

**MID SEMESTOR EXAM-1  
MECHANICAL OPERATIONS (B.E. F.T and B.E CHEM+MBA) 3<sup>rd</sup> Sem**

Attempt all questions:

Marks:25

- 1 a) Explain work index and Bond's crushing law. What is the power required to crush 100 tons/h of limestone ( $W_i = 12.74$ ) if 80% of the feed passes a 1.75-inch screen and 80% of the product passes a 1/6-inch screen?
- b) Describe the principle, working and construction of a Ball mill. Derive the expression for critical speed of a ball mill.

CO1 (4+4)

- 2 a) Explain different types of screens with their features.

- b) A quartz mixture is having a screen analysis is screened through a standard 20 inch screen with following results:

$$x_F = 0.885 \quad x_D = 0.99 \quad x_B = 0.83 \quad \text{cut point dia} = 0.833 \text{ mm}$$

Calculate the mass ratios of overflow and underflow to feed and the overall effectiveness of the screen.

CO2 (4+4)

3. Derive the expression for constant pressure filtration, specific cake resistance and filter medium resistance for a cake filter. Differentiate between cake filters and clarifying filters.

CO3 10