

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI- EXAMINATION – SUMMER 2016****Subject Code:161404****Date:17/05/2016****Subject Name:Food Drying & Dehydration****Time: 10:30 AM to 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) What is the requirement of selection of dryer? Discuss selection process of dryers. **07**
- (b) 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**
- Q.2** (a) What is quality of dried products? Explain quality changes in drying. **07**
- (b) Give the applications of equilibrium moisture content. Determine the equilibrium moisture content of paddy at a relative humidity of 60% and at a temperature of 27°C using Henderson's equation. Given that constant C and n are 5.5×10^{-4} and 2.1 **07**
- OR**
- (b) Explain design of tray dryer and freeze dryer. **07**
- Q.3** (a) Explain simple and vigorous tests for selection of dryer. **06**
- (b) Answer the following. (Any four) **08**
- (i) Explain moisture removal process in freeze drying.
 - (ii) Explain grain drying in grain dryer.
 - (iii) Explain requirement of continuous and batch type of dryer.
 - (iv) What are specifications of dryers?
 - (v) Explain moisture removal in drum drying.
- OR**
- Q.3** (a) Describe briefly the importance of drying of agricultural material. Also discuss factors affecting drying. **07**
- (b) Define the following terms and give their application. (Any seven) **07**
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|----------------------------------|--------------------------------|
| (i) Water activity | (ii) Dehydration |
| (iii) Novel dryer | (iv) Critical moisture control |
| (v) Equilibrium moisture content | (vi) Unheated air drying |
| (vii) Hysteresis | (viii) Finishing dryer |
| (ix) Rehydration ratio | |
- Q.4** (a) (i) Explain most commonly used drying methods in brief. **04**
- (ii) Explain shallow and deep bed drying. **03**
- (b) Define/explain following terms (Any seven). **07**
- (i) Water activity
 - (ii) Equilibrium moisture content
 - (iii) Rehydration of food
 - (iv) Shelf life of grain
 - (v) Non heated dryers
 - (vi) Natural Sun drying

- (vii) Super-heated steam drying.
- (viii) Flash drying.

OR

- Q.4 (a)** (i) How much water to be added to food granules containing 15% moisture (dry basis) to give a final mass of 40 kg with a moisture content of 60% (wet basis) **04**
- (ii) Explain solar energy based dryer. **03**
- (b)** Describe the following (Any Two) **07**
- (i) Tunnel dryer
 - (ii) Spray dryer
 - (iii) Freeze drying
- Q.5 (a)** Draw sketch and explain drum dryer and tray dryer. **07**
- (b)** Explain basic steps for design of grain dryers and freeze drying. Also draw PHTC grain dryer. **07**

OR

- Q.5 (a)** Answer the following (Any Five) **10**
- (i) What is thin layer drying?
 - (ii) Explain moisture desorption curve.
 - (iii) Explain coefficient of performance of drying.
 - (iv) Explain requirement of novel and hybrid dryers.
 - (v) What is energy and environmental conservation in drying?
 - (vi) Explain freeze drying.
 - (vii) What are conditions of drying?
- (b)** Explain vacuum and osmotic drying method. **04**
