B.Tech Odd Semester (CBCS) Exam., December—2017

AGRICULTURAL ENGINEERING

(5th Semester)

Course No. : AE–504 (C)

(Food Chemistry and Microbiology)

Full Marks : 75
Pass Marks : 30

Time : 3 hours

Note : 1. Attempt **one** questions from each Unit.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the margin indicate full marks for the questions.

UNIT—1

1. *(a)* Classify and discuss different types of carbohydrate with examples. 7

(b) Define the types of moisture present in food with neat sketch. Explain hysteresis with diagram. 4+4=8

2. *(a)* Write short notes on the following : 6
(i) Water activity
(ii) Optical activity
(iii) Mutarotation
(iv) Gelatinization

(b) Define colloidal system. Write down the difference between lyophilic and lyophobic solutions. 3+6=9

UNIT—2

3. *(a)* What is browning? Describe different types of food browning. Discuss the desirable and undesirable changes in food due to browning. 7

(b) Write short notes on the following : 8
(i) Amylose
(ii) Amylopectin
(iii) Caramelization
(iv) Dextrinization

4. Define the pure proteins of plant and animal origin with their functional properties. 15

UNIT—3

5. *(a)* Write down the factors influencing the rate of lipid oxidation in food. 9

(b) Define the following terms : 6

(i) Crystallization

(ii) Interesterification

(iii) Autooxidation

6. *(a)* Explain in detail : 8

(i) Wet rendering

(ii) Dry rendering

(b) What are different types of test for assessing the quality of frying oils? 7

UNIT—4

7. *(a)* Define thermal death time. Derive the equation of microbial death kinetics. 10

(b) The initial inoculated in concentration of 5 10^7 per g of food with $D_{121\,1}$ 1 2 min. It is assumed that only one spore remains visible at the end of the process if the total mass of food is 400 g. Calculate the F value. 5

8. *(a)* Define the following terms : 6

(i) Sterilizing value

(ii) z-value

(iii) Temperature quotient

(iv) 2-log reduction

(b) Write the distinguishing features of different groups of microorganisms. Illustrate different extrinsic and intrinsic factors of that play significant role in the growth of microorganisms. 9

UNIT—5

9. *(a)* Explain the microbial growth curve. Why does the population of microbial cells reduce during their declination phase? 5

(b) Write in detail about different measures that are taken to prevent food spoilage. 5

(c) A food material packed in cans which can be sterilized at 135 °C for 6 sec or at 140 °C for 2 sec. Find the z-value of the microorganism to destroy in this process. 5

10. *(a)* What do you mean by food poisoning? Describe how certain microbes are used for food preservation. 10

(b) The initial and the required spore concentrations in a food are 1 10^9 and 1 10^3 per container, respectively. If the decimal reduction time for C. *botulinum* at 121 °C is 0·21 min, find the time required to complete sterilization of the food at 121 °C. 5

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