



Refrigeration and air conditioning charts, design tables and Catalogues belong the students are allowed.

**Answer all the following Questions (Full Marks 100)**

**Question 1 (30 Marks)**

- a) Explain the different types of residence air conditioning systems
- b) Discuss the advantages and disadvantages of each system.
- c) Represent the cycle of each one on the psychrometric chart.

**Question 2 (30 Marks)**

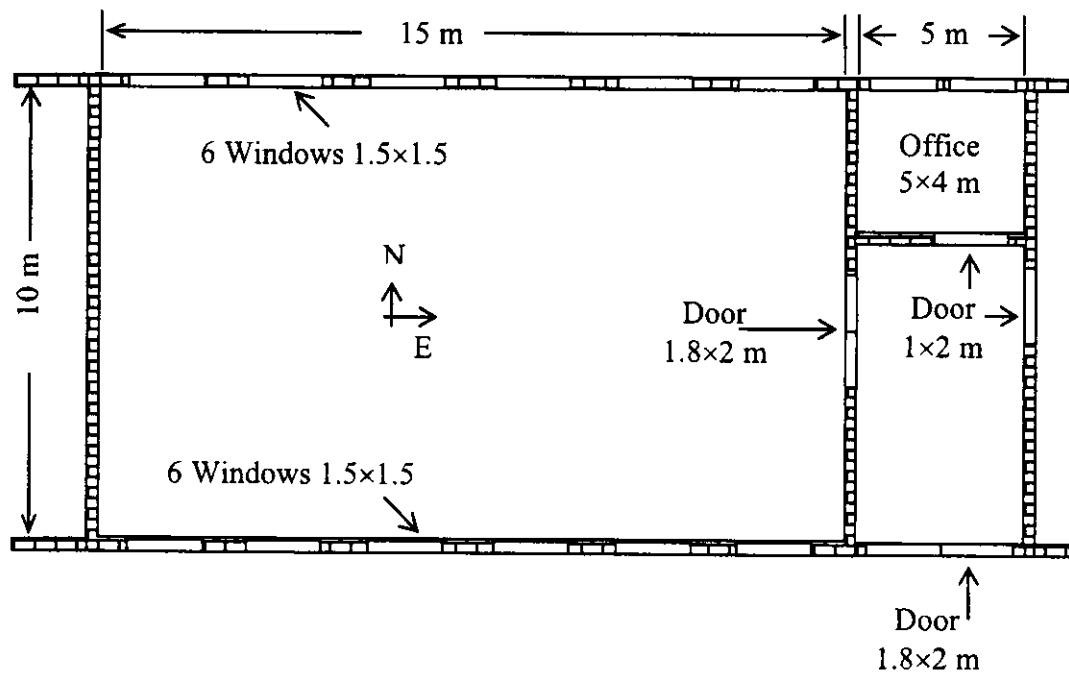
- a) Explain how air could be cooled without heat transfer.
- b) It is required to maintain the relative humidity inside a textile factory at 90%. The outside air is at 35 °C dbt and 25 °C wbt. Design a suitable system that achieve this purpose.

**Question 3 (40 Marks)**

With the aid of drawing, explain the classification of Air Conditioning systems, showing the application of each case. Represent the cycle for each case on the psychrometric chart.

**Question 4 (30 Marks)**

- a) Mention the requirements for designing the air conditioning for the Hotels.
- b) The figure shown below represents the plan of a reception space in an Hotel at Cairo. The hall which is to be air conditioned is 15×10×5 m and it lies in the second floor. The following data are given:
  - Maximum number of occupants is 80.
  - There are 4 computers, 2 printers, 1 data show, 2 T.V., 1 video and 4 cameras.
  - Heat gain from hot meal is 100 W sensible and 120 W latent.
  - The door is made of wood while the windows are made of 6 mm single glass.It is Required the following:
  - a) The cooling load of the space.
  - b) Draw in details the required air conditioning system and represent it on the psychrometric chart and explain the function of each component of the air handling unit.
  - c) Calculate the cooling capacity of the AHU and select the suitable unit.



This exam measures the following ILOs.

Question No	Knowledge & Understanding Skills	Intellectual Skills	Professional Skills
1	KU5.1 to KU5.4,	I1.3, I1.5, I1.6, I4	
2, 3	KU3.3, KU5.3, KU5.4,	I1.4, I1.5, I1.6, I4.1, I4.4,	PP2.3, PP3.2,
4	KU3.2	I1.1, I1.2, I1.3,	PP2.4, PP3.1,