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END SEMESTER EXAMINATION – 2019

Semester : 6th

Subject Code : FPT-601

FOOD ENGINEERING OPERATIONS - II

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. Answer *all* questions from PART – A and any *five* (05) questions from PART – B.
2. Illustrate your answers with suitable sketches and examples wherever necessary.
3. Make suitable assumption(s) wherever and whenever applicable.
4. Preferably, write the answers with sequential order.

[Turn over

PART - A

Marks - 25

1. Match the following Columns : $1 \times 5 = 5$

Column - A	Column - B
(a) Harkin-Zura Equation	(i) Screening and cleaning
(b) Falling rate period	(ii) Infra-red moisture meter
(c) Bond's Law	(iii) Size reduction
(d) Tromel	(iv) Equilibrium moisture content
(e) Moisture content	(v) Drying

2. Multi-choice questions : $1 \times 10 = 10$

- (i) Drying of fruit pulp can be accomplished by a
- (a) Tray dryer
 - (b) Fluidized bed dryer
 - (c) Drum dryer
 - (d) Spray dryer

92/FPT-601/FEO-II (2)



(ii) Psychrometric chart is used to determine the following property of air

- (a) Relative humidity
- (b) Humidity ratio
- (c) Both (a) and (b)
- (d) None of these

(iii) Psychrometric chart is made for

- (a) any pressure
- (b) one atmospheric pressure
- (c) below 1 atmosphere
- (d) above 1 atmosphere

(iv) Pascal is a unit of

- (a) Displacement
- (b) Temperature
- (c) Pressure
- (d) Viscosity

(v) Microwave oven as dryer is best example of

- (a) Radiation drying
- (b) Di-electric drying
- (c) Pneumatic drying
- (d) Vacuum drying

92/FPT-601/FEO-II (3) [Turn over

- (vi) Law of grinding which is more applicable for fine grinding is
- (a) Bond's Law (b) Kick's Law
(c) Ratzinger's law (d) None of these
- (vii) Which one of the following is not a physical property of food materials ?
- (a) Porosity (b) Specific gravity
(c) Specific heat (d) Frontal area
- (viii) Preheating temperature ($^{\circ}\text{C}$) of milk before pasteurization is
- (a) 30-35 (b) 35-40
(c) 40-45 (d) 45-50
- (ix) Belt conveyor is used in
- (a) material transportation over long distance
(b) material transportation with in the premises
(c) Both (a) and (b)
(d) Lifting of materials



- (x) In twin screw extruder, Screw extruders runs at speed of
- (a) 100-400 rpm (b) 20-60 rpm
(c) 10-20 rpm (d) None of these

3. Define the following: 2x5=10
- (a) Dew point temperature
(b) Henderson's Law of EMC
(c) Hysteresis effect
(d) Sensible cooling
(e) Baking.

PART - B
Marks - 45

9x5=45

1. What do you mean by moisture content ? Discuss the different types of moisture content determination methods. 9
2. Differentiate between the following: 9
- (i) Dry bulb-temperature and Wet-bulb temperature
(ii) Constant rate period and falling rate period.

3. How do you classify various evaporation equipments ? Describe forward feeding method (with diagram) in a multiple effect evaporator. 9
4. What do you mean by EMC ? Write down the different models associated with EMC of food materials. 9
5. Describe the principles of drying. Discuss the different factors which affect drying characteristics. 9
6. Write down the effects of freezing and frozen storage on product quality. 9
7. With neat labeled diagram draw spray dryer.

