1. What is the heat source in a Down Drain System?
2. Oil
3. Propane
4. Electricity
5. Solar
6. Is the Down Drain System and open or closed loop system?

Open

1. What heat transfer media does a Down Drain System use?
2. Freon
3. Glycol
4. Water
5. Esophageal Phlegm
6. What is the biggest problem with a Down Drain System?
7. Over heating
8. Heat exchanger failure
9. Freezing of component parts
10. Antifreeze depletion
11. True or False: A Down Drain System drains by gravity.
12. True or False: A Down Drain System uses both a storage tank and a heat exchanger.
13. True or False: A Down Drain System uses both gate valves and ball valves.
14. True or False: A Down Drain System requires a pump.
15. The Balance Point is defined as…
16. The point at which the building in use would be able to support thermal comfort without the need for heating or cooling
17. The point at which interior noise and exterior noise are in equilibrium.
18. The point at which heating loads and cooling loads are such that they negate one another.
19. The point at which flame and smoke are present in equal amounts.
20. HVAC system components can be grouped into which 3 of the following categories…
21. Source
22. Diffusion
23. Delivery
24. Distribution
25. Collection
26. Return
27. True or False: Cooling can be described as reverse heat flow.
28. The term “coolth” is…
29. Used in reference to a heat sink.
30. A cooling mass used to chill interior space.
31. A naturally occurring “cool” spot within the earth that cab be tapped for distribution.
32. True or False: Absorption is a chemical process.
33. True or False: Vapor compression is a mechanical process.
34. What are the 3 major refrigeration approaches employed in buildings:
35. Cross ventilation
36. Evaporative cooling
37. Absorption
38. Vapor compression
39. Vapor Expansion
40. Naturally occurring heat sinks include which of the following:
41. Outside air
42. Outside soil
43. On-site bodies of water
44. The night sky
45. Munster cheese
46. True or False: Fire places are passive heating systems.
47. RE: Fireplaces- The method of heat distribution is… (Choose 2)
48. Conduction
49. Radiation
50. Enthalpy
51. Convection
52. Projectile vomiting
53. A Furnace is designed to hear…
54. Air
55. Water
56. Gas
57. Oil
58. Which heat sources are used with a furnace?
59. Solar
60. Heat pumps
61. Human farts
62. Electrical resistance
63. On-site combustion (oil, natural gas, coal, propane)
64. The basic components of a furnace are:
65. Burner / coil
66. Filter
67. Flue fan
68. Plenum
69. All of the above
70. A boiler heats what media for distribution…
71. Water
72. Oil
73. Propane
74. Air
75. Steam
76. A boiler uses what 2 basic heat sources to function?
77. On-site combustion
78. Electric resistance
79. Wood
80. Snot
81. Solar
82. True or False: An on-site solar energy collection system can serve in lieu of a boiler.
83. True or False: Heat pumps may serve as a substitute for a boiler.
84. Electric baseboard heat works on the principal of…
85. Conduction
86. Convection
87. Radiation
88. Evaporation
89. A&B
90. B&C
91. All of the above.
92. A heat pump : (choose 2)
93. Is a reversible cycle vapor compression unit.
94. Is a reversible cycle absorption unit.
95. Requires some kind of on-site combustion to take place for it to work.
96. Uses electricity as its power source.
97. The diagram below illustrates a…
98. An air to air chiller cycle
99. The vapor compression refrigeration cycle
100. The absorption refrigeration cycle
101. Component A is…
102. The evaporator
103. The pump
104. The compressor
105. Component B is…
106. The compressor
107. The condenser
108. The expansion valve
109. Component C is…
110. The pump
111. The expansion valve
112. The check valve
113. Component D is a…
114. Vapor lock
115. Condenser
116. Evaporator
117. At stage 1, the media in question is…
118. Gaseous
119. Cold refrigerant
120. Hot refrigerant
121. None of the above
122. At stage 2, the media in question is…
123. Absorbing heat
124. Giving off heat
125. Creating a vacuum
126. At stage 3, the media in question is…
127. Still gaseous
128. Still liquid
129. still crazy after all these years
130. At stage 4, the media in question …
131. Undergoes a dramatic pressure drop
132. Is subject to an intense pressure increase
133. Exposed to high heat
134. At stage 5, the media in question …
135. Radiates heat
136. Absorbs heat
137. Is in the form of hot liquid
138. To switch from refrigeration to vapor compression heat pump, what has to happen?
139. The compressor shifts to a vacuum.
140. Water must be purged from the system and replaced with refrigerant.
141. The system cannot be switched.
142. The expansion valve changes flow directions so the inside coil becomes the condenser and the outside coil the evaporator.
143. A condenser …
144. Rejects heat
145. Absorbs heat
146. In the absorption-refrigeration cycle, what is the “driving force” of the process?
147. A heat pump
148. Liquid nitrogen
149. A desiccant salt
150. Freon
151. The absorption-refrigeration cycle is…
152. A chemical process
153. A mechanical process
154. A physical process
155. An electrical process
156. Evaporative cooling is the process in which what 2 things happen simultaneously?
157. Air is sensibly cooled
158. Refrigerant is chilled further by exposing it to air
159. Air is humidified
160. Water is cooled to the point of evaporation.
161. A window air conditioner is an example of…
162. A chiller
163. A heat pump
164. An absorption-refrigeration unit
165. A DX unit
166. A chiller …
167. Is a refrigeration unit designed to produce cold water for space cooling
168. Can be operated on the vapor compression principal
169. Can be operated on the absorption principal
170. Is an act of sexual depravity outlawed in most states
171. None of the above
172. A & C
173. B & C
174. A,B & C
175. A & C
176. Once the media leaves the chiller, it is circulated to… (choose 3)
177. Cooling coils located in AHU(s)
178. Fan Coils
179. Cast Iron radiators
180. Induction units
181. Duct work leading to spaces requiring cooling
182. The purpose of a cooling tower is…
183. To extract heat from the water that is used to cool the condenser coils of the chilled water plant.
184. The mechanism by which heat removed from the building by the air conditioning system is dissipated to the atmosphere.
185. Humidify the air.
186. A & C
187. A & B
188. All of the above
189. Chilled water based cooling systems are typically used in…
190. Single story residential buildings
191. Larger buildings
192. Tee Pee(s)
193. An air-cooled condenser is…
194. A sensible heat exchange device where the magnitude of heat flow is a function of the temperature differential between the heat carrying media and the outside air temp.
195. A latent heat exchange device where the magnitude of heat flow is a function of the temperature differential between the heat carrying media and the outside air temp.
196. A hybrid DX unit that uses glycol as the heat carrying medium, and is directly cooled by outside air.
197. The Coefficient of Performance is defined as…
198. The amount of light given off in relation in relation to the amount of energy put in.
199. The amount of noise reduced divided by the amount received.
200. The cooling output divided by the energy input.
201. Which 2 of the following heat rejection devices?
202. Chiller
203. Air-cooled condenser
204. Compressor
205. Cooling tower
206. A cooling tower is…
207. A sensible heat exchanger
208. A latent heat exchanger
209. A method of changing gaseous media to liquid
210. Used only in the North East
211. The same as a chiller
212. An act of such profound perversion that is has been banned in the continental US, and most of Europe.
213. A cooling tower is…
214. Affected by the relative humidity of the outside air
215. Not affected by the relative humidity of the outside air
216. Used in conjunction with all-air systems
217. Used in conjunction with all water systems
218. A & C
219. B & C
220. C & D
221. A,C & D
222. B,C, & D
223. B & D
224. Supply duct is typically designed to operate at \_\_\_\_\_\_-velocity and \_\_\_\_\_\_\_-pressure.
225. High, low
226. Low, high
227. Low, low
228. High, high
229. Increasing air flow velocities allows the use of \_\_\_\_\_\_\_ duct cross sections.
230. Larger
231. Smaller
232. When would you specify a high velocity system?
233. When space is unlimited, but financial resources scarce.
234. When distribution space is constricted.
235. Only in single story buildings of less than 3000 s.f.
236. When is higher pressure in an air distribution system necessary? (Choose 3)
237. In a system that is old and has degenerated over time.
238. In a system that has multiple 90 degree bends.
239. In a system with a long distribution path.
240. In a system providing both heating and cooling.
241. In a system requiring extensive media filtration devices throughout the distribution path.
242. Return duct is typically designed to operate at \_\_\_\_\_\_-velocity and \_\_\_\_\_\_\_-pressure.
243. High, low
244. Low, high
245. Low, low
246. High, high
247. True or False: High velocity systems are advantageous in that they are quieter than their low velocity counterparts.
248. Regarding specific heat, which substance is the measure to which all other substances are compared (i.e.- which substance has the highest capacity for specific heat)?
249. Air
250. Water
251. CO2
252. steam
253. HVAC systems can be noisy. What are 3 ways that this can be mitigated?
254. For air systems, using interior duct liners/insulation
255. For air systems, using exterior duct liners/insulation
256. Locate equipment in areas away from occupied areas
257. Place equipment on vibration isolators
258. Use flexible duct connections originating from the plant
259. All of the above
260. B & C
261. A,B, & D
262. A,C,D & E
263. The first diagram is what type of system?
264. A single pipe, series (perimeter) loop
265. The second diagram is what type of system?
266. A single pipe system
267. The third diagram is what type of system?
268. A two-pipe, reverse return system
269. The fourth diagram is what type of system?
270. A two-pipe, direct return system
271. Which system is the least efficient and limited in the amount of heaters it can feed?
272. A single pipe, series (perimeter) loop
273. Of all the systems above, which system is the most efficient?
274. The two-pipe, reverse return- the spent water does not feed the following heating elements. Each element gets the same temp. water. Also, by reversing the return, equal friction resulting in equal flow is achieved through all baseboards.
275. Of all the diagramed systems, which one ***cannot*** have valves attached to each unit?
276. Single-pipe series perimeter loop. Shutting down one heating element would shut down the whole system…duh….
277. The diagram below is an example of…
278. A single duct, VAV system
279. A single duct, CAV system
280. A multi-zone, CAV system
281. A multi-zone, VAV system
282. Name components A,B,C,D,E, & F
283. Supply (fresh) Air Intake
284. Exhaust air
285. Diffusers
286. Humidifier
287. Fan room
288. Cooling tower
289. This type of system is appropriate for…
290. Theaters
291. Lobbies
292. Department stores
293. All of the above
294. None of the above
295. True or False: This system permits total temperature control by individual occupants.
296. The diagram above is an example of…
297. A single duct, VAV system
298. A single duct, CAV system
299. A multi-zone, CAV system
300. A multi-zone, VAV system
301. True or False: This system permits total temperature control by individual occupants.
302. True or False: This system is well suited for larger buildings with many zones.
303. True or False: In this system, the air is mixed within each individual zone.
304. True or False: This system the heating of one area while simultaneously cooling another no matter how extreme the temperature differential.
305. The diagram above is an example of…
306. A single duct, air-water VAV system
307. A single duct, air-water CAV system
308. A multi-zone, air-water CAV system
309. A multi-zone, air-water VAV system
310. An air-water induction system
311. True or False: The air is the heat carrying medium in this system.
312. The air supplied to the “space conditioning unit” is referred to as…
313. Primary air
314. Secondary air
315. Tertiary air
316. The air drawn into the “space conditioning unit” is…
317. Of smaller quantity in relation to the supplied air
318. Of greater quantity in relation to the supplied air
319. Of equal quantity in relation to the supplied air
320. The air drawn into the “space conditioning unit” is…
321. The coil within the “space heating unit” is heated or cooled by…
322. The water supplied, which is referred to as “secondary water.”
323. The air drawn in, which is referred to as “secondary air.”
324. The air supplied, which is referred to as “primary air.”
325. The ratio of room air to supplied air mix within this system is…
326. Room air, apx. 50%, Supply air 50%
327. Room air, apx. 75%, Supply air 25%
328. Room air, apx. 10%, Supply air 90%
329. Room air, apx. 30%, Supply air 70%
330. The diagram above is an example of…
331. A fan-coil terminal
332. An air-water induction system
333. A closed loop heat pump
334. A hydronic convector
335. Name components A,B,C,D,E, & F
336. Control valves
337. Bypass valves
338. Pump
339. Heat pump
340. Cooling tower
341. True or False: The water can bypass both the cooling tower and boiler when no heating or cooling is necessary.
342. The diagram above is an example of…
343. A fan-coil terminal
344. An air-water induction system
345. A closed loop heat pump
346. A hydronic convector
347. True or False: This system can be used for either heating or cooling.
348. This system works on the principal of…
349. Radiation
350. Conduction
351. Convection
352. Induction
353. Which types of all air system(s) is/are capable of heating one area of a building while simultaneously cooling another?
354. Single Duct VAV
355. Dual Duct CAV
356. Multi-Zone
357. Single Duct CAV
358. DX System
359. Single Duct CAV w/ Reheat
360. Determine the temperature @ each inside wall layer at the cavity (sans stud) of a wall section with the following characteristics: Design day= 15 degF, Interior Temp = 65 deg F

Formula is Delta T layer= (Rlayer/Rtotal) x Delta Ttotal

* Outside air film R=0.15
* Aluminum siding (who specified that?!) R=0.50
* ½” Plywood sheathing R=.60
* 3 ½” Batt insulation R=11.5
* ½” GWB R=.40
* Inside air film R=.70

Rtotal= .15+.50+.60+11.5+.40+.70=***13.85***

* Outside air film R=0.15/13.85 x 50 = ***.54 (next step) + 15 (dd)= 15.54 deg F***
* Aluminum siding (who specified that?!) R=0.50/13.85 x 50 = ***1.81 (next step) +15.54 = 17.35 deg F***
* ½” Plywood sheathing R=.60/13.85 x 50 = ***2.17 (next step) +17.35 = 19.52 deg F***
* 3 ½” Batt insulation R=11.5/13.85 x 50 = ***41.5 (next step) +19.52= 61 deg F***
* ½” GWB R=.40/13.85 x 50 = ***1.44 (next step) +61 =62.44 deg F***
* Inside air film R=.70/13.85 x 50 = ***2.53 (next step)+62.44 = 65 deg F***