EASTERN UNIVERSITY, SRI LANKA
FACULTY OF AGRICULTURE
SECOND YEAR SECOND SEMESTER EXAMINATION IN AGRICULTURE 2002/2003
POST HARVEST TECHNOLOGY (AEN 2202)

Answer all questions
This question paper should be answered only in English
Time allowed: Two hours

1. a). i. List the factors considered in quality control of paddy.
   ii. Briefly describe the importance of Equilibrium Moisture Content (EMC) in grain drying and storage.

   b). Determine the Equilibrium Moisture Content (EMC) of rice (whole grain) which is at 25% RH and 65^0 C temperature using Henderson's semi empirical model. ('C' and 'n' values for the rice are 1.62×10^{-5} and 2.02 respectively).

2. a). Briefly explain the process and significance of parboiling in paddy processing and give suggestions to improve parboiling technique in Sri Lanka.

   b). i. 30^0 C and 20^0 C are the dry and wet bulb temperatures of air respectively. Find the following using psychrometric chart:
   - Relative humidity (RH).
   - Humidity ratio.
   - Enthalpy.
   - Specific volume.

   ii. If the air is heated to 42^0 C. Find the following;
   - RH.
   - Humidity ratio.
   - Enthalpy.
   - Density of the air.
   - Saturation temperature.

   iii. Then, drying is done up to 80% RH using heated air at the air flow rate of 50 m^3/minute. Find the following;
   - Amount of sensible heat to be added per hour.
   - Amount of moisture removed from grain per hour.
   - If the moisture that should be removed from the grain mass is 100 kg, determine the drying time required.

   iv. Show the graphical representation of the psychrometric behaviour of above processes.

(Psychrometric chart is provided)

(P.T.O)

3. a). Comment on the following

i). Psychrometric chart and it's use.
ii). Cooling and dehumidifying in psychrometric principle.
iii). Sensible heating and cooling in psychrometric principle.

b). A bin of grain is to be chilled with air at a dry bulb temperature(db) of 4.5^{0}C and an air flow rate of 47 m^3/minute. If the ambient air conditions are 29^0 C db and 25^0 C wb;

i. Show the graphical representation of the psychrometric behaviour of this process.
ii. Determine the amount of heat to be removed per hour from the air.
iii. Determine the amount of moisture to be condensed per hour.

(Psychrometric chart is provided)

4. Write short notes on the following

a). Moisture migration in the bulk storage of grains.
b). Adiabatic saturation process.
c). Comparison of bag and bulk storage systems.
d). Controlled atmospheric storage.