CLASS: B.TECH   SEMESTER : VII
BRANCH: CHEMICAL/ CHEMICAL (P&P)   SESSION : MO/2022

SUBJECT: CL424 MICROFLUIDICS

TIME: 3:00 Hours   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Explain point value in continuum fluid mechanics	[2]	CO1	L1
Q.1(b)	Describe Couette flow and Poiseuille flow.	[3]	CO1	L1
Q.1(c)	Summarize the different theories proposed for different length scale base on molecular number density.	[5]	CO1	L2
Q.2(a)	Describe with example: electrocapillary effect, thermocapillary effect.	[4]	CO2	L1
Q.2(b)	Derive Young's equation from interfacial energy minimization principle.	[6]	CO2	L4
Q.3(a)	Summarize the Mechanisms of DNA separation.	[2]	CO3	L2
Q.3(b)	Derive the expression of Electrophoretic mobility due to the movement of charged particles in an insulating fluid, submitted to an electric field.	[3]	CO3	L4
Q.3(c)	Describe Electro-osmosis, Electrophoresis, Streaming Potential, Sedimentation Potential, and Dielectrophoresis.	[5]	CO3	L1
Q.4(a)	Write down the application of Polydimethylsiloxane in microcasting.	[5]	CO4	L4
Q.4(b)	Explain Czocharalski method (CZ-method) with a neat sketch.	[5]	CO4	L3
Q.5(a)	Compare isothermal and nonisothermal flow sensor. Give example.	[5]	CO5	L2
Q.5(b)	Write down the working principle and application of nonmechanical micropumps: Electrohydrodynamic Pumps, Electrokinetic Pumps, Surface Tension Driven Pumps, Magnetohydrodynamic (MHD) Pumps.	[5]	CO5	L3

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