1.

Time: 18:00 Tuesday 04 December 2019 The relative humidity  $\phi$  =90% Total air pressure P =101.9 kPa T =230 K

web-bulb temperature  $T_{wb} = 6 \, ^{\circ}C$ 

absolute humidity  $\omega = 0.0055$ 

 $\omega = 0.622P_v/P_a = 0.622P_v/(P-P_v) = 0.0055$ ,

 $P_v \approx 0.893 \text{ kPa}$ 

autem,  $\varphi = m_v/m_g = 90\%$ 

M =  $P_V$  /  $R_{sp}.T$  ,  $R_{sp}.=0.4615$ 

V = The volume of Aula A

 $M_v = 0.893 \text{ V} / 0.4615*230 \approx 8.41 \times 10^{-3} \text{ V}$ 

 $M_g = m_{v/} 90\% \approx 9.34 \times 10^{-3} V$ 

2.

Internal gains:

 $q_{ig,\,s} = 136 + 2.2 \; A_{cf} + 22 \; N_{oc} = 136 + 2.2*200 + 22*2 = 620 \; W \\ q_{ig,\,l} = 20 + 0.22 \; A_{cf} + 12 \; N_{oc} = 20 + 0.22*200 + 12*2 = 88 \; W$ 

Infiltration:

unit leakage area  $A_{ul}$  = 1.4 cm²/m² exposed surface  $A_{es}$  =  $A_{wall}$  + $A_{roof}$  = 200 + 144 = 344 m²

 $A_L = A_{es} * A_{ul} = 344 * 1.4 = 481.6 \text{ cm}^2$ 

 $\Delta$  Tcooling = 31.1 °C -24 °C = 7.1 °C = 7.1 K  $\Delta$  Theating= 20 °C -(-4.1 °C) = 24.1 °C = 24.1 K DR = 7.1 °C = 7.1 K

 $\begin{aligned} & \mathsf{IDF}_{\mathsf{heating}} = 0.073 \; \mathsf{L} \, / \, \mathsf{S*cm^2} \\ & \mathsf{IDF}_{\mathsf{cooling}} = 0.033 \; \mathsf{L} \, / \, \mathsf{S*cm^2} \end{aligned}$ 

 $\begin{aligned} &Q_{i,\;heating} = AL*IDF_{heating} = 481.6*0.073 \approx 35.157\;L\;/\;S\\ &Q_{i,\;cooling} = AL*IDF_{cooling} = 481.6*0.033 \approx 15.893\;L\;/\;S \end{aligned}$ 

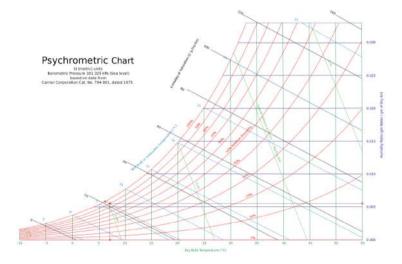
 $Q_v = 0.05 A_{cf} + 3.5 (N_{br} + 1) = 0.05 * 200 + 3.5 * (1+1)=17 L/S$ 

$$\begin{split} Q_{i-v,heating} &= Q_{i,\;heating} + Q_{V} \approx 35.157 + 17 = 52.157 \; \text{L/S} \\ Q_{i-v,cooling} &= Q_{i,\;cooling} + Q_{V} \approx 15.893 + 17 = 32.893 \; \text{L/S} \end{split}$$

 $C_{sensible}$  = 1.23 ,  $C_{latent}$  = 3010,  $\,\Delta_{\omega Cooling}$  = 0.0039

 $Q_{inf-ventilation,\,cooling,\,sensible} = C_{sensible}\,Q_{i-v,\,cooling}\,\Delta T_{Cooling} \approx 1.23*32.893*7.1 \approx 287.25\,W$   $Q_{inf-ventilation,\,cooling,\,latent} = C_{latent}\,Q_{i-v,\,cooling}\,\Delta T_{\omega Cooling} \approx 3010*32.893*0.0039 \approx 386.13\,W$   $Q_{inf-ventilation,\,heating,\,sensible} = C_{sensible}\,Q_{i-v,\,heating}\,\Delta T_{heating} \approx 1.23*52.157*24.1 \approx 1546.9\,W$ 

			oggi in I 04 Dicem				
	13:00	14:00	16:00	18:00	20:00	21:00	22:00
	246	ak.	246	346	24	(B)	JK.
	PartlyCloud	PartlyCloud	LightCloud	LightCloud	PartlyCloud	Cloud	PartlyCloud
Temperatura effettiva	10°C	10°C	9°C	7°C	6°C	7°C	8°C
Temperatura percepita	10°C	10°C	8°C	7°C	5°C	6°C	7°C
Precipitazioni	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
Úmidità	79 %	77 %	89 %	90 %	90 %	92 %	91 %
Pressione atmosferica	1016 nPa	1015 hPa	1016 hPa	1019 hPa	1017 hPa	1019 hPa	1020 nPa



				BRINDISI, Italy													
	Lat	40.65N	Long:	17.95E	Elev	c 10	StdP:	101.2		Time Zone:	1.00 (EU	N)	Period	86-10	WBAN:	99999	
	Annual He	ating and H	fumidificat	ion Design C	Conditions			120 20 20 20 2			020520202						
	Coldest Month	Heatin		Humidification DP/MCDB and HR 99.6% 99%							%		IPCWD 6% DB				
	Month	99.6%	99%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD		
	(0)	(b)	(c)	(d)	(0)	(1)	(9)	(h)	(1)	(1)	(k)	(1)	(m)	(n)	(0)		
(1)	2	2.9	4.1	-5.1	2.5	7.2	-3.0	3.0	7.4	13.4	10.2	12.4	10.6	3.4	250		(1)
	Annual Co	oling, Dehu	umidificatio	n, and Enth	alpy Desig	n Condition											
	Hottest	Hottest		4%	Cooling DB/MCWB			Evaporation WB/MCDI									
	Month	Month DB Range	DB 0	MCWB	DB	1% MCWB	DB 25	MCWB	WB.	4% MCDB	WB	% MCDB	WB	MCDB	to 0.4 MCWS	% DB PCWD	
	(8)	(b)	(c)	(d)	(0)	(f)	(9)	(h)	(1)	(J)	(k)	(I)	(m)	(n)	(0)	(p)	
(2)	8	7.1	32.8	23.6	31.1	24.3	29.9	24.3	27.2	29.7	26.3	29.0	25.6	28.3	4.2	180	(2)
(4)			02.0					24.0		20.7	20.0			20.0	7.8		
		0.4%	_	Dehumidifi	cation DP/fi 1%	MCDB and H			Enthalpy/MCDB					N.	Hours 8 to 4 &		
	DP	HR	MCDB	DP	HR.	MCDB	DP	2% HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB	12.8/20.6	
	(a)	(6)	(c)	(d)	(0)	(f)	(g)	(h)	(1)	(j)	(k)	(1)	(m)	(n)	(0)	(p)	
(3)	26.3	21.8	29.2	25.4	20.7	28.5	24.7	19.7	27.9	86.0	30.1	82.2	29.1	78.5	28.3	1236	(3)
	Extreme A	nnual Desi	an Conditie	ons													
	Evte	ws	Extreme Annual DB			n-Year Return Period V											
		Max		Max		Aean	Standard			years		years		years	n=50		
	1%	2.5%	5%	(d)	Min	Max (f)	Min	Max	Min	Max	Min	Max	Min (m)	Max	Min	Max	
	11.3	9.9	(c) 8.7		(0)	37.3	(g) 1.4	3.0	(1)	39.4	-1.4	(1)	-2.2	(n) 42.8	(0) -3.2	(p) 44.9	
(4)	11.3	9.9	8.7	31.4	0.4	37.3	1.4	3.0	-0.6	39.4	-1.4	41.1	-2.2	42.8	-3.2	44.9	(4)