

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III Examination December 2009****Subject code: 132103****Subject Name: Mineral Processing****Date: 29 / 12 / 2009****Time: 11.00 am – 1.30 pm****Instructions:****Total Marks: 70**

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

Q.1 (a) Draw a flow chart showing principal steps in a ore dressing process. Explain the need of each step. **07**

(b) List different types of crushers. Draw a neat diagram of Jaw crusher indicating the forces acting on a 'nipped particle'. **07**

Q.2 (a) Give physical and chemical characteristics and sources of the following minerals: Calcite, Galena, Haematite, Quartz, Chalcopryite, Magnetite, Bauxite. **07**

(b) Explain the terms: Ratio of concentration, Enrichment ratio and theoretical assay. **07**

OR

(b) What do you mean by the term 'Average Size' of the particles in a mixture of ground mineral particles of various sizes? **07**

Q.3 (a) Derive a relation between 'Critical speed' of ball mill and its diameter. The ball diameter could be neglected. **07**

(b) What do you understand by 'Open circuit' and Closed circuit' grinding? Is it true that rod mill can run with 'Open circuit' but ball mill cannot? Justify. **07**

OR

Q.3 (a) Explain the term 'Liberation' and its importance in mineral processing. **07**

(b) What is classification? List different types of classifiers and explain Air-classifier in detail. **07**

Q.4 (a) Explain the term 'Initial acceleration' used in jigging process. Draw a diagram of Harz jig and explain its parts. **07**

(b) The pulp density of galena/water pulp is 2700 kg/m^3 . The pulp density of this pulp needs to be increased by siphoning out some water to 2750 kg/m^3 . How much water needs to be removed? **07**

OR

Q.4 (a) Explain why floatation process is used for fine particles only? Draw a floatation circuit consisting of rougher cells, cleaner cells and scavenger cells. **07**

(b) What are the purpose of collector, frother, activator and depressant in floatation process? **07**

Q.5 (a) Explain the following (**Any Two**): **07**

(i) Nip angle of material in a crusher depends on the coefficient of friction between the two.

(ii) Regrinding of rougher cell product helps in improving grade of concentrate.

(iii) Derivation of the equation for free-settling ratio as per Newton's law.

(b) What is magnetic separation? Which are the materials usually separable by magnetic separation? **07**

OR

Q.5 (a) What is High-tension separation? Explain briefly. **07**

(b) Write short notes (**Any Two**): **07**

(i) Comminution (ii) Differential floatation (iii) Heavy media separation process.
