

In an air conditioning system for a precision gauge laboratory, atmospheric air at 32°C , 101.3 kPa and 80% relative humidity is first chilled to 10°C to remove moisture. The air is then heated until its relative humidity reaches 40% . If the air flow rate is $800\text{ m}^3/\text{min}$, (a) determine the dew point temperature at the cooling coil, (b) the heat removed at the cooling coil, (c) the heat added at the heating coil and the rate of condensate removal. In order to save energy it is decided to replace the heating section by a mixing chamber in which a quantity of the atmospheric air (at 32°C and 80% relative humidity) is mixed at atmospheric pressure with chilled air at 10°C . How much dry air should be added (in kg/sec) to result in a humidity of 40% ? What is the dry bulb temperature of the mixture?