

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, B.Tech. Dairy Technology 2018-19

Semester	: VI (New Syllabus)	Academic Year	: 2018-2019
Course No.	: DE-611	Course Title	: Food Engineering
Credits	: 3+1=4	Total Marks	: 50
Day & Date	: Tuesday, 25.06.2019	Time	: 11.00 to 13.00 Hrs.

- Note :**
- 1) All questions from **Section 'A'** are compulsory.
 - 2) Solve **Any Five** questions from **Section 'B'**.
 - 3) Draw neat and well labelled diagram wherever necessary.

SECTION - 'A'

Q. 1 A) Choose the most appropriate answer from the options given below. (05)

- i) Flow behavior index is one for fluid.
 - a) Dialatant
 - b) Pseudoplastic
 - c) Newtonian
 - d) Blugham plastic
- ii) When the apparent viscosity increases with time as fluid is continuously sheared, the fluid is called
 - a) Rheopectic
 - b) Thixotropic
 - c) Bingham plastic
 - d) Quasi plastic
- iii) Density measured after placing the product in constant volume container without vibration
 - a) Packed bulk density
 - b) Loose bulk density
 - c) Particle density
 - d) Crushed bulk density
- iv) The point in food that cools most slowly is called the
 - a) Center most point of food
 - b) Centre of the surface
 - c) Thermal center
 - d) Centre of the volume
- v) The latent heat of fusion of ice is
 - a) 80 kcal/kg
 - b) 500 kcal/kg
 - c) 1000 kcal/kg
 - d) 200 kcal/kg

B) Answer in One line. (05)

- i) What is Suspension?
- ii) What is Eutectic temperature?
- iii) Define 'water activity'.
- iv) What is mean by 'Bound water'?
- v) Define 'Blanching'.

Q. 2 A) Give the formulae for the following. (05)

- i) Conversion of Moisture content on Dry basis from wet basis.
- ii) Freezing point depression for dilute solution
- iii) Drying time taken in falling rate drying period.
- iv) Plank's equation for freezing time.
- v) Power law model.

(P.T.O.)

- B) State whether True or False. If false, rewrite the statement after making necessary corrections. (05)
- i) Examples of pseudo plastic liquids are condensed milk and tomato catchup.
 - ii) Critical moisture content is the moisture content of food below which rate of drying falls.
 - iii) Food does not freeze at one temperature because of presence of substances dissolved in the water
 - iv) For Dilatant fluid, flow behavior index is greater than 1.
 - v) A fluid which exhibits a yield stress is called a visco-elastic fluid.

SECTION - 'B'

- Q. 3 Explain with equations, the Stress-Strain behavior of the following fluids. (06)
- A) Pseudoplastic;
 - B) Dilatent
 - C) Newtonian
 - D) Blugham
 - E) Thixotropic
- Q. 4 Explain Maxwell and Kelvin models in detail. (06)
- Q. 5 Write about the changes that occur in food during freezing including the changes in the enthalpy. (06)
- Q. 6. A) Name different types of food freezing equipment. (02)
B) Write short note on 'freeze drying'. (02)
C) Draw drying rate curve and name the various stages in it. (02)
- Q. 7 A) A dry food product has been exposed to a 30% RH environment at 15 °C for 5 h without a weight change. The moisture content has been measured and is 7.5% (wet basis). The product is moved to a 50% RH environment and a weight increase of 0.1 kg/kg product occurs before equilibrium is reached. Compute moisture contents of the product on dry basis in both environments. (03)
B) Give the assumptions and limitations of planks equation. (03)
- Q. 8 A) 100 gm of powder contains 30 gm of moisture. Calculate its moisture content on wet basis and dry basis. (02)
B) Write short note on 'Air Blast Freezer'. (02)
C) Explain extraction in brief. (02)
- Q. 9 A) List out the differences between conventional drying and freeze drying. (02)
B) Develop an equation for prediction of freeze drying time for a food product. (04)
