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B.E. / B.Tech. (Full Time) DEGREE

EXAMINATIONS, APR / MAY 2014

AGRICULTURAL AND IRRIGATION ENGINEERING BRANCH

SEVENTH SEMESTER

AI 9403 – FOOD PROCESSING ENGINEERING

(REGULATION 2008)

Time: 3 hours

Answer ALL Questions

Max Marks: 100

Part – A (10 x 2 = 20 Marks)

- 1) What are the different types of blanching?
- 2) How is food technology different from food science?
- 3) Write the BET isotherm equation.
- 4) Following data were obtained from a thermal resistance experiment conducted on a spore suspension at 111°C. Find the D value.

Time (minutes)	0	4	8	12
Number of survivors	10^6	1.2×10^5	1.4×10^4	1.5×10^3

- 5) How do the particle size and its distribution affect the brewing time and turbidity in coffee?
- 6) List out the driving forces and membranes in membrane separation process
- 7) Differentiate MUFA and PUFA with examples.
- 8) Define *radappertization* with suitable example.
- 9) What are edible films? Give examples.
- 10) List out any 8 details found in a food packaging material.

Part – B (5 x 16 = 80 Marks)

- 11) (i) Two food powders A and B are mixed in the ratio 80% and 20% respectively. After mixing, they are stored in sealed containers. The moisture sorption isotherm for these materials is approximated to straight lines as $M_A = 9 + 3 a_w$ and $M_B = 6 + 5 a_w$ where M_A and M_B are moisture contents on dry basis and a_w is the water activity. The initial moisture content of the powder A is 11 g of water / 100 g of dry matter and powder B is 6 g of water / 100 g of dry matter. Find out the equilibrium water activity. (8)
- (i) Write a note on thermal process time and the factors affecting it. (8)
- 12) a) i) Discuss in detail the various constituents of food. (8)
- ii) What are the objectives of food processing? (8)

(or)

b) i) How is sorting and grading done in processing of fruits and vegetables? (10)

ii) Enumerate the various causes of food spoilage with examples. (8)

13) a) i) Cut and blanched pieces of mushroom are dehydrated in a cabinet dryer. The initial moisture content of mushroom was 82% wb and it is to be dried to 4% moisture content wb. The critical moisture content is 24% wb. Constant rate drying continues for 7 minutes. Estimate the total drying time for the product. (7)

ii) Explain the process of Spray drying with a neat sketch. (9)

(or)

b) i) Explain the 2 stage freeze concentration process with a neat sketch. (7)

ii) Tabulate the applications of various dryers in food processing with suitable examples. (9)

14) a) i) With a neat sketch of an extruder discuss extrusion cooking with suitable examples. (8)

ii) Discuss the various steps in vegetable oil processing. (8)

(or)

b) i) Explain the process of dielectric heating and its applications to food industry along with a neat sketch of a microwave oven. (9)

ii) What are the basic principles of food preservation? Discuss various methods available for the same. (7)

15) a) i) Write short notes on Controlled Atmosphere Storage and Modified Atmosphere Packaging (11)

ii) It is proposed to establish a fruit processing unit in a potential fruit producing region. The capacity and locations of the godowns of that region are as follows.

Godown	Capacity (T)	Co-ordinates (km)
1	34	(91,105)
2	33	(82,17)
3	26	(12, 128)
4	55	(33,76)
5	45	(89,19)

Find out the location of the proposed fruit processing unit for minimising the transportation cost. (5)

(or)

b) i) Explain in detail the various materials used for packaging and their properties. (8)

ii) Discuss the various mango products and their processing methods. (8)
