GATE PSUs
State Engg. Exams

MADE EASY Workbook 2025

Detailed Explanations of Try Yourself *Questions*

Chemical Engineering

Mechanical Operation

1 Particles Characterization

Detailed Explanation of Try Yourself Questions

T1 : Solution

[Ans : (b)]

As, screen capacity $\propto \frac{1}{\text{Screen effectiveness}}$

T2 : Solution

[Ans : (d)]

For samples consisting of uniform particles these average diameters are of course all the same.

■■■■

2 Size Reduction and Separation of Solid

Detailed Explanation of Try Yourself Questions

T1 : Solution

[Ans : 0.447 kW]

Power required in ball mill is directly proportional to $(\text{Feed})^{2.5}$.

Power required for feed of 1 mm size is

$$P_2 = 25 \times \left(\frac{1}{5}\right)^{2.5}$$

$$= 0.447 \text{ kW}$$

■■■■

3 Particles Dynamics

Detailed Explanation of Try Yourself Questions

T1 : Solution

[Ans : 119.7 mins]

In constant pressure

$$t = K \cdot \frac{V^2}{2}$$

$$30 = K \cdot \frac{64}{2} = \frac{30}{32}$$

$$\frac{dt}{dV} = \frac{30}{32} \times 11.3$$

t = Washing time

$$= \frac{11.3}{\frac{dV}{dt}} = 11.3 \times 11.3 \times \frac{30}{32}$$

$$t = 119.7 \text{ mins}$$

■■■■

4 Mixing, Agitation and Transportation of Solid

Detailed Explanation of Try Yourself Questions

T1 : Solution

[Ans : 2415.92]

$$\text{Power} = 2415.92\ \text{W}$$

$$N_P = \frac{P}{\rho N^3 D_a^5}$$

$$\frac{P_1}{\rho_1 N_1^3 D_1^5} = \frac{P_2}{\rho_2 N_2^3 D_2^5}$$

(Another condition of dynamic similarity is that the power number of the two system will be equal) where

1 ⇒ lab experiment

2 ⇒ industrial vessel

$$10^{-2} \times \frac{1}{1000} \times \frac{1}{5^3} \times \frac{1}{(0.05)^5} = P_2 \times \frac{1}{900} \times \frac{1}{1^3} \times \frac{1}{(1.6)^5}$$

$$P_2 = 2415.92\ \text{W}$$

■■■■