PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech Winter 2022 - 23 Examination

Semester: 3   Date: 06/10/2022
Subject Code: 203103203   Time: 02:00 pm to 04:30 pm
Subject Name: Particle and Fluid Particle Processing   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions -   **(15)**
  1. Fluid energy mill is an example of
   a) Crusher
   b) Grinder
   c)Ultrafine grinder
   d)Cutting machine
  2.Which of the following works on the principle of compression and impact?
   a) Fine crusher
   b) Jaw crusher
   c) Tramp crusher
   d) Gyratory crusher
  3. A hammer mill is used for
   a) cutting
   b) crushing
   c) grinding
   d) ultra-grinding
  4.Which of the following involves vibrations?
   a) Hammer mill
   b) Ball mill
   c) Roll mill
   d) Grizzly screen
  5. _____ are slow speed machines used for coarse reduction
   (a) Crushers
   (b) Grinders
   (c) Cutters
   (d) Mills
  6.Which of the following is a modified fluidized bed dryer?
   a) Batch fluidized bed dryers
   b) Hybrid fluidized bed dryer
   c) Semi-continuous fluidized bed dryer
   d) Plug flow fluidized bed dryer
  7.For crushing rolls, α is called _____
  8.How can be the angle of nip calculated?
  9.The feed size of a toothed crusher ranges from ____
  10.As the rate of feed increases, the size reduction ____   .
  11.Define Sphericity.
  12. Define Shape factor
  13. Define Rate of filtration.
  14.Define sedimentation
  15.Define colloids.

Q.2 Answer the following questions. (Attempt any three)   **(15)**
  A) Write Selection Criteria used in size reduction Equipment..
  B) Describe various laws for size reduction and write principle of comminution.
  C) Explain "Characterization of Particles "in details
  D) Explain Fluidization and minimum fluidization velocity along with its applications.

Q.3 A) Derive pressure drop equations for cake filtration process and also derive final rate of filtration **(07)** equation.

B) With the help of a neat sketch explain the construction and working of toothed roller crusher **(08)** and write the important equations for roll crusher.

OR

B) Derive the equation for Thickener for batch sedimentation process. **(08)**

Q.4 A) The power required to crush 100 tons/h of limestone from 100 mm to 6.25 mm is 170 kW. An **(07)** estimate of the power required, using Kick's law to crush 100 tons/h of limestone from 50mm to 3.125 mm is:

OR

A) Explain Sieve Analysis and particle size distribution curve. **(07)**

B) What are nanoparticles. Explain its characteristics with applications **(08)**