Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (BIOTECHNOLOGY)

END SEMESTER EXAMINATIONS, NOV/DEC 2017

SUBJECT: **FOOD PROCESSING TECHNOLOGY [BIO 4016]**

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A.	Illustrate the pathway of cleavages of proximate principles of food in LHGBRs of carbohydrates, proteins and fats.	**5**
1B.	Food is important for health and growth. Expand and explain BMR.	**2**
1C.	Starch is an important element in food industries as this involves in majority of the food production with the different roles. List the modified starches used in food industry with their functions.	**3**
2A.	The advancement of food industry is preferably to satisfy the consumer choice to produce the food materials to available throughout the world in all seasons. This involves in different production strategies and flow characteristics. Explain the classification of food based on consumption and flow characteristics	**4**
2B.	Explain the traditional and modern aspects of the role of bacteria in positive bioconversion (desirable) of dairy industry and its negative bioconversion (spoilage)	**4**
2C.	Explain the production of FPC	**2**
3A.	Draw a flow sheet of following fermentative preparation a. Idli b. Tempeh c. Beer d. Fenjiu wine using bamboo shoots.	**8**
3B.	Describe the food preservation process by high low temperature	**2**
4A.	How do we select packaging material, what are their types and packaging functions?	**3**
4B.	Engineering operations are important in food industry to reduce the size, nature of the raw material. The crushing and grinding is the most common unit operation in size reduction. Explain the steps involved in wet milling of starch grain and corn for its product and co-product.	**4**

4C.	Write short note on HACCP and its important in food industry?	**3**
5A.	A single-effect continuous evaporator is used to concentrate a fruit juice from 15Bx to 40Bx. The juice is fed at 25^0C, at the rate of 5400kg/h (1.5 kg/s). The evaporator is operated at reduced pressure, corresponding to a boiling temperature of 65^oC. Heating is by saturated steam at 128^oC, totally condensing inside a heating coil. The condensate exits at 128^oC. Heat losses are estimated to amount to 2% of the energy supplied by the steam. Calculate, a). the concenteration ratio R, b). the required evaporation capacity V (kg/s), c). the required steam consumption S (kg/s).	**4**
5B.	Estimate the convective heat transfer coefficient between orange juice flowing inside a pipe and the pipe wall. The juice is being cooled. Data: Pipe diameter: 0.05 m, Volumetric flow rate: 4 m^3/h, Properties of orange juice at the temperature of the process: ρ=1060 $kg.m^{-3}$; μ= 3 $x10^{-3}$ Pa.s; Cp= 3900 $J.kg^{-1}.K^{-1}$; k =0.54 $W.m^{-1}.K^{-1}$	**4**
5C.	Calculate the radiation dose needed to reduce the Salmonella count in egg yolk by 7 log cycles. For Salmonella in egg yolk D_{10}=0.8kGy.	**2**