Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- VIth SEMESTER–EXAMINATION – MAY- 2012

Subject code:161404 **Date:17/05/2012**

Subject Name: Food Drying and Dehydration

Time:10.30 am to 1.00 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)** Give importance of drying of agricultural produce including food materials. Explain critical moisture content. **04**

(b) Define/explain the following terms (any three). **03**

(i) Water activity (iii) Free moisture

(ii) Equilibrium moisture content (iv) Drying

(c) Explain various changes in quality during drying of food materials. **07**

Q.2 **(a)** Explain hysteresis phenomena. Also describe type of moisture present in food with diagram. **07**

(b) Explain the Henderson's equation of EMC. **07**

Determine the value of c and n from Henderson's equation for the following data.

Relative Humidity (%)	Temperature (°C)	Equilibrium moisture content. (% wet basis)
40	60	8
80	60	14

OR

(b) Discuss water activity and rehydration in food. **07**

Q.3 **(a)** Discuss drying theory in brief. **07**

(b) Discuss design of a dryer. **07**

OR

Q.3 **(a)** Explain working of grain dryers. **07**

(b) Explain working of spray dryer and freez dryer. **07**

Q.4 **(a)** Write short notes (any two). **08**

(i) Properties of dehydrated foods.

(ii) Dryer performance.

(iii) Vaccum dryer.

(b) Answer the following (any three). **06**

(i) How will you determine EMC?

(ii) Explain thin bed drying.

(iii) Explain moisture content measurement.

(iv) Explain working of drum dryer.

OR

Q.4 **(a)** Explain most commonly used drying methods with their drying conditions. **07**

(b) Discuss factors affecting structural properties. **07**

Q.5 **(a)** Briefly describe the type of moisture present in food by defining each of the following terms: Bound moisture, Unbound moisture, Equilibrium moisture and Free moisture and represent them in a single graph. **07**

(b) List various novel and hybrid technology. Also explain how new technology is developed. **04**

(c) Explain selection of a dryer in brief. **03**

OR

Q.5 **(a)** A 200 kg batch of a food powder contains 30% moisture on a wet basis. It is to be dried to 17% moisture at a constant rate of 0.005 kg/m^{2}s. The critical moisture content is 15%. Calculate the batch drying time if the drying surface is 0.025 m^2 per kg of dry weight. **05**

(b) Determine the quantity of parboiled paddy with 75% moisture content on dry basis required to produce 10 tonnes of product with 13% of moisture content on wet basis. **04**

(c) Discuss solar energy based dryers. **03**

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