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10NT71

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Micro and Nano Fluidics

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Describe the molecular model for gas and explain the relations between the molecular behaviour and the macroscopic properties of gases. (10 Marks)
b. Explain the heat transfer analysis of i) Microscale Couette flow; ii) Micro-Poiseuille flows. (10 Marks)
- 2 a. Explain in detail about the electric double layer effect. (10 Marks)
b. Explain the concept of electrophoresis in micro scale liquid flow. (10 Marks)
- 3 a. Explain concepts of surface and interfacial energies and tensions in micro fluids. (10 Marks)
b. Derive the Young-Laplace equation of capillarity. (10 Marks)
- 4 a. Describe the stability of equilibrium solutions in microscale. (10 Marks)
b. Explain in detail the kinetics of capillary and confined flows. (10 Marks)

PART – B

- 5 a. Explain about stabilization of nanofluids with enhancement techniques. (10 Marks)
b. Discuss about one step method to synthesize nanofluids and state its advantage and disadvantage. (10 Marks)
- 6 a. Write a note on electrophoresis of individual nanotubuler in micro fluidic channels. (10 Marks)
b. Explain about polymer transport. (10 Marks)
- 7 a. Explain about nanofluids with carbon nanotubes. Name few surfactants which are used with CNT and its properties. (10 Marks)
b. Discuss about waste heat collectors. (04 Marks)
c. Explain the phenomenon of critical heat flux. (06 Marks)
- 8 a. Discuss about nanofluids in medical applications. (10 Marks)
b. Explain briefly optical and magnetic properties of nanofluids. (10 Marks)

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1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written on the back of the question paper will be treated as malpractice.