

KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food . Engg) Degree Programme 2014 Admission

IVth Semester Final Examination- June – July 2016

Cat. No: Fden.2207

Title: Unit Operations in Food Engineering (2+1)

Marks: 50.00

Time: 2 hours

I Choose the correct answer

(10 x 1 =10)

1. In sieve analysis the screen opening are maintained _____ times of the previous screen opening
a) Square b) square root c) cube d) cube root
2. The economy of triple effect evaporator is _____ than single effect evaporator
a) More b) less c) equal d) unpredictable
3. The resistance of offered to filtration _____ with increase in thickness of cake
a) Increases b) decreases c) unpredictable d) none of the above
4. Mixing index _____ with time
a) Increases b) decreases c) equals d) does not change
5. Leaching is also called as _____
a) Solid extraction b) liquid extraction c) gaseous extraction d) none of these
6. Terminal velocity depends on _____ of the particle
a) Size b) shape c) density d) all of the above
7. Wave guides are the most efficient way to transfer _____ energy
a) Electromagnetic b) UV light c) RF energy d) none of these
8. Extrusion –cooking as a method is used for the manufacture
a) Snack foods b) cereal flakes c) baby food d) all the above

Fill up the blanks

9. A point where solid , liquid and vapour phase of a substance exist is called _____
10. Direct electrical heating of food mixtures is achieved by _____ heating.

II Write short notes ANY FIVE

(5 x 2 =10)

1. Write mass and enthalpy equation for multiple effect evaporator
2. Write empirical equations for size reduction
3. Explain contact equilibrium separation
4. Define nucleation
5. What is extrusion cooking
6. Differentiate extraction and leaching
7. Write some applications of microwave heating in food processing

III. Explain ANY FIVE of the following

(5 x 4 =20)

1. Write note on plate and frame press filtration unit
2. Explain the working of single screw extruder with neat sketch
3. Explain principle and working of solid mixing equipments
4. Explain multiple effect forward feed and backward feed evaporators with neat sketch
5. Discuss theory of contact equilibrium separation process with an example
6. Explain working of hammer mill with neat sketch
7. Explain the working principle of microwave oven with a diagram

IV. Write essay on ANY ONE

(1 x 10 = 10)

1. A single effect evaporator is to be concentrate a food solution containing 15 % (by mass) dissolved solid to 50 % solids. The feed stream enters the evaporator at 291 K with a feed rate of 1.0 Kg s^{-1} .Steam is available at a pressure of 2.4 bar and absolute pressure of 0.07 bar is maintained in the evaporator. Assuming that the properties of the solution are the same as those of water ,and taking the overall heat transfer coefficient to be $2300 \text{ W m}^{-2} \text{ K}^{-1}$, calculate the rate of steam consumption and the necessary heat transfer surface area.
2. Discuss in detail about distillation process.
