BITS, Pilani, KK Birla Goa Campus

FIRST SEMESTER 2022-2023

BITS F417 Microfluidics and its applications

Comprehensive Examination-Part B (Open Book)

DATE: 21/12/2022 Time: 3:30-5:00 PM Maximum Marks: 35

Instructions:

- All parts of a question must be answered at a single place.
- Support your answer with neat sketches where ever necessary

1. Describe the fabrication technique considered for rapid prototyping of microfluidic devices **[10 M]**

2. (a) Mix methanol completely with water in a parallel micromixer with two inlets (Y-mixer) at room temperature. The flow rates of both methanol and water are 20 µl/min. Determine the required length of the mixing channel if the channel cross section has a dimension of 75 µm x 100 µm.

   (b) The above mixer has to be redesigned with more lamination layers. In the new design, the channel length should be 3 mm. In how many laminate should each stream be separated? **[5 + 4 = 9 M]**

3. (a) Elaborate on the technique that is commonly used to fractionate or separate **DNA** molecules according to length a technique that is used widely in forensics and human genome **[8 M]**

4. Identify the given figure and discuss on the same. [**8 M]**