

Arch 427 Architectural Engineering & Env. Systems

Assignment -2 (take home exam)

07.04.2016

Please answer the questions below. 2-3 and 4-5 are optional questions; you can select one of each.

- 1.) What is **high-tech architecture**? When and why buildings are defined as “high-tech”? Please give at least two examples of high tech buildings and explain their specifications, system characteristics, environmental performances (if any) and design failures (if any). Criticise high tech architecture with your own words. *(please list all the references at the end of your answer)*
- 2.) Explore the main thermal environmental systems of **RWE Headquarters Building in Germany**. Indicate the performances that achieved by proposing such systems in the building. *(please list all the references at the end of your answer)*
- 3.) Explore the main thermal environmental systems of **Menara UMNO in Malaysia**. Indicate the performances that achieved by proposing such systems in the building. *(please list all the references at the end of your answer)*
- 4.) Give one example of a **heating system**, its specifications and its operation principles. Briefly explain it’s contribution to energy efficiency of the building. *(please list all the references at the end of your answer)*
- 5.) Give one example of a **cooling system**, its specifications and its operation principles. Briefly explain it’s contribution to energy efficiency of the building. *(please list all the references at the end of your answer)*
- 6.) Considering the interactions between the services and fabric issues of the building listed in below chart; please state the requirements in each cell that are necessary for that interaction. Select one of building type and a climatic region to specify that interaction.
(building types: *residential, *non-residential) (climatic region: *hot-humid, *hot-dry, *temperate, *cold)

Services issues	Cooling			Minimise solar gains		
	Heating					Store heat in thermal mass and effect on response times
	Electric lighting and daylight	Use shallow plan for maximum daylight penetration or lightwells/atria				
	Natural ventilation					Seal building envelope and allow only controlled ventilation
	Mechanical ventilation and air conditioning		Orientated to avoid solar gains		Consider atria with mixed mode to allow natural ventilation and daylight at certain times	
		Deep plan/ shallow plan	Orientation	Percentage glazing	Lightwells and atria	Airtightness

Fabric issues