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Total Number of Pages: 02

**B.TECH**  
**PMI3I103**

**3<sup>rd</sup> Semester Regular / Back Examination 2017-18**

**PARTICULATE TECHNOLOGY**

**BRANCH: MINERAL**

**Time: 3 Hours**

**Max Marks: 100**

**Q.CODE:B798**

**Answer Part-A which is compulsory and any four from Part-B.  
The figures in the right hand margin indicate marks.**

**Part – A (Answer all the questions)**

**Q1 Answer the following questions: *multiple type or dash fill up type* (2 x 10)**

- a) In case of Spherical particles, -----indicates the size.
- b) Wadell's sphericity is the ratio between ----- and -----.
- c) ----- sampling is used for hard and uniform ore.
  - (i) Chip sampling (ii) Grab sampling
  - (iii) Groove sampling (iv) Muck sampling
- d) The base screen on the Tyler's series is.....
  - (i) 200 micron, (ii) 200 mesh, (iii) 75 mm, (iv) None of these
- e) The charge develops at the interface between a solid surface and its liquid medium is called -----.
- f) ----- conveyor can be used for fine powder conveying.
  - (i) Belt conveyor, (ii) Bucket conveyor, (iii) Screw conveyor
- g) Hopper flow factor is the ratio between ----- and -----.
- h) The phenomenon exhibited by some fluids, sols, and gels in which they become more viscous or solid under pressure is -----.
- i) A particle in an electrolyte solution contains a strongly bound layer and a diffuse layer of ions closed to its surface is called -----.
  - (i) Mix layer (ii) Mixed layer
  - (iii) Double layer (iv) None of these
- j) The bulk density of a powder compacted by tapping or being subjected to vibration is called.....

**Q2 Answer the following questions: *Short answer type* (2 x 10)**

- a) What is isokinetic sampling?
- b) Calculate the equivalent spherical diameter of a 10 micron cube using equivalence by volume.
- c) Differentiate between bulk sampling and chip sampling.
- d) What is the relationship between surface forces and the potential energy between a pair of particles?
- e) What you mean by Mesh Size and Mesh No?
- f) What is volume shape coefficient?
- g) What is Reynolds number?

- h) Write Richardson and Zaki equation for settling velocity.
- i) Explain bulk density, true density.
- j) What is the importance of sedimentation in particle technology?

**Part – B (Answer any four questions)**

- Q3** a) What are the different solid sampling methods used in ore dressing plants? Discuss any two equipments used for it in detail with neat sketch. What is error in sampling? (10)
- b) What is slurry sampling? How it is different from dry solid sampling? Write the disadvantages of slurry sampling. (5)
- Q4** a) What are the different surface forces arises in particles acting across intervening medium due to intermolecular interaction between the molecules in the particles? Describe in detail. (10)
- b) Discuss the different mechanisms of segregation according to size of the particles. (5)
- Q5** a) Write in details about the different methods used for algebraic representation of size functions. (10)
- b) Indicate how the true arithmetic average diameter of a sample of particles may be calculated from the screen analysis data. (5)
- Q6** a) Discuss the following. (10)
- i) Ro-tap Sieve analysis
  - ii) Dynamic weighing
  - iii) Convective transport
- b) Write in details about the forces acting on a very small particle in a liquid medium. (5)
- Q7** a) Describe the different mechanical transport used in industry. Also write the principle and construction of screw conveyor with neat sketch. (10)
- b) Draw the distinction between blending and homogenization. (5)
- Q8** a) Describe the principle of blending. Describe different equipments used for blending in industry. (10)
- b) Identify the problems associated with fine particle handling. (5)
- Q9** a) Write a short note on following: (10)
- (i) Flowability
  - (ii) Packing density and ratio
  - (iii) Friability
- b) A sample is collected and placed in a container with volume of 800 cm<sup>3</sup>. The mass of the sample at the natural moisture content is determined as 152.7 g. The sample is then dried to remove all the water and reweighed as 120.3 g. The sample is saturated with water and weighed 157.6 g. Calculate porosity, true density of the sample. (5)