

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



Bachelor of Animal Science
Third Year First Semester Examination – June/July 2017

Food and Biochemical Engineering (EAG 346 - 2)
Section III – Essay Questions

Instructions:

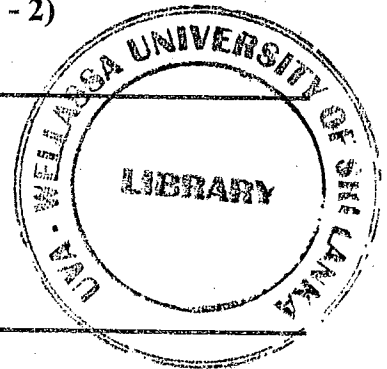
Answer all questions in the given booklet.

No. of questions : Two (02)

No. of pages : Three (03)

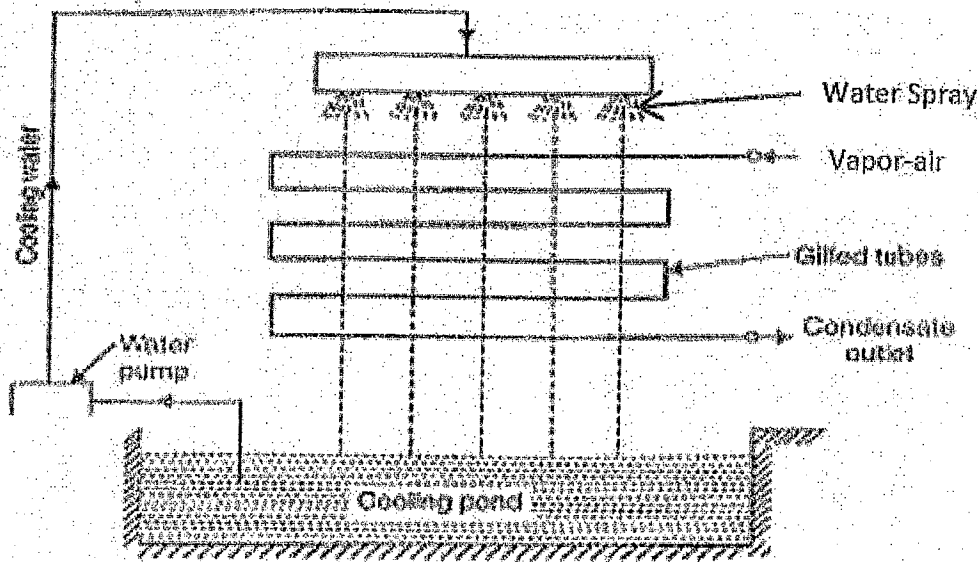
Time : One (01) hour

Total marks allocated : 50%



01. Describe the following properties and process related to downstream processing (support the answer with labeled diagram wherever necessary).
- a) Characters of the broth which decide the separation methods. (30 marks)
 - b) Separation of insoluble particles from liquid . (35 marks)
 - c) Necessity of cell rupture and cell rupture methods. (35 marks)
- 02.
- a) State First Law of Thermodynamics and explain its application with an example. (20 marks)
 - b) Explain the process of dehumidification by cooling and state the character of this process. (20 marks)

- c) A hot air-vapor mixture sends through a pipe to cool down by a water shower is shown in the diagram below.



The temperature of inlet air-vapor mixture is $50\text{ }^{\circ}\text{C}$ and Relative Humidity (RH) is 30%. The volume flow rate of inlet air-vapor mixture is $10\text{ m}^3/\text{s}$. The temperature of outlet air-vapor mixture is $15\text{ }^{\circ}\text{C}$. The temperature of cooling shower water is $10\text{ }^{\circ}\text{C}$ and water spraying rate is $50\text{ m}^3/\text{s}$. (Please refer the psychometric chart attached here with).

- I. Find out the mass flow rate of the air-vapor mixture that goes through the pipe.
- II. Find out the moisture removal rate from air-vapor mixture.
- III. Find out the latent heat change and sensible heat change of the air-vapor mixture.
- IV. Find out the heat removal rate from air-vapor mixture.
- V. What is the RH of outlet air-vapor mixture?
- VI. Calculate the temperature of spray water after cooling down the air-vapor mixture.

(6 x 10 marks)

[End of section III]



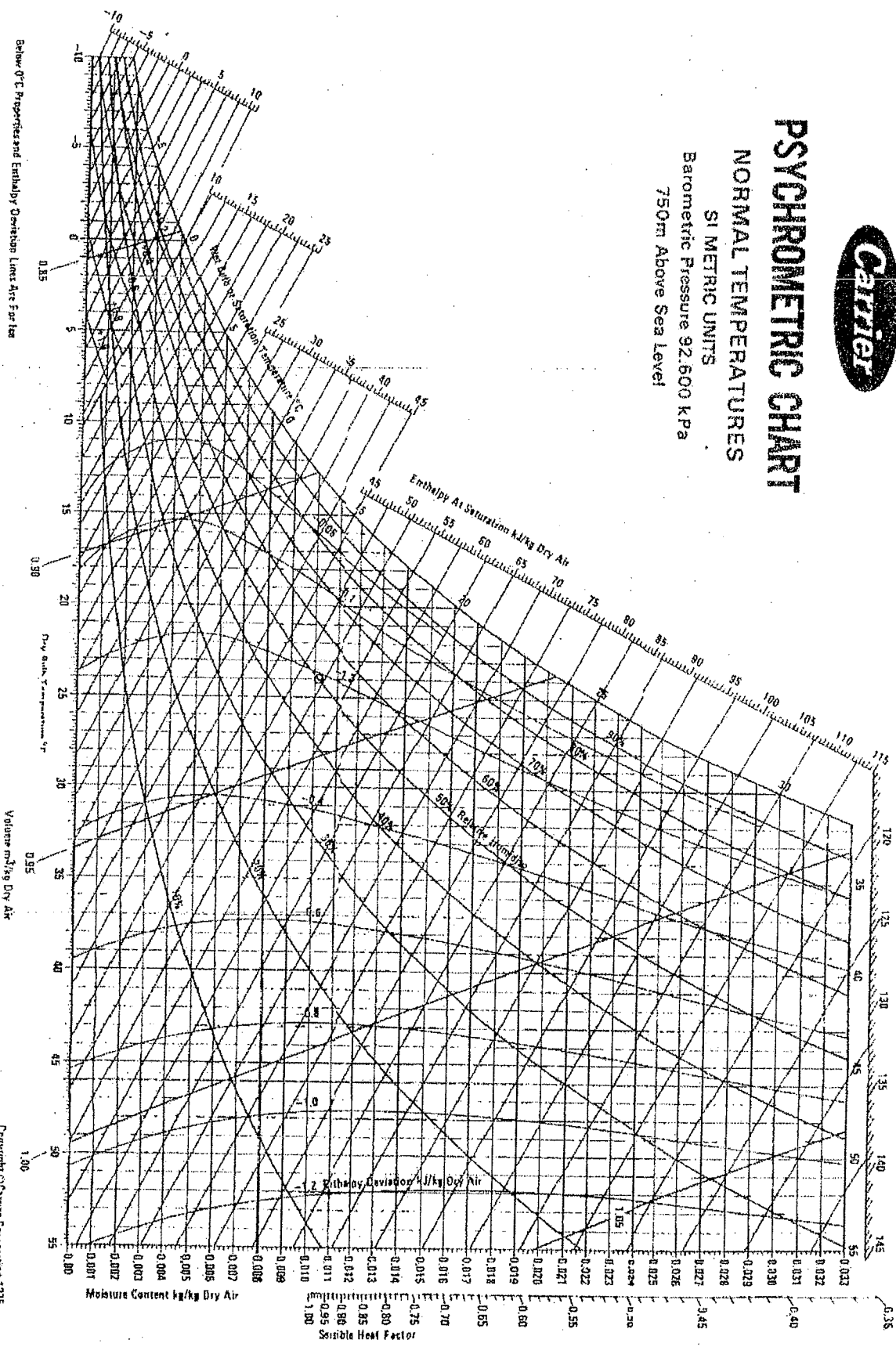
PSYCHROMETRIC CHART

NORMAL TEMPERATURES

SI METRIC UNITS

Barometric Pressure 92.600 kPa

750m Above Sea Level



Below 0°C Properties and Enthalpy Deviation Lines Are Further

Volume m³/kg Dry Air

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