ends and atinch intervals.
A 5 B 6 C 7 D 8
75 The T-1 flat drive is suitable for use as reinforcement for 24 gauge metal when the duct wall static pressure is 1/2 inch water gage to a maximum width of?
A 20 B 18 C 12 D 8
76 Each layer of flexible duct liner used in a rectangular duct must be attached percent coverage of adhesive at the liner contact surface area.
A 87 B 90 C 92 D 95
77 When installing rectangular ducts using flexible liner, metal nosings shall be used on the upstream edges of the liners at every transverse joint, if velocities exceed (fpm).
A 3,700 B 3,800 C 3,900 D 4,000

72 For a Type L-1, metal duct Pittsburgh seam, the most common pocket sizes are?

78 When installing rectangular ducts using flexible liner, ducts with interior widths of require mechanical fasteners in addition to adhesive.
A Eight inches or more B Eight inches or less C More than eight inches D At least eight inches
79 Flexible liners for rectangular ducts must be installed with mechanical fastening devices that are as corrosion resistant as?
A Possible, without being cost prohibitive B Galvanized metal C G60 coated galvanized steel D Stainless steel
80 The boiling temperature of water is?
A 212 degrees Fahrenheit B Constant C Not constant D Under an atmospheric pressure of - 14.7 psia
81 Studies indicate that women of all age groups prefer an effective temperature approximately than men.
A 1 degree lower B 1 degree higher C 2 degrees lower D 2 degrees higher
82 ABC Heating and Air is about to install a new air conditioning system in a commercial building. Rob, the ABC mechanical contractor, is evaluating the heat flow through the building. Rob knows that a layer of air clings to the face of any object. This, he knows, will cause a from the outdoor air to the inner face of the wall.
A Heat transfer B Drop in temperature C Increase in temperature D Difference in temperature
83 In pressure lubricated (refrigeration) compressors, the oil pump pressure is exerted on one bellows while the suction pressure is exerted on the other.
A Release B Discharge C Thermal D Head

pressure and the suction pressure is called the?
A Measured oil pressure B Oil pressure coefficient C Oil pressure differential D Usable oil pressure
85 When the scale trap at the suction of a (refrigeration) compressor becomes clogged, the suction pressure?
A Is unaffected B May fall to a point where the duplex switch will stop the compressor C May fall slightly D May fall to a point that the system can no longer function efficiently
86 In air conditioning systems, the percentage of warm water entrained by air and carried away from the cooling device is called the?
A Drift B Drip C Dew point D Discharge
87 Condensate from air conditioning units must discharge to an approved location.
A 3 ton B 4 ton C 5 ton D All
88 Auxiliary drain pans on equipment and appliances containing evaporators or cooling coils should be not less than inches larger than the unit or coil dimensions in width and length.
A 2 B 3 C 4 D 5
89 When using inside fuel-oil tanks, the shutoff may be installed at the?
A Entrance B Tank C Unit D Back door

90 A steam type heating system has a fluid design operating temperature of 275 degrees Fahrenheit and a nominal pipe diameter of one and one half inches. The minimum pipe insulation should be how many inches?
A 1.5 B 2.0 C 2.5 D 3.0
91 The manual actuation device on a commercial food heat-processing appliance must be located a minimum of feet above the floor.
A 3 1/2 B 4 C 4 1/2 D 5
92 The manual actuation device of a commercial food heat-processing appliance must not be located more than a maximum of feet above the floor.
A 3 1/2 B 4 C 4 1/2 D 5
93 Liquid adhesive coatings'used on air filters for central heating - and air-conditioning systems shall have a flashpoint not lower than degrees Fahrenheit.
A 325 B 326 C 327 D 328
94 Smoke detectors installed in supply air systems must have a design capacity greater than cfm in the supply air duct.
A 2,000 B 2,500 C 3,000 D 3,500

95 Pressure-relief devices, fusible plugs and purge systems located within a machinery room must terminate outside the structure at a location not less than feet above the adjoining grade						
evel.						
A 15						
3 16						
C 17						
D 18						
96 When using a(n) tank, valves cannot be installed on return piping.						
A Fuel oil						
B Above-ground						
C Below-ground						
O Inside						

## Answer Key – Exam 8

1	D	Trans Designating Definemention	49
1	В	Trane Reciprocating Refrigeration	
2	A	Trane Reciprocating Refrigeration	55 56
3	В	Trane Reciprocating Refrigeration	56
4	C	Trane Reciprocating Refrigeration	56
5	D	Trane Reciprocating Refrigeration	61
6	В	Trane Reciprocating Refrigeration	71 
7	В	Trane Reciprocating Refrigeration	71
8	C	Trane Reciprocating Refrigeration	92
9	D	Trane Reciprocating Refrigeration	1061
10	D	Trane Reciprocating Refrigeration	106
11	D	Trane Reciprocating Refrigeration	108
12	D	Trane Reciprocating Refrigeration	128
13	Α	Trane Reciprocating Refrigeration	128
14	В	Trane Reciprocating Refrigeration	130
15	D	Trane Reciprocating Refrigeration	130
16	D	Trane Reciprocating Refrigeration	167
17	D	Pipefitter's Handbook	3-28
18	A	Pipefitter's Handbook	3-41
19	C	Pipefitter's Handbook	3-42
20	В	Pipefitter's Handbook	4-100
21	В	Pipefitter's Handbook	5-22
22	A	Air Conditioning and Refrigeration Troubleshooting Handbook	22
23	A	Air Conditioning and Refrigeration Troubleshooting Handbook	22
24	C	Air Conditioning and Refrigeration Troubleshooting Handbook	22
25	C	Air Conditioning and Refrigeration Troubleshooting Handbook	22
26	C	Air Conditioning and Refrigeration Troubleshooting Handbook	28
27	Ä	Air Conditioning and Refrigeration Troubleshooting Handbook	34
28	В	Air Conditioning and Refrigeration Troubleshooting Handbook	36
29	D	Air Conditioning and Refrigeration Troubleshooting Handbook	49
30	A	Air Conditioning and Refrigeration Troubleshooting Handbook	49
31	C	Air Conditioning and Refrigeration Troubleshooting Handbook	57
32	C	Air Conditioning and Refrigeration Troubleshooting Handbook	57
33	A	Air Conditioning and Refrigeration Troubleshooting Handbook	73
34	C	Air Conditioning and Refrigeration Troubleshooting Handbook  Air Conditioning and Refrigeration Troubleshooting Handbook	73
35	D	Air Conditioning and Refrigeration Troubleshooting Handbook  Air Conditioning and Refrigeration Troubleshooting Handbook	86
36	C	Air Conditioning and Refrigeration Troubleshooting Handbook  Air Conditioning and Refrigeration Troubleshooting Handbook	86
30 37	В	Air Conditioning and Refrigeration Troubleshooting Handbook  Air Conditioning and Refrigeration Troubleshooting Handbook	111
38		Air Conditioning and Refrigeration Troubleshooting Handbook  Air Conditioning and Refrigeration Troubleshooting Handbook	311
39	A B		
		Air Conditioning and Refrigeration Troubleshooting Handbook	344
40	В	Air Conditioning and Refrigeration Troubleshooting Handbook	360
41	C	Air Conditioning and Refrigeration Troubleshooting Handbook	360
42	C	Air Conditioning and Refrigeration Troubleshooting Handbook	435
43	В	Air Conditioning and Refrigeration Troubleshooting Handbook	435
44	В	NFPA 99 - Health Care Facilities	18
45	В	NFPA 99 - Health Care Facilities	20
46	D	FPA 99 - Health Care Facilities	26
47	A	NFPA 99 - Health Care Facilities	26
48	В	NFPA 99 - Health Care Facilities	44

4.0	_		
49	D	NFPA 99 - Health Care Facilities	44
50	Α	NFPA 99 - Health Care Facilities	47
51	D	NFPA 99 - Health Care Facilities	47
52	В	NFPA 99 - Health Care Facilities	51
53	C	NFPA 99 - Health Care Facilities	51
54	A	NFPA 99 - Health. Care Facilities	93
55	D	NFPA 99 - Health Care Facilities	35
56	C	NFPA 99 - Health Care Facilities	58
57	C	NFPA 99 - Health Care Facilities	58
58	A	NFPA 96	21
59	В	NFPA 90B	5
60	C	NFPA 90B	5
61	Ā	NFPA 90B	10
62	A	NFPA 90A	9
63	В	NFPA 90A	9
64	В	Florida Building Code, Fuel Gas, 2010	304.9
65	A	Florida Building Code, Fuel Gas, 2010	402.6.1
66	C	Florida Building Code, Fuel Gas, 2010	404.15.1
67	A	Florida Building Code, Fuel Gas, 2010	404.1.5.1
68	C	Florida Building Code, Fuel Gas, 2010 Table	406.7.1
69	A	SMACNA Duct Construction Standards, Metal/Flexible	1.18
70	D		2.6
		SMACNA Duct Construction Standards, Metal/Flexible	
71 72	В	SMACNA Duct Construction Standards, Metal/Flexible	2.10
	D	SMACNA Duct Construction Standards, Metal/Flexible	2.10
73	C	SMACNA Duct Construction Standards, Metal/Flexible	2.10
74	D	SMACNA Duct Construction Standards, Metal/Flexible	2.10
75	A	SMACNA Duct Construction Standards, Metal/Flexible	2.110
76	В	SMACNA Duct Construction Standards, Metal/Flexible	7.14
77	D	SMACNA Duct Construction Standards, Metal/Flexible	7.14
78 <b>7</b> 8	C	SMACNA Duct Construction Standards, Metal/Flexible	7.14
79	C	SMACNA Duct Construction Standards, Metal/Flexible	7.14
80	C	Trane Air Conditioning Manual	6
81	В	Trane Air Conditioning Manual	15
82	В	Trane Air Conditioning Manual	37
83	В	Trane Air Conditioning Manual	179
84	D	Trane Air Conditioning Manual	179
85	В	Trane Air Conditioning Manual	184
86	A	Trane Air Conditioning Manual	248
87	D	Florida Building Code, Mechanical, 2010	307.2.1
88	В	Florida Building Code, Mechanical, 2010	307.2.3
89	В	Florida Building Code, Mechanical, 2010	1307.1
90	D	Florida Building Code, Energy Conservation, 2010	Table 503.2.8
91	A	NFPA 96	20
92	В	NFPA 96	20
93	A	Florida Building Code, Mechanical, 2010	605.1
94	A	Florida Building Code, Mechanical, 2010	606.2.1
95	A	Florida Building Code, Mechanical, 2010	1105.7
96	A	Florida Building Code, Mechanical, 2010	1305.4