Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-III Remedial Examination March 2010

Subject code: 132103 **Subject Name: Mineral Processing**

Date: 11 / 03 /2010 **Time: 03.00 pm- 05.30pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Draw a figure of roll crusher and derive a relation between friction coefficient and angle of nip. **07**

(b) Draw a flow chart showing principal steps in a mineral processing. Explain each step. **07**

Q.2 **(a)** Give physical and chemical characteristics and source of following minerals: **07**
(i) Iron (ii) Copper (iii) Aluminium (iv) Zinc

(b) (i) What do you understand by 'Open Circuit' and 'Closed Circuit' grinding? **04**
(ii) Explain washing, sorting and picking. **03**

OR

(b) (i) Explain motion of charge in tumbling mill and derive the equation of critical speed. **05**
(ii) Define liberation, comminution. **02**

Q.3 **(a)** Draw a cross sectional diagram of rotating ball mill and indicate various zones. **06**

(b) Why in ball mill different sizes of balls are used? **04**

(c) What is the maximum distance of separation between two rolls of 30 cm dia.? Is it possible to crush a feed size of 5 cm dia.? The friction coefficient between roll & feed mineral is 0.3. **04**

OR

Q.3 **(a)** What is classification? Give different types of classifier & explain Air classifier? **07**

(b) What is free settling ratio in classification? Derive the equation for it as per Newton's law. **07**

Q.4 **(a)** Explain in brief heavy media separation in mineral beneficiation. **07**

(b) Explain term 'Recovery', 'Ratio of Concentration', 'Enrichment Ratio'. How they are calculated? Derived relevant formula. **07**

OR

Q.4 **(a)** Draw a floatation circuit consisting of rougher cell, cleaner cell & scavenger cell. **07**

(b) What chemicals are used for floatation process? Explain. **07**

Q.5 **(a)** Explain Rittinger's, Kick's and Bond's law of size reduction. **07**

(b) Explain how you represent sieve analysis data. What is average size of particles? **07**

OR

Q.5 Write note on **any two**. **14**

(1) Magnetic Separation

(2) Operation of Jigging machine

(3) Differential floatation

****