FAQs

1. What is passive cooling and list two fundamentals.

- **Passive cooling** is a building design approach that focuses on heat gain control and heat dissipation in a building in order to improve the indoor thermal comfort with low or nil energy consumption

FUNDAMENTALS:

- Heat flows from high temperature areas to low temperature areas
- Reverse flow can only be induced by feeding additional energy into the thermal system

2. What is the physics of evaporative cooling?

- Evaporative cooling is a natural phenomenon that occurs when moving air passes over a wetted medium or water source, i.e. fountain, river, sea, shower, etc. The human body uses evaporative cooling through sweating to maintain a constant body temperature.
- Warm dry air when passing over water liberates some of the water in the form of an evaporate. This adiabatic process converts sensible heat (that which can be measured by a thermometer) into latent heat
- The net result is air which has measurably lower temperatures than ambient air (approximately 6-7 ^{o}C for typical Irish summer temperatures) but has increased levels of relative humidity

3. What are the types of evaporative cooling?

Evaporative cooling is classified in two types:

1. Direct evaporative cooling
2. Indirect evaporative cooling.

4. List few advantages of evaporative cooling over conventional methodologies

- Evaporative cooling is economical, effective, environmentally friendly, and healthy.
- Cuts mechanical cooling costs 25% to 65%.
- Increases existing equipment cooling capacities without adding mechanical cooling.
- Less greenhouse gas production (Typically 80% less)
- Allows flow through ventilation, with plenty of fresh air.

5. Explain briefly about nocturnal radiation cooling system

Cooling of the building by outgoing long-wave radiation during the night can be achieved by two systems:

i. Direct nocturnal cooling of the mass of the roof, and, subsequently, protection of the upper surface from the sun and outdoor air during daytime by external insulation. The cooled ceiling services as a radiant convective cooling panel for the space below.

ii. Radiant cooling of a specialized radiator usually made of a metallic plate above the insulation with an air space in between.

iii. Outdoor air circulated at night under the long-wave radiator is cooled by contact with the cold metal.

iv. The cooled air can be blown into the building or through a gravel-bed, thus transferring the “cold” to a mass which serves during the following day, as a cold heat sink, counteracting heat penetrating into or generated inside the building.