



B.E. / B.Tech. (Full Time) END SEMESTER EXAMINATIONS, APRIL / MAY 2011

AGRICULTURAL AND IRRIGATION ENGINEERING BRANCH

EIGHTH SEMESTER – (REGULATIONS 2004)

AI 481 – FOOD PROCESSING ENGINEERING

Time: 3 hrs

Max Marks: 100

Answer ALL Questions

Part – A (10 x 2 = 20 Marks)

- 1) State reasons as to why food processing is necessary.
- 2) A non-vegetarian meal provides 35 g protein, 13 g fat and 110 g carbohydrates out of which 7 g is fibre. Calculate the calories provided by the meal.
- 3) What does  $F_{250}^{18}$  denote?
- 4) Write the BET isotherm equation.
- 5) Differentiate (i) drying and dehydration (ii) freeze drying and freeze concentration.
- 6) Why is instant tea not as popular as instant coffee and dip coffee not popular as dip tea?
- 7) What is miscella?
- 8) What are 'rad' and 'gray'?
- 9) Discuss tetra pack with an example.
- 10) What are edible films?

Part – B (5 x 16 = 80 Marks)

- 11) a) 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  $M_B = 5 + 5 a_w$  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 two powders is A - 11 g of water / 100 g of dry matter and B - 6 g of water / 100 g of dry matter. Find out the equilibrium water activity. (8)
- b) Discuss the methods to determine the dependence of reaction rate constant on temperature. (8)
- 12) a) i) Discuss in detail the various constituents of food. (9)
- ii) Discuss the fruit marketing system with a flow chart. (7)
- (or)
- b) i) Enumerate the various causes of food spoilage with examples. (8)
- ii) What are the basic steps to be followed in canning? (8)

- 13) a) i) Describe the osmosis and reverse osmosis processes for concentrating a liquid. (8)  
 ii) Discuss the stages of drying in detail. (8)

(or)

- b) i) Describe in detail the various steps involved in Instant Coffee preparation. (6)  
 ii) Explain the process of Spray drying with a neat sketch. (10)

- 14) a) i) Discuss the various steps in the manufacture of margarine in detail. (8)  
 ii) Explain with a flowchart the solvent extraction process of rice bran oil production. (8)

(or)

- b) i) Explain the process of microwave heating and its applications to food industry along with a neat sketch of a microwave oven. (9)  
 ii) What are the applications of irradiation in food industry? (7)

- 15) a) i) What are the new trends in packaging? Explain the 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	43	(11,15)
2	25	(12,17)
3	62	(27,18)
4	77	(13,16)
5	54	(30,30)

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

(or)

- b) i) What are the methods of food preservation? How are the preservatives permitted in food classified and give examples of the food in which they are used? (8)  
 (ii) Explain in detail the processing of any fruit / vegetable / food product. (8)
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