

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**
