

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, B.Tech. (D.T.) Degree Course 2017-18

Semester	: IV (New Syllabus)	Academic Year	: 2017-2018
Course No.	: DE- 409	Course Title	: Dairy Process Engineering
Credits	: 2+1=3	Total Marks.	: 50
Day & Date	: Tuesday, 12.06.2018	Time	: 15.00 to 17.00 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) With increase in number of evaporators the consumption of steam requirement per kg of water evaporated
 - a) Increases
 - b) Reduces
 - c) Does not change
 - d) None of the above
- ii) It is possible to evaporate 12 kg water with 1 kg steam in a seven effect evaporator, which means the specific steam consumption is approximately
 - a) 7/12
 - b) 1/12
 - c) 12/7
 - d) 1/7
- iii) Change in drying rate is constant in
 - a) Constant rate period
 - b) First Falling Rate Period
 - c) Second Falling Rate Period
 - d) All of the above
- iv) In drum dryers the steam pressure inside the drum is about
 - a) 0.8 to 1.0 kg/Sq.cm
 - b) 0.6 to 0.8 kg/Sq.cm
 - c) 1.0 to 2.0 kg/Sq.cm
 - d) 3.0 to 6.0 kg/Sq.cm
- v) The humidity of air used for spray drying should be normally below
 - a) 70%
 - b) 50 %
 - c) 15 %
 - d) 3 %

B) Answer in one line. (05)

- i) Why the steam requirement of vacuum pan is more than the multiple effect evaporator.
- ii) What is meant by "Case Hardening".
- iii) Give the relationship between water activity and ERH.
- iv) In which of drying Period majority of water is removed from the food.
- v) Why RO is known as concentration process?

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

- i) Steam Economy of Evaporator.
- ii) Drying rate.
- iii) Moisture content on wet basis.
- iv) Porosity.
- v) Heat transfer capacity of an evaporator in terms of Overall heat transfer coefficient.

(P.T.O.)

- B) State whether True or False. If false, rewrite the statement after making necessary corrections. (05)
- i) The increase in the economy of evaporator is possible through the use of multiple.
 - ii) The amount of water evaporated per unit area of surface of evaporator is lower in single effect evaporator.
 - iii) Critical moisture content marks the division between constant rate drying period and Falling drying rate period.
 - iv) Centrifugal atomizers may not be used for spray drying of highly concentrated milk.
 - v) Maximum seven effect evaporator can be used for concentrating milk.

SECTION - 'B'

- Q. 3 With the help of a labeled diagram explain the working of double effect falling film evaporator. (06)
- Q. 4 Describe the working of a drum dryer with a neat diagram. Also derive an expression for its capacity. (06)
- Q. 5 With the help of a neat diagram describe the continuous butter manufacture equipment. (06)
- Q. 6
- a) How steam economy of an evaporator can be improved? (02)
 - b) Differentiate falling film evaporator from rising film evaporator. (02)
 - c) What do you understand by Boiling Point Rise. (02)
- Q. 7
- a) Define bound moisture, unbound moisture and equilibrium moisture contents. (03)
 - b) With the help of drying characteristic curve explain different rate periods of drying. (03)
- Q. 8 Describe with a neat diagram:-
- a) Pressure atomization in spray dryers. (02)
 - b) Function of Bag filters. (02)
 - c) Working principle of Cyclone separators. (02)
- Q. 9
- a) Briefly describe the mechanism of fluidization. (02)
 - b) With the help of neat diagram explain the working of fluidized bed dryers. (04)
