UVA WELLASSA UNIVERSITY OF SRI LANKA
FACULTY OF ANIMAL SCIENCE & EXPORT AGRICULTURE

BSc in Export Agriculture
BSc in Palm & Latex Technology and Value Addition
BSc in Tea Technology and Value Addition

First Year Second Semester Examination – December/January 2017/18

Principles of Agricultural Engineering (EAG 142- 2)
Section III – Essay Questions

Instructions

Answer all questions in the given booklet.

No. of questions	:	Two (02)
No. of pages	:	Three (03)
Time	:	One (01) Hour
Total marks allocated	:	50 %

01. A medicine packet contains 5 g of silica gel to absorb the moisture from air-vapor mixture in the packet. This packet is stored under 30 °C and the initial relative humidity (RH) of the packet (before introducing silica gel into the packet) is 60%. The moisture of medicine packet is absorbed by the silica gel after it was introduced to packet. (Use the psychometric chart given in page 3 for the calculation).

I. Identify the relevant psychometric process. (05 marks)

II. Define that psychometric process. (15 marks)

III. Give three (03) features of this psychometric process. (15 marks)

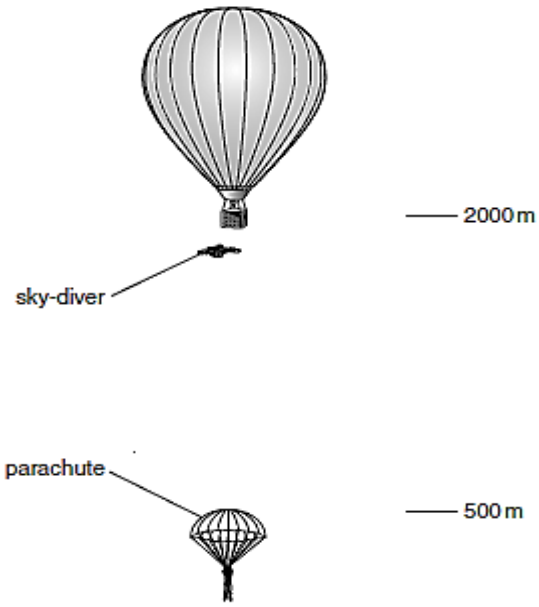
IV. Find the initial moisture content, wet bulb temperature, dew point temperature and specific volume of the air-vapor mixture in the packet at initial stage. (20 marks)

V. After introducing the silica gel into the packet RH decreased to 30%. Find the amount of moisture removed in this process. (10 marks)

VI. What is the maximum amount of moisture that can be absorbed by the silica gel from the packet? (15 marks)

VII. If the absorbance ability of the silica gel is 0.01g moisture/ g of silica gel, calculate the additional amount of silica gel needed to be added to absorb the maximum amount of moisture. (20 marks)

02. A sky diver decent from a stationary balloon is shown in the diagram. The sky-diver steps from the balloon at a height of 2000 m and accelerates downwards. His actual velocity is 52 m/s at a height of 500 m. Then he opens his parachute. From 400 m to ground level, he falls at constant speed. The total mass of the sky-diver and his equipment is 92 kg (gravitational acceleration is 10 m/s^2).



I. Write the Law of Energy Conservation. (10 marks)

II. Calculate the loss of gravitational potential energy in the fall from 2000 m to 500 m. (10 marks)

III. Find out the time taken to reach 500 m height level. (10 marks)

IV. Calculate the velocity at the height of 500 m using the Law of Energy Conservation. (10 marks)

V. The velocity at 500 m is not equal to actual velocity 52 m/s. Explain why there is a difference in the values. (10 marks)

VI. Calculate the energy loss during the travel from 2000 m to 500 m. (10 marks)

VII. The time taken to reach from 500 m level to 400 m level is 30 seconds. Calculate the acceleration of the diver during this traveling. (10 marks)

VIII. Draw Displacement - Time graph and Velocity - Time graph for the whole travel from 2000 m level up to reach the ground level. (15 marks x 2)

[**End of section III**]

Carrier

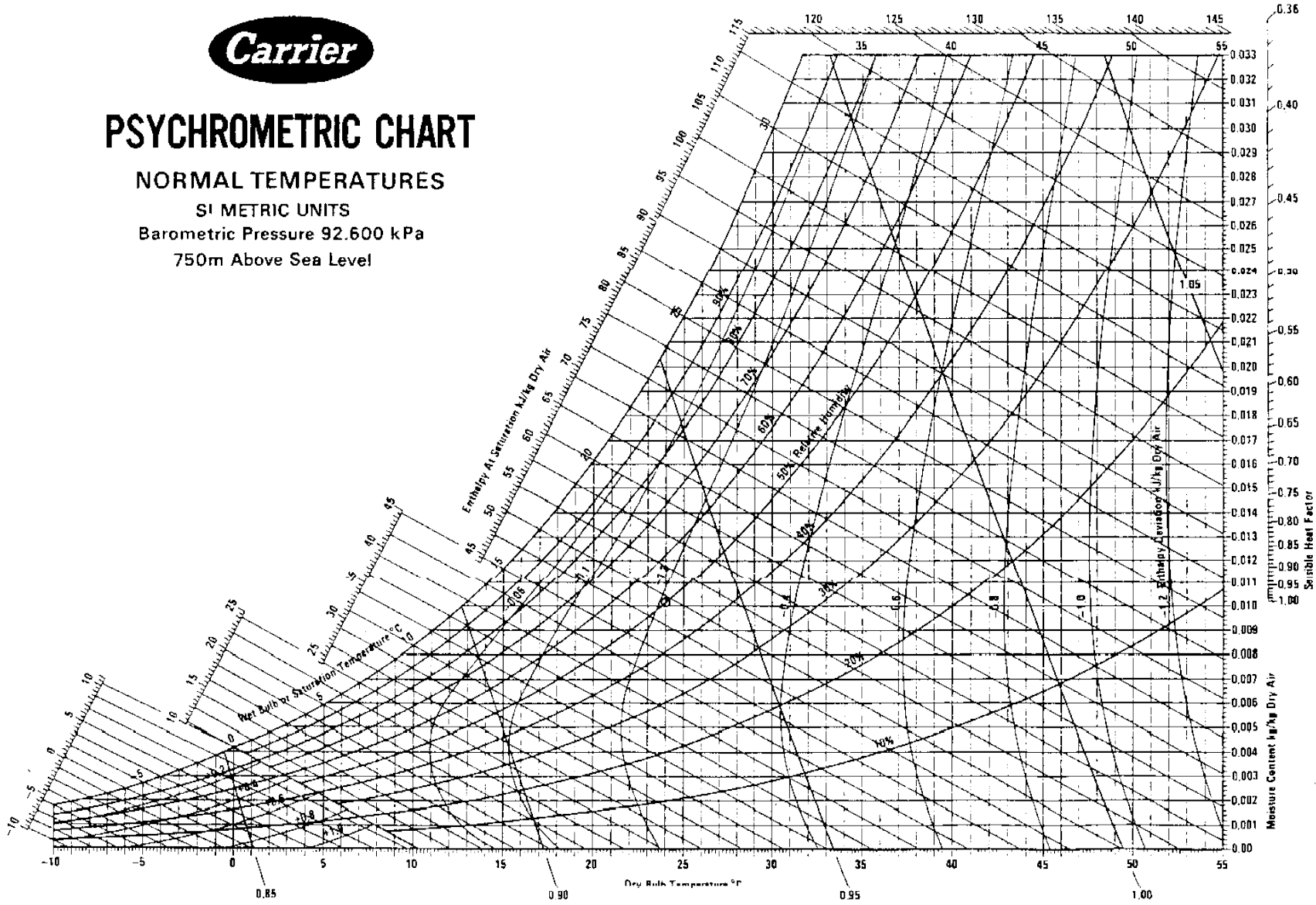
PSYCHROMETRIC CHART

NORMAL TEMPERATURES

SI METRIC UNITS

Barometric Pressure 92.600 kPa

750m Above Sea Level



Below 0°C Properties and Enthalpy Deviation Lines Are For Ice

Cat. No. 794-006 Printed in U.S.A.