CBCS SCHEME

USN | | | | | | | | | | |

15NT64

Sixth Semester B.E. Degree Examination, Aug./Sept. 2020
Microfluidics and Nanofluids

Time: 3 hrs. Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Explain briefly about benefits of size reduction. **(06 Marks)**

b. Write a short note on multi layer Fabrication with a neat diagram. **(10 Marks)**

OR

2 a. Explain the factors affecting the nanofluids. **(10 Marks)**

b. Discuss about the theoretical models for the thermal conductivity of nanofluids. **(06 Marks)**

Module-2

3 a. What are micropumps? Explain in detail about two types of micropumps. **(08 Marks)**

b. Write a short note on : (i) Soft thiography and PDMS (ii) Detection method in microfluids. **(08 Marks)**

OR

4 a. What are micromixers? Discuss briefly about Active mixers and passive mixers. **(08 Marks)**

b. Explain : (i) Laminar flow (ii) Peclet number (iii) Pressure driven flow (iv) Electro osmotic flow. **(08 Marks)**

Module-3

5 a. Define chemotaxis. Explain in detail about any four techniques. **(10 Marks)**

b. Discuss the impact of microfluidcis on biomedical research. **(06 Marks)**

OR

6 a. Explain briefly about microfluidic device fabrication. **(08 Marks)**

b. Write a short note on organ-on-a-chip and biomimetic blood vessel. **(08 Marks)**

Module-4

7 a. Discuss the applications of nano emulsions. **(08 Marks)**

b. What are micro emulsions? Explain briefly about its history and its type. **(08 Marks)**

OR

8 a. What are Emulsions? Explain the properties, mechanism and uses of emulsification. **(08 Marks)**

b. Explain briefly about surfactant film properties. **(08 Marks)**

Module-5

9 a. Explain the preparation of the following non-metallic nano-fluids:
(i) Aluminium oxide nanofluids.
(ii) Silicon dioxide nanofluids. **(08 Marks)**

b. Mention the biomedical applications of nanofluids and explain each of them. **(08 Marks)**

OR

10 a. Explain briefly the preparation of the following metallic nanofluids:
(i) Gold and silver nanofluid.
(ii) Copper nanofluid. **(08 Marks)**

b. Mention the applications of nanofluids and explain each of them. **(08 Marks)**

* * * * *