

Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Science and Technology Degree Program
1st Semester Examination February/March 2012
SCT 314-3 Cereal Science and Technology

Instructions for Candidates

Answer five (05) questions

All questions carry equal marks

Total questions : 06

Time : Three (03) hours

Total Marks allotted: 100

1. Instructions were given to a Store Keepers of a reputed organization to purchase paddy with moisture content and level of impurities are less than 15% and 1% respectively. Three suppliers namely A, B and C supplied paddy to a store keeper with respect to following specifications.

Name of the supplier	Quantity supplied kg	Moisture content %	Level of impurities %
A	5000	16.5	2.5
B	3500	16.0	1.0
C	10000	15.5	0.7

As the Store Keeper was equipped with dehydration and pre-cleaning facilities, he purchased all deliveries and stored them after drying and cleaning to get the moisture content to 15% and impurities level to zero.

- Calculate total wastage due to cleaning and drying process.
- Explain a better cleaning process leading to a higher keeping quality.
- Maintaining the moisture content of paddy to less than 15% during the period of storage may contribute to the value addition process of the polished rice. Explain this statement. (20 marks)

2. A Technical Officer of a reputed organization decided to dry 10,000 kg of paddy to 15.8% moisture content to get the safe moisture content at 15.0% using an air-heat dryer coupled with a heat exchanger. If Wet bulb temperature and Relative Humidity of incoming air were 30⁰ C and 40% respectively.
- i. Determine the Humidity ratio and Dry bulb temperature of the incoming air.
 - ii. If the temperature of the incoming air reached 40⁰ C after passing through the heat exchanger, determine the Relative Humidity and Humid Ratio of hot air.
 - iii. When hot air was used to dry paddy at 15.8% moisture content, dew was formed in the outgoing air. Determine Wet Bulb Temperature and Humidity Ratio of the outgoing air.
 - iv. Draw a sketch diagram to depict the whole drying and heating processes and briefly explain the important points there in. (20 marks)
3. A Rice processor wanted to establish a state of the art paddy parboiling facility at his processing plant. However, he did not have the necessary knowledge in paddy parboiling. Therefore, he has decided to get advice from you, because he knew that you have a fairly good knowledge on paddy Post Harvest Technology.
- i. Explain the importance of paddy parboiling and that parboiled polished rice is nutritionally richer than the raw polished rice.
 - ii. Explain the processor on the negative consequences, if he has decided to adapt the domestic way of parboiling process for a market oriented product.
 - iii. If the processor decided to use a steel huller for de husking of parboiled paddy and polishing the brown rice, what is your opinion on this process? And suggest your recommendations to get rid of the shortcomings that may occur in the steel huller.
 - iv. 1000 kg of raw paddy at 12% moisture content was parboiled and dried to get the moisture content of 14%. If paddy contains 20% husk and 8% rice bran, calculate the outturn of the finished product. Assume that parboiled rice was polished to get 80% bran removal. (20 marks)
4. Write short notes for followings
- i. Importance of moisture meter calibration in paddy post harvest technology.
 - ii. Use of 1000 grain weight as a quality parameter in paddy post harvest technology.
 - iii. Moisture adsorption and desorption isotherms for grain drying.
 - iv. Efficiency of de-stoning is directly related to the physical properties of the grain as well as the stones. (20 marks)

5. A millet powder (Kurakkan flour) producer has confronted with a serious of quality issues and market return of his product was gradually increased and finally it exceeded the profit margin. Hence, the producer analyzed the market return and found that the major contributory factors in this regard as:

- a. Bad smell of the product.
- b. Bad taste of the product (Sour taste) and
- c. Shrunken packets, after 3 months of shelf life.

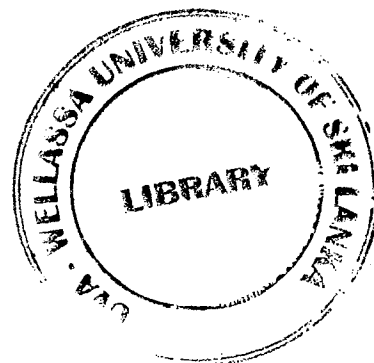
- i. What are the factors that are responsible for the development of bad smell, bad taste and packet shrinking during shelf life? Explain the quality deterioration process.
- ii. If you have been assigned to rectify above issues, how would you do it?
- iii. Explain the validity of using Pareto analysis in analyzing of market return.

(20 marks)

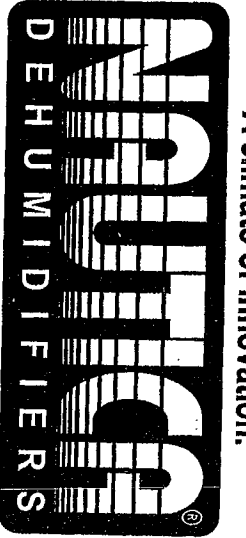
6. A bakery manager of a reputed bakery in Badulla town has encountered with a series of issues, related to his bakery products, particularly on bread. He found out most of these problems were appeared after purchasing of a consignment of wheat flour from a new supplier. The shortcomings of the bread were, poor bread crumb structure, high bulk density of the bread, poor crust color, sour taste and cavities in the loaf.

- i. Name two factors responsible for each of the above shortcomings
- ii. Briefly explain how you are going to rectify those defects, if you have been appointed as a trouble shooter.
- iii. Explain role of wheat flour in bakery industry and limited factors in rice flour.

(20 marks)



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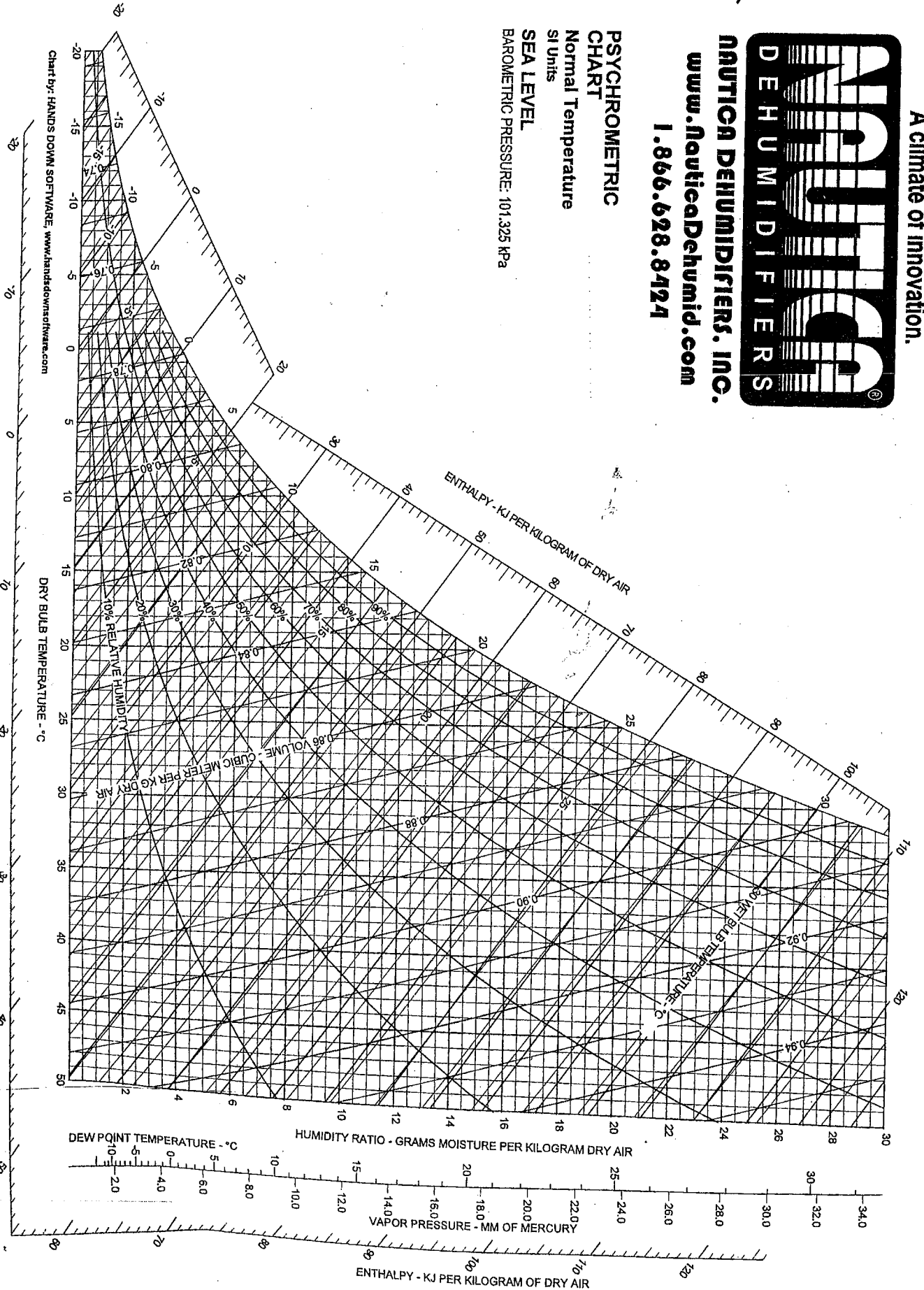


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