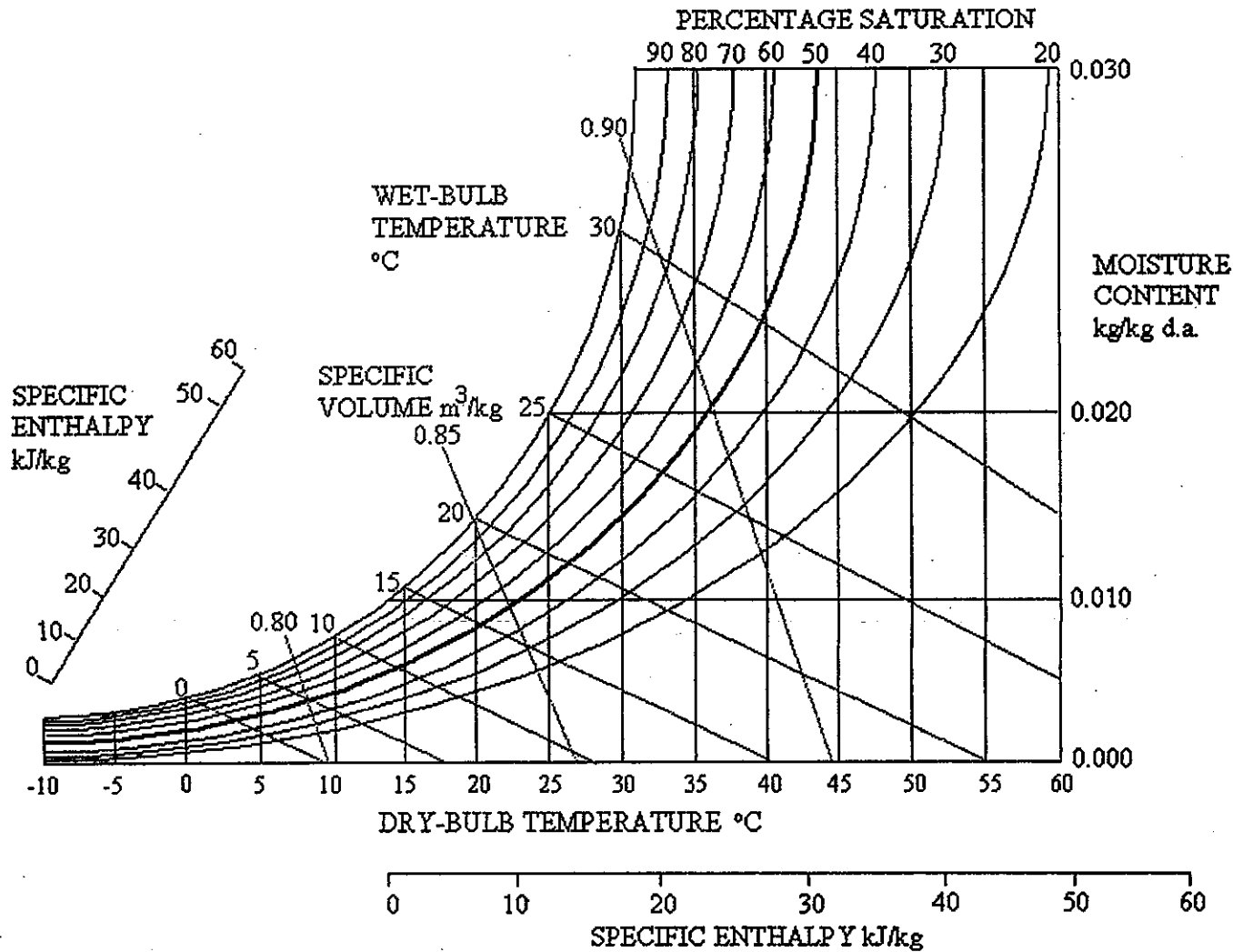


※ 注意：請於試卷內之「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

State the conditions you assume, if insufficient.

1. A plant factory is kept at absolute humidity = 0.02 and dry bulb temperature = 25 °C. Find out the corresponding (1) wet bulb temperature (7%) (2) dew point (7%) (3) specific volume (7%) (4) Explain why the result of (3) is different from the value (43.340) of the saturated vapor in the table. (9%)



2. (1) The heat of evaporation of water at 50°C=? (10%)
 (2) For a space at 25 °C with water vapor pressure of 2.5 kPa, the relative humidity=? (10%)
 (3) For saturated vapor at 75°C, calculate the specific volume using the ideal-gas law. (12%) Explain why your result is different from the value (4.1291) in the table. (12%)
 (4) What is the major difference between GAS and VAPOR? (8%)
3. For an ideal air conditioner (chiller), COP=5 and cooling capacity is 10 kW. Please find out:
 - (1) The maximum electrical power to consume (6%)
 - (2) With suitable configuration, the air conditioner can also be a heater. The COP_{HP}=? (6%)
 - (3) Following (2), the heating capacity=? (6%)

見背面

TABLE A-2

Ideal-gas specific heats of various common gases

(a) At 300 K

Gas	Formula	Gas constant, R kJ/kg · K	c_p kJ/kg · K	c_v kJ/kg · K	k
Air	—	0.2870	1.005	0.718	1.400
Argon	Ar	0.2081	0.5203	0.3122	1.667
Butane	C ₄ H ₁₀	0.1433	1.7164	1.5734	1.091
Carbon dioxide	CO ₂	0.1889	0.846	0.657	1.289
Carbon monoxide	CO	0.2968	1.040	0.744	1.400
Ethane	C ₂ H ₆	0.2765	1.7662	1.4897	1.186
Ethylene	C ₂ H ₄	0.2964	1.5482	1.2518	1.237
Helium	He	2.0769	5.1926	3.1156	1.667
Hydrogen	H ₂	4.1240	14.307	10.183	1.405
Methane	CH ₄	0.5182	2.2537	1.7354	1.299
Neon	Ne	0.4119	1.0299	0.6179	1.667
Nitrogen	N ₂	0.2968	1.039	0.743	1.400
Octane	C ₈ H ₁₈	0.0729	1.7113	1.6385	1.044
Oxygen	O ₂	0.2598	0.918	0.658	1.395
Propane	C ₃ H ₈	0.1885	1.6794	1.4909	1.126
Steam	H ₂ O	0.4615	1.8723	1.4108	1.327

Saturated water—Temperature table

Temp., T °C	Sat. press., P_{sat} kPa	Specific volume, m^3/kg		Internal energy, kJ/kg			Enthalpy, kJ/kg		
		Sat. liquid, v_f	Sat. vapor, v_g	Sat. liquid, u_f	Evap., u_{fg}	Sat. vapor, u_g	Sat. liquid, h_f	Evap., h_{fg}	Sat. vapor, h_g
0.01	0.6117	0.001000	206.00	0.000	2374.9	2374.9	0.001	2500.9	2500.9
5	0.8725	0.001000	147.03	21.019	2360.8	2381.8	21.020	2489.1	2510.1
10	1.2281	0.001000	106.32	42.020	2346.6	2388.7	42.022	2477.2	2519.2
15	1.7057	0.001001	77.885	62.980	2332.5	2395.5	62.982	2465.4	2528.3
20	2.3392	0.001002	57.762	83.913	2318.4	2402.3	83.915	2453.5	2537.4
25	3.1698	0.001003	43.340	104.83	2304.3	2409.1	104.83	2441.7	2546.5
30	4.2469	0.001004	32.879	125.73	2290.2	2415.9	125.74	2429.8	2555.6
35	5.6291	0.001006	25.205	146.63	2276.0	2422.7	146.64	2417.9	2564.6
40	7.3851	0.001008	19.515	167.53	2261.9	2429.4	167.53	2406.0	2573.5
45	9.5953	0.001010	15.251	188.43	2247.7	2436.1	188.44	2394.0	2582.4
50	12.352	0.001012	12.026	209.33	2233.4	2442.7	209.34	2382.0	2591.3
55	15.763	0.001015	9.5639	230.24	2219.1	2449.3	230.26	2369.8	2600.1
60	19.947	0.001017	7.6670	251.16	2204.7	2455.9	251.18	2357.7	2608.8
65	25.043	0.001020	6.1935	272.09	2190.3	2462.4	272.12	2345.4	2617.5
70	31.202	0.001023	5.0396	293.04	2175.8	2468.9	293.07	2333.0	2626.1
75	38.597	0.001026	4.1291	313.99	2161.3	2475.3	314.03	2320.6	2634.6
80	47.416	0.001029	3.4053	334.97	2146.6	2481.6	335.02	2308.0	2643.0
85	57.868	0.001032	2.8261	355.96	2131.9	2487.8	356.02	2295.3	2651.4
90	70.183	0.001036	2.3593	376.97	2117.0	2494.0	377.04	2282.5	2659.6
95	84.609	0.001040	1.9808	398.00	2102.0	2500.1	398.09	2269.6	2667.6
100	101.42	0.001043	1.6720	419.06	2087.0	2506.0	419.17	2256.4	2675.6
105	120.90	0.001047	1.4186	440.15	2071.8	2511.9	440.28	2243.1	2683.4
110	143.38	0.001052	1.2094	461.27	2056.4	2517.7	461.42	2229.7	2691.1
115	169.18	0.001056	1.0360	482.42	2040.9	2523.3	482.59	2216.0	2698.6
120	198.67	0.001060	0.89133	503.60	2025.3	2528.9	503.81	2202.1	2706.0

試題隨卷繳回