

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

Semester	: VI (V Dean)	Academic Year	: 2018-2019
Course No.	: DE- 612	Course Title	: Food Engineering
Credits	: 2+1=3	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 Three** questions from **Section 'B'**.
  - 3) Draw neat and well labelled diagram wherever necessary.

**SECTION - 'A'**

Q. 1 A) Choose and indicate the most appropriate answer for the following. (05)

- i) Ideal plastic body is also known as .....
  - a) Hookean body
  - b) St. Venant body
  - c) Newtonian body
  - d) None of these
- ii) In air blast freezer, temperature of air is kept at .....
  - a) -20 to 0 °C
  - b) -20 to -40 °C
  - c) -10 to -20 °C
  - d) -10 to -40 °C
- iii) The loose, porous and ragged protein matrix of rasogolla attributes to its .....
  - a) Lower springiness
  - b) Higher springiness
  - c) Fracturability
  - d) Hardness
- iv) Flowability of granular powdered product mainly depends on .....
  - a) Bulk density
  - b) Moisture content
  - c) Angle of repose
  - d) Particle size
- v) During falling rate period, water movement mainly depends on .....
  - a) Vapour pressure difference
  - b) Surface tension
  - c) Diffusion
  - d) All of these

B) State one critical difference between.

- i) Newtonian and non-Newtonian fluid.
- ii) Hardness and Adhesiveness.
- iii) Elasticity and Plasticity.
- iv) Specific heat and thermal conductivity.
- v) Dilatant and Pseudo plastic.

Q. 2 A) Answer the following.

- i) Write Plank's equation.
- ii) State the equation for calculation of Constant rate drying time.
- iii) Expand IQF.
- iv) Write the values of P and R for spherical bodies.
- v) What is triple point of water?

(P.T.O.)



- B) State whether the following statements are True or False, If False, rewrite the statement after making necessary corrections. (05)
- i) As compare to batch ice cream freezer, continuous ice cream freezer requires less viscosity mix.
  - ii) Immersion type freezer is an indirect type freezer.
  - iii) Drying time is mainly affected by vapour pressure difference.
  - iv) Blanching removes the poly phenol oxidase enzyme responsible for discoloration.
  - v) The efficiency of hydraulic press depends on shearing force.

### SECTION – 'B'

- Q. 3 A) Explain the different types of dryers. (05)  
B) Briefly describe the freezing curve. (05)
- Q. 4 A) Explain texture profile analysis with the help of force time diagram. (05)  
B) Explain the three ideal classical bodies. (05)
- Q. 5 A) Explain constant rate and falling rate drying period with neat sketch. (05)  
B) Explain the different food freezing equipment. (05)
- Q. 6 A) Write the Plank's equation and its assumptions. (03)  
B) Enumerate the different freezers used in food processing. (03)  
C) Explain the effect of temperature and storage humidity on storage of frozen foods. (04)
- Q. 7 A) Enumerate primary and secondary foods. (03)  
B) State the thermal properties of frozen foods. (03)  
C) A tunnel dryer is being used to dry a high moisture food product with 60% moisture content (WB) to a moisture content of 4% (WB). The critical moisture content is 16% (WB) and the time required for constant rate drying is 12 minutes. Estimate the total drying time for the product. (04)

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