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TEST - 1 EXAMINATION – SEPTEMBER, 2019

M.Tech. Ist Semester

COURSE CODE: 10M11CE115 MAX. MARKS: 15

COURSE NAME: Mechanical and Electrical Systems in Building

COURSE CREDITS: 03 MAX. TIME: 1Hr

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume data wherever necessary. The Psychrometric chart is given at the back of the question paper as Fig. 1.*

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[1] Briefly answer the following: **[1+1+1 = 3]**

(i) A boiler used to heat a school building is rated at 8 000 000 Btu/hr. Determine its rating in kW.

(ii) What effect does humidity have on the comfort of a body?

(iii) Distinguish between sensible heat and latent heat.

[2] Moist air at standard conditions is at a dry bulb temperature of 50°F and a relative humidity of 70%. It is sensibly heated (constant moisture) to 72°F. Use the psychrometric chart **(Fig. 1)** to determine the following properties of the air after it is heated:

(i) The relative humidity

(ii) The dew point temperature

(iii) The specific volume

(iv) The humidity ratio

(v) The enthalpy

[1+1+1+1+1=5]

[3] A 3 m by 5 m rectangular room has one 4-m exterior framed wall with a surface temperature of 16°C. The three interior wall surfaces are at a temperature of 22°C.

(i) Approximate the mean radiant temperature sensation of a person standing in the center of the room. Neglect the effects of the floor and ceiling.

(ii) Approximate the mean radiant temperature sensation of a person standing 1 m from the exterior wall. Neglect the effects of the floor and ceiling. **[2+2 = 4]**

[4] Conditions at a construction site are recorded as a wet bulb temperature (WBT) of 70°F, a black globe temperature (BGT) of 89°F, and a dry bulb temperature (DBT) of 4°F.Determine the wet bulb globe temperature (WBGT).Is this temperature deemed safe for working conditions if an immediate supply of water is available? Give reasons. **[3]**

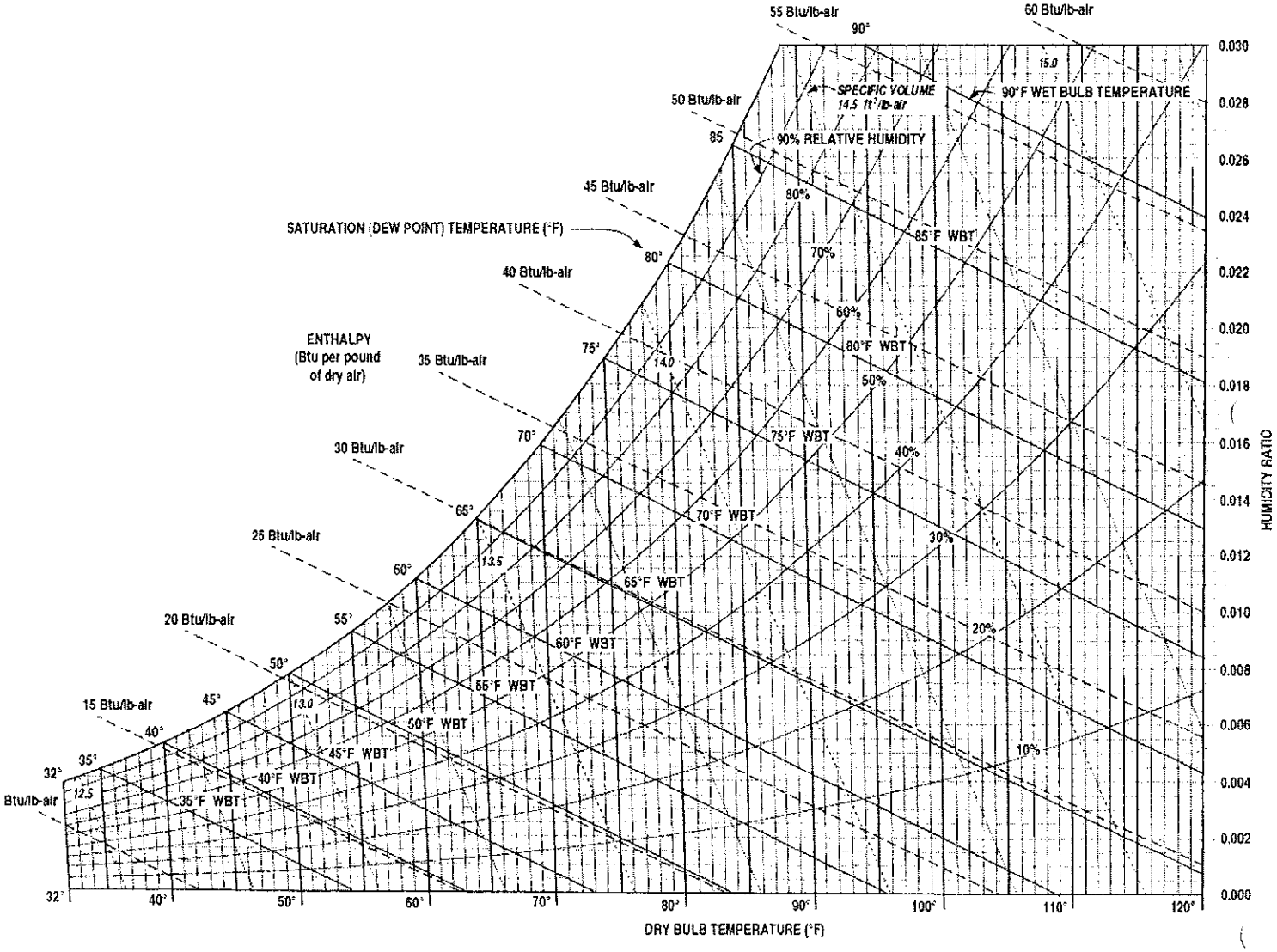

Fig.1 Psychrometric Chart