

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech Winter 2019- 20 Examination

Semester: 5
Subject Code: 03103302
Subject Name: Mechanical Operations

Date: 26/11/2019
Time: 10:30am to 01:00pm
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. _____ is an operation wherein particles of solids are cut or broken into smaller pieces.
2. The ratio of the surface energy created by crushing to the energy absorbed by the solid is known as _____
3. _____ is employed for coarse reduction of large quantities
4. _____ is the angle formed by the tangent to the roll faces at point of contact with a particle to be crushed.
5. The minimum speed at which centrifuging occurs in a ball mill is called _____
6. The speed of a rotary drum vacuum filter may be about _____ rpm

| | |
|---------|---------|
| (a) 1 | (b) 50 |
| (c) 100 | (d) 500 |
7. Fibrous material is broken by _____

| | |
|------------------|---------------------------------|
| (a) roll crusher | (b) squirrel cage disintegrator |
| (c) tube mill | (d) none |
8. A method of separating solid particles according to size alone is called

| | |
|---------------|--------------------|
| (a) screening | (b) grinding |
| (c) crushing | (d) size reduction |
9. Settling of particles unaffected by the other particles and the wall of the container is known as

| | |
|-------------------|-----------------------|
| (a) free settling | (b) hindered settling |
| (c) both | (d) none |
10. The fluid velocity at which motion of particles just start is called

| | |
|----------------------|-----------------------|
| (a) minimum velocity | (b) critical velocity |
| (c) high velocity | (d) low velocity |
11. State Kicks Law Equation for size reduction
12. A Static Mixer is used for _____ continuous mixing of fluid materials._
13. Shape Factor is given by _____
14. Name the Mixer used for cohesive Solids _____
15. Hydro cyclone is used for _____

Q.2 Answer the following questions. (Attempt any three) (15)

- A) Derive an expression of effectiveness of a screen
- B) Explain the concept and principle of sedimentation
- C) Write difference between sedimentation and filtration
- D) Write difference between Jaw Crusher and Gyratory Crusher

Q.3 A) Explain principle, construction and working of Hydro Cyclones with diagram (07)

- B) Write a short note on 'Classification of Size Reduction Equipment' (08)

OR

- B) Derive an Expression for Power requirement for Agitation (08)

Q.4 A) What is Fluidization ? Explain Different types of Fluidization with diagram (07)**OR**

- A) Draw a neat diagram and explain construction, working, advantages, limitations and applications of plate and frame filter press. (07)

- B) Discuss Equipment's used for Settling and Sedimentation with diagram (08)