



Multiple Choice.

- 1) The main purpose of the accumulator is to
 - a) Prevent liquid slugs at the compressor
 - b) Provide space for vapor to accumulate
 - c) Provide space for the accumulation of oil and contaminants
 - d) Store liquid refrigerant

- 2) Heat that changes the physical state of a substance without effecting a change in its temperature is known as
 - a) Sensible heat
 - b) Specific heat
 - c) Latent heat
 - d) Lost heat

- 3) The location of the thermal bulb for the TXV on the evaporator affects
 - a) Both the pressure and temperature in the feeler bulb
 - b) The amount of superheat required to operate the TXV
 - c) The amount of liquid in the evaporator
 - d) The amount of gas in the evaporator

- 4) If the spring is adjusted to increase the superheat, this new setting will
 - a) Shorten the frost line
 - b) Lengthen the frost line
 - c) Have no effect on the frost line
 - d) Allow more liquid into the evaporator

- 5) The amount of heat required to raise the temperature of 1 lb of water 1°F is?
 - a) The rate of conduction
 - b) 1 BTU
 - c) 1 Therm
 - d) 1 Kelvin

- 6) The low pressure oil safety switch
 - a) Must be reset manually
 - b) Resets itself automatically
 - c) Resets itself after the time delay has terminated
 - d) Never trips



- 7) Suction line oil traps should be installed when the condenser is?
 - a) In the basement and the evaporator is on the third floor
 - b) Located outside and operates in temperatures below 35°F.
 - c) On the third floor roof and the evaporator is in the basement.
 - d) More than 100' away from the evaporator

- 8) The proper location for an oil separator is between the
 - a) evaporator and compressor
 - b) compressor and condenser
 - c) condenser and receiver
 - d) receiver and metering device

- 9) On a TXV, the purpose of an external equalizer is to?
 - a) Increase the pressure on top of the power head diaphragm
 - b) Balance the evaporator load
 - c) Compensate for a pressure drop across the evaporator coil
 - d) Allow a greater adjustment span

- 10) The approximate boiling point of R-12 at atmospheric pressure at sea level is?
 - a) 21°F
 - b) -21°F
 - c) -41°F
 - d) -78°F

- 11) The freezing point of water is?
 - a) 0°F
 - b) -10°C
 - c) 32°C
 - d) 32°F

- 12) Crankcase heaters are energized?
 - a) While the compressor is running
 - b) When the compressor is off
 - c) To prevent compressor freeze-up
 - d) To allow easy compressor start-up



- 13) An accumulator can be located between the
 - a) Compressor and condenser
 - b) First stage and second stage compressors
 - c) Evaporator and compressor
 - d) Condenser and evaporator

- 14) On a central air conditioning system, a frosted suction line at the compressor inlet indicates
 - a) Improper insulation at the suction line
 - b) Low back pressure
 - c) High humidity
 - d) Low load in the space

- 15) The normal temperature of the liquid in an air conditioning evaporator is?
 - a) -10 to 0°F
 - b) 0 to 30°F
 - c) 35 to 40°F
 - d) 45 to 50°F

- 16) In an A/C unit, dirty air filters will cause
 - a) Low suction pressure
 - b) High suction pressure
 - c) High discharge pressure
 - d) Low oil pressure

- 17) The reversing valve is commonly used
 - a) When the code requires a check valve
 - b) On commercial systems that involve two different temperatures
 - c) On all heat pumps
 - d) On multiple compressor systems

- 18) If the suction pressure is low and the evaporator temperature high, the cause will be a?
 - a) Compressor suction valve stuck open
 - b) Starved evaporator
 - c) Too small evaporator
 - d) Overcharge



- 19) A gage commonly used to measure the pressure in a system while it is being dehydrated is the
- Compound gage
 - High-pressure gage
 - Micron millimeter gage
 - Scale
- 20) When an A/C system is excessively low on refrigerant
- It can become contaminated with water
 - There can be nuisance trip outs
 - The suction line may be too hot to touch
 - All of the above
- 21) On an A/C system, the likely cause for a frosted evaporator is
- Low on refrigerant
 - Dirty air filter
 - Both a & b
 - Neither a & b
- 22) While the system is operating, the discharge line should be
- Too hot to hold by hand
 - At the same temperature as the crankcase
 - 10 to 15°F warmer than ambient
 - room temperature
- 23) The most common method used to determine superheat is accomplished by
- Using the suction gage and a pressure temperature chart and taking a thermometer reading under the suction line insulation near the gage port
 - Using one thermometer at the evaporator inlet and another at the evaporator outlet
 - Measuring the air temperature split across the coil
 - A clear sight glass will eliminate the need to take superheat readings
- 24) The biggest problem caused by moisture in the refrigeration system is
- Freeze-up at the expansion valve
 - Rusted parts inside the compressor
 - Burned out compressor motors
 - Slightly less heat transfer



- 25) When used as a drier in the liquid line, silica gel
- a) Dehydrates water
 - b) Releases water
 - c) Absorbs water
 - d) Collects air
- 26) When is a condensate trap not required
- a) When the condensate drain is on the suction side of the blower
 - b) When the condensate drain is on the discharge side of the blower
 - c) When an auxiliary drain pan is used
 - d) Traps are always required
- 27) An instrument used to indicate humidity conditions is a
- a) Thermometer
 - b) Hydrometer
 - c) Hygrometer
 - d) Pyrometer
- 28) Excessive head pressure is often caused by
- a) Insufficient refrigerant
 - b) Leaking reed valve on the discharge side
 - c) Air cooled condenser is plugged
 - d) Thermostat set too high
- 29) What is the suction gas temperature of R-22 if the pressure is measured as 68 psig?
- a) 68°F
 - b) 40°F
 - c) 117°F
 - d) 125°F
- 30) With a 5/8" x 5/8" x 3/4" tee, what size is the center connection?
- a) 3/8"
 - b) 1/2"
 - c) 5/8"
 - d) 3/4"



- 31) Why is the suction line insulated?
- a) To prevent excessive heat gain
 - b) To prevent water damage from condensate on line
 - c) Both a & b
 - d) Neither a & b
- 32) When brazing a line set, nitrogen is run through the piping to
- a) Prevent combustibles in the line from exploding
 - b) Reduce oxidation on the brazed parts
 - c) Keep the pipe cool
 - d) None of the above
- 33) What component in the following list is not necessary for a refrigeration cycle
- a) Evaporator
 - b) Metering device
 - c) Compressor
 - d) Condenser
- 34) When charging on the low side, what statement is true
- a) The refrigerant is added as a liquid
 - b) The refrigerant is added as a vapor
 - c) The compressor has to be turned off
 - d) A torch should be used to heat the refrigerant tank
- 35) To help speed evacuating an A/C unit
- a) The compressor should be turned off
 - b) The recovery tank should be submersed in very cold water
 - c) The recovery tank should be pre-charged with refrigerant
 - d) There is nothing that can be done to speed evacuation
- 36) What type of tubing should be used to install refrigeration lines
- a) PVC
 - b) Copper
 - c) Galvanized steel
 - d) Cast iron
- 37) When using a capillary tube
- a) Pressures equalize on the off cycle
 - b) Low side pressure will always be lower than the high side
 - c) A crankcase heater will not be necessary



- 38) What component in a thermostat will cut off the heating unit before it reaches setpoint?
- a) Bi-metal strip
 - b) Fan switch
 - c) Mercury bulb
 - d) Heat anticipator
- 39) How are safety controls wired in HVAC systems?
- a) Parallel wired
 - b) Series wired
 - c) Parallel series wired
- 40) On an R-22 system, when the suction line pressure is 66 psig and its temperature is 50°F, what is the superheat?
- a) 50°F
 - b) Ambient temperature – 50°F
 - c) 17°F
 - d) 12°F
- 41) What terminals on a conventional thermostat can be jumped to prove the circuit to the blower?
- a) R and G
 - b) R and Y
 - c) R and W
 - d) R and C
- 42) What should you measure to determine if a compressor is burnt?
- a) Resistance from winding to winding
 - b) Resistance from winding to ground
 - c) Both a & b
 - d) Neither a or b
- 43) What does the condenser do?
- a) Collects heat from the conditioned space
 - b) Allows refrigerant to boil off
 - c) Gives up the heat from the refrigerant
 - d) Transfers heat to the refrigerant



- 44) A hard start kit consists of a
- a) Multivoltage transformer and wire for the line starter
 - b) Group of capacitors used in parallel
 - c) Potential relay and a start capacitor
- 45) The primary function of the expansion valve is to
- a) Regulate the flow of refrigerant according to the heat load
 - b) Regulate the evaporator temperature according to the heat load
 - c) Expand the refrigerant
 - d) Evaporate the refrigerant
- 46) A service valve is said to be front seated when
- a) The auxiliary port for the pressure gauge is closed
 - b) No refrigerant can enter or exit the compressor
 - c) The main refrigerant flow port is open
- 47) When a compressor start and stops too frequently, it is called
- a) Short cycling
 - b) Erratic action
 - c) A long skirted piston
- 48) What device proves the pilot flame in a typical furnace
- a) Gas valve
 - b) Thermocouple
 - c) High limit switch
 - d) Klixon
- 49) A sight glass will
- a) Indicate moisture
 - b) Show flash gas
 - c) Both a & b
 - d) Neither a or b
- 50) Sensible heat is
- a) The heat required to make a change of state of a fluid
 - b) The heat required to raise the temperature of a fluid
 - c) The heat required to evaporate a fluid



Pressure-Temperature Chart

PSIG	Refrigerant Temperature, °F					
	R-12	R-22	R-134a	R-408A	R-410A	R-502
0	-22	-41	-15	-46	-60	-50
2	-16	-37	-10	-42	-58	-45
4	-11	-32	-5	-38	-54	-40
6	-7	-28	-1	-34	-50	-36
8	-2	-24	3	-30	-46	-32
10	2	-20	7	-26	-42	-29
12	5	-17	10	-22	-39	-25
14	9	-14	13	-20	-36	-22
16	12	-11	16	-16	-33	-19
18	15	-8	19	-14	-30	-16
20	18	-5	22	-10	-28	-13
22	21	-3	25	-8	-26	-11
24	24	0	27	-6	-23	-8
26	27	2	30	-2	-20	-6
28	29	5	32	0	-18	-3
30	32	7	35	2	-16	-1
32	34	9	37	4	-14	1
34	37	11	39	6	-12	3
36	39	13	41	8	-10	5
38	41	15	43	10	-8	7
40	43	17	45	12	-6	9
42	45	19	47	14	-4	11
44	47	21	49	16	-3	13
46	49	23	51	18	-2	15
48	51	24	52	19	0	16
50	53	26	54	20	1	18
52	55	28	56	22	3	20
54	57	29	57	24	4	21
56	58	31	59	26	6	23
58	60	32	60	27	7	24
60	62	34	62	28	8	26
62	64	35	64	30	10	27
64	65	37	65	31	11	29
66	67	38	66	32	13	30
68	68	40	68	34	14	32
70	70	41	69	35	15	33
72	71	42	71	36	16	34
74	73	44	72	38	17	36
76	74	45	73	39	19	37
78	76	46	75	40	20	38



PSIG	R-12	R-22	R-134a	R-408A	R-410A	R-502
80	77	48	76	42	21	40
85	81	51	79	44	24	43
90	84	54	82	48	26	46
95	85	56	85	50	29	49
100	90	59	88	53	32	51
105	93	62	90	55	34	54
110	96	64	93	58	36	57
115	99	67	96	60	39	59
120	102	69	98	63	41	62
125	104	72	100	65	43	64
130	107	74	103	67	45	67
135	109	76	105	70	47	69
140	112	78	107	72	49	71
145	114	81	109	74	51	73
150	117	83	112	75	53	75
155	119	85	114	77	55	77
160	121	87	116	80	57	80
165	123	89	118	83	59	82
170	126	91	120	85	60	83
175	128	92	122	87	62	85
180	130	94	123	90	64	87
185	132	96	125	92	66	89
190	134	98	127	93	67	91
195	136	99	128	94	69	93
200	138	101	131	95	70	95
205	140	103	132	96	72	96
210	142	105	134	97	73	98
215	143	106	136	98	75	100
220	145	108	137	100	76	101
225	147	110	139	103	78	103
235	150	113	142	105	80	106
245	154	116	145	107	83	109
255	157	119	148	110	85	112
265	160	121	151	112	88	115
275	163	124	153	116	90	118
285	166	127	155	120	92	121
295	169	130	158	123	95	124
305	172	133	161	125	97	127
315	175	134	164	127	99	129
325	178	137	167	129	101	131
335	181	139	169	132	104	134
345	184	141	171	133	106	136
355	187	144	173	134	108	138
365	190	146	175	135	110	141
375	191	148	177	140	112	143
405	197	155	182	146	118	149
500	218	173	202	N/A	134	167
550	N/A	N/A	N/A	N/A	142	N/A
600	N/A	N/A	N/A	N/A	149	N/A
700	N/A	N/A	N/A	N/A	159	N/A



Answer Key

- | | |
|-------|-------|
| 1. A | 38. D |
| 2. C | 39. B |
| 3. C | 40. D |
| 4. A | 41. A |
| 5. B | 42. C |
| 6. A | 43. C |
| 7. C | 44. C |
| 8. B | 45. A |
| 9. C | 46. B |
| 10. B | 47. A |
| 11. D | 48. B |
| 12. B | 49. C |
| 13. C | 50. B |
| 14. B | |
| 15. C | |
| 16. A | |
| 17. C | |
| 18. B | |
| 19. C | |
| 20. D | |
| 21. C | |
| 22. A | |
| 23. A | |
| 24. C | |
| 25. A | |
| 26. B | |
| 27. C | |
| 28. C | |
| 29. B | |
| 30. D | |
| 31. C | |
| 32. B | |
| 33. C | |
| 34. B | |
| 35. B | |
| 36. B | |
| 37. A | |