Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

B E Sem-VI Examination May 2011

Subject code: 161404

Subject Name: Food Drying and Dehydration

Date:21/05/2011 **Time: 10.30 am – 01.00 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Discuss quality changes during drying of food materials. **07**

(b) Define the following terms and give their applications (Any seven): **07**

i) Water activity
ii) Dehydration
iii) Coefficient of performance
iv) Novel dryer
v) Critical moisture content
vi) Equilibrium moisture content
vii) Unheated air drying
viii) Free moisture

Q.2 **(a)** Give application of equilibrium moisture content. Determine the equilibrium moisture content of grain at a relative humidity of 10% and temperature 318^{O} K using Henderson's equation. The value of product constants are C= 6.12×10^{6} and n= 2.25 **07**

(b) Discuss vacuum and freeze drying methods. **07**

OR

(b) Explain drying of grains with its importance. Also discuss unheated air drying.. **07**

Q.3 **(a)** What is hysteresis? Describe hysteresis graphically along with its phenomena. **04**

(b) Describe type of moisture present in food with diagram or graph. **05**

(c) Discuss water activity and rehydration in food. **05**

OR

Q.3 **(a)** 40 kg of food at moisture content 40% wet basis is to be dried to a 15% moisture content. What will be the final mass and moisture content in percent dry basis of the product. **04**

(b) How much water to be added to the food granules containing 15% moisture (dry basis) to give a final mass of 35 kg with a moisture content of 70% (wet basis) **03**

(c) Explain the Henderson's equation of EMC. Determine the value of C and n from Henderson equation for the following data: **07**

Relative humidity (%)	Temperature (^{0}C)	Equilibrium Moisture content (% wet basis)
40	60	8
80	60	14

Q.4	**(a)**	Explain the need of novel technology? List the various novel and hybrid technologies. Also explain how new technology is developed.	**07**
	(b)	Discuss selection of dryer in detail.	**07**
		OR	
Q.4	**(a)**	Discuss the different moisture movement phenomena in cereal grains. Also discuss drying rate curves.	**04**
	(b)	Discuss hybrid technology.	**04**
	(c)	Discuss energy and environmental conservation in drying	**06**
Q.5	**(a)**	Discuss design of grain dryer in detail.	**07**
	(b)	Write short notes on (Any two): i) Solar dryer ii) Factors affecting drying iii) Test procedures in dryers	**07**
		OR	
Q.5	**(a)**	Discuss optical and structural properties of dried material.	**07**
	(b)	Describe commonly used four drying methods with drying conditions	**04**
	(c)	Give effects of drying conditions on food	**03**

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