Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent Institution of MAHE, Manipal)

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKE-UP EXAMINATIONS, DECEMBER 2017

SUBJECT: BUILDING AUTOMATION SYSTEMS [ELE 4016]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 30 December 2017** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.
- Phychrometric Chart is available on the back side of this question paper

1A. What are the implementation issues of integrator term in the controller? How to address them? ***(06)***

1B. What are the different techniques used for computing controller settings? ***(04)***

2A. What is relative humidity? What is its importance? How does dry bulb temperature and wet bulb temperature indicate relative humidity? ***(04)***

2B. Explain the working of transit time ultrasonic flowmeter. What are its disadvantages? ***(03)***

2C. Write a short note on thermal comfort indices ***(03)***

3A. Draw the block diagram of chiller and explain vapour compression refrigeration system ***(06)***

3B. Solve the following phychrometric numerical

i. Outdoor air at 34°C DB and 24°C WB is to be mixed with return air at 24°C and 50% RH. Find the percentage of outdoor air that must be used if the resulting mixture is to be at 21°C WB.

ii. Heated air at 50°C and 10% relative humidity is used to dry rice in a bin dryer. The air exits the bin under saturated conditions. Determine the amount of water removed per kg of dry air. ***(04)***

4A. What are the factors that affect 'daylight factor' in a space? ***(04)***

4B. How does cooling tower aid the vapour compression refrigeration cycle? ***(02)***

4C. What are the different HVAC components? Mention one objective of each component ***(04)***

5A. Draw the architecture of building management system ***(02)***

5B. What is direct digital control? How can DDC be beneficial over analog control? ***(04)***

5C. Write a short note on exterior shading and control devices used for daylighting ***(04)***

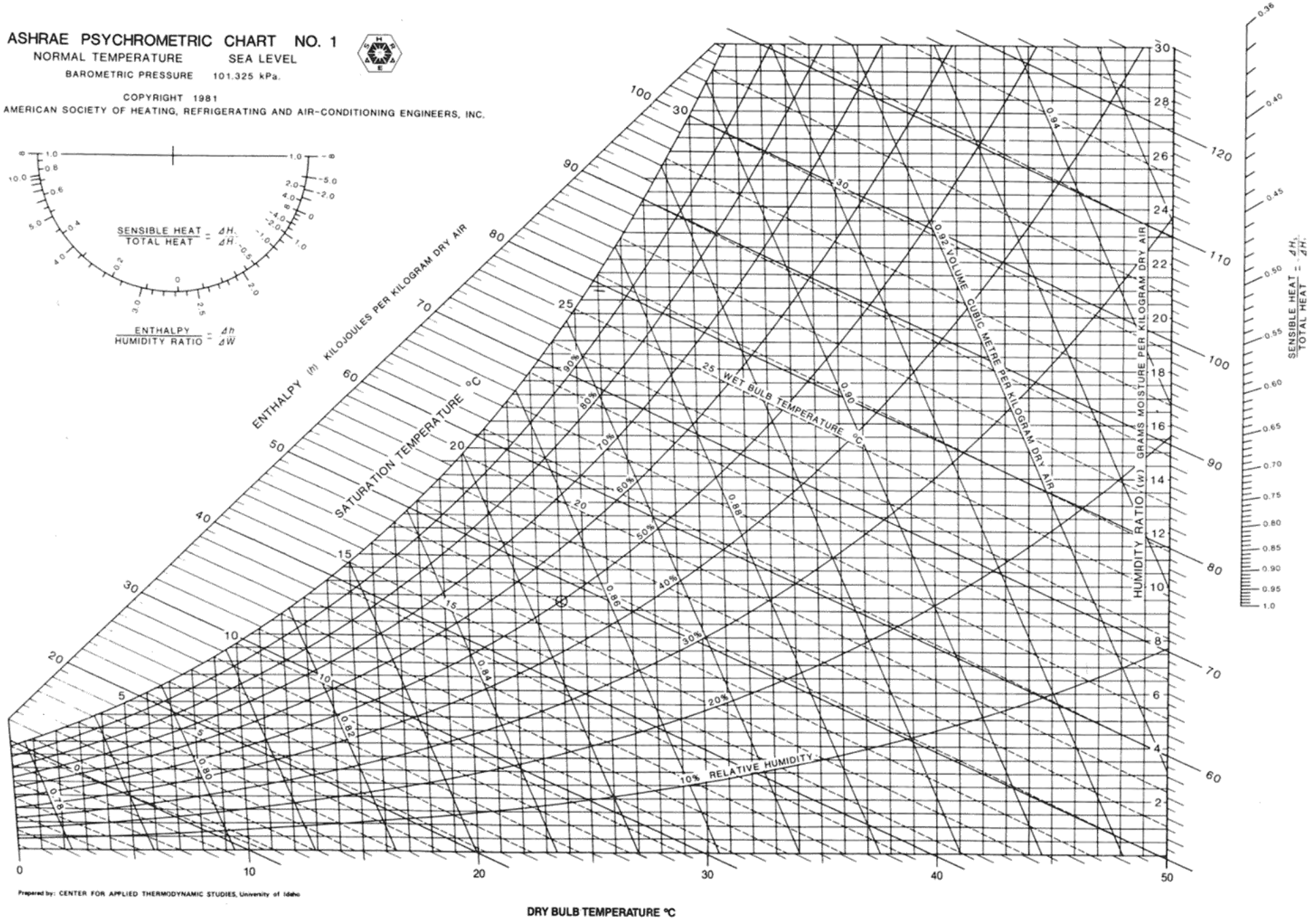
ASHRAE PSYCHROMETRIC CHART NO. 1
NORMAL TEMPERATURE
SEA LEVEL
BAROMETRIC PRESSURE 101.325 kPa.
COPYRIGHT 1981
AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
SENSIBLE HEAT / TOTAL HEAT = ΔH / ΔH
ENTHALPY / HUMIDITY RATIO = Δh / ΔW
ENTHALPY (h) KILOJOULES PER KILOGRAM DRY AIR
SATURATION TEMPERATURE °C
HUMIDITY RATIO (W) GRAMS MOISTURE PER KILOGRAM DRY AIR
VOLUME CUBIC METRE PER KILOGRAM DRY AIR
SENSIBLE HEAT / TOTAL HEAT = ΔH / ΔH
25 WET BULB TEMPERATURE °C
10% RELATIVE HUMIDITY
Prepared by: CENTER FOR APPLIED THERMODYNAMIC STUDIES, University of Idaho
DRY BULB TEMPERATURE °C

Chart 1*b*