CHL-331 : Minor-1 Examination: Fluid Particle Mechanics

Time:1 hour; Full Marks:20. Answer All the Questions . Use necessary assumptions if required and state clearly in answer booklet. Do not ask questions to invigilators.

1. Find out mode, median and harmonic mean size of a powder written as feed below. If a screen of 100μm is placed, the distribution of course product and fine fraction are shown in the table. Find out the efficiency of the screen.

Size range (μm)	10-50	50-100	100-150	150-200	200-250	250-300
N_3 (feed)	0.1	0.25	0.50	0.80	0.95	1.00
N_3(course product)	0	.05	.32	.71	.93	1.00
N_3(fine product)	0.32	0.68	0.90	0.99	1.00	1.00

Marks: 3+1+2+4

2. Find out terminal velocity of the particle for following case. A solid spherical particle (dia 0.1mm) of density 0.95 gm/cc is placed at the bottom of a column of water (density 1gm/cc , viscosity 1cp). Find out the drag force and buoyancy force after it attains the terminal velocity.

Marks : 3+1+1

3. (i)Find out sphericity and area shape coefficient of a cuboid particle(ratio of dimension of sides 1:1:1).
   (ii) Discuss the methodology of determination of particle density of a powder sample using inert gas.
   (iii) What is zeta potential?

Marks : 2+2+1