

AMFT18 REFRIGERATION AND COLD CHAIN MANAGEMENT

UNIT-1 REFRIGERATION PRINCIPLES

- 1.1 Refrigeration- principles- refrigeration effect
- 1.2 Coefficient of performance
- 1.3 Units of refrigeration
- 1.4 Simple vapour compression cycle
- 1.5 T-S diagram- p-h chart- application of refrigeration

UNIT-2 VAPOUR COMPRESSION REFRIGERATION AND COMPONENTS

- 2.1 Vapour compression system
- 2.2 Refrigeration components
- 2.3 Compressor and condenser- types, construction and working
- 2.4 Expansion device and evaporators- types, construction and working

UNIT-3 REFRIGERANTS AND VAPOUR ABSORPTION CYCLE

- 3.1 Refrigerants- properties- classification- comparison and advantages
- 3.2 Chloroflouro carbon (CFC) refrigerants
- 3.3 Effect on environmental pollution
- 3.4 Alternate refrigerants- vapour absorption cycle- theoretical- deviation in practice
- 3.5 Electrolux refrigerator- construction and principles.

UNIT-4 SHELF- LIFE OF FOOD PRODUCTS

- 4.1 Defining overall Shelf-life, remaining shelf life in the context of Chilled & Frozen foods;
- 4.2 Deterioration modes of food items; Models of quality deterioration- Kinetic model; shelf-life model; Q10/q10 model;
- 4.3 TTT model for the remaining shelf- life;
- 4.4 General procedure for shelf- life testing- the 11 steps procedure.
- 4.5 Storage of frozen foods;- Basic design requirements of storage to uphold the shelf- life- size , insulation, entry- exit position,
- 4.6 Palletization, proper disk-space for air-circulation,
- 4.7 Automatic door- closing, proper lighting, temperature monitoring and recording facility;
- 4.8 Stacking systems, emergency exits, material handling devices like fork-lifts, pallet trucks, etc. floor heaters, vapour barriers, etc.

UNIT-5 COLD CHAIN

- 5.1 What is cold chain? Need for the chain for chilled / frozen food item,
- 5.2 Various links of the chain; importance of shelf- life; just- in-time deliveries;
- 5.3 Temperature limits;-in various countries-Europe, US, Australia etc.;
- 5.4 Chilling and freezing;- Chilling injury, cook-chilling systems; cold- shortening;
- 5.5 PPP and TTT concepts;

- 5.6 Temperature monitoring; -Critical temperatures; Temperature- time indicators(TTI);
- 5.7 Time- temperature- correlation-the kinetic approach, effective temperature;
- 5.8 Transportation regulations;
- 5.9 Role of packaging in cold chain- MAS, MAP, CAS, CAP etc.; Thaw indicators.

References Books

- 1 Evans, Judith. “Frozen Food Science and Technology”. Wiley-Blackwell, 2008.
- 2 Hui, Y.H. etal. “Handbook of Frozen Foods”. Marcel Dekker, 2004.

