

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III Regular / Remedial Examination December 2010****Subject code: 132103****Date: 18 /12 /2010****Subject Name: Mineral Processing****Time: 10.30 am – 01.00 pm****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 the flow chart showing principle steps in Mineral Processing. Explain the need of each step. **07**
- (b) What are the advantages of "closed circuit grinding" over "open circuit grinding"? Draw various grinding circuits. **07**
- Q.2** (a) Derive the relation between critical speed of ball mill and its diameter. The ball diameter could be neglected. **07**
- (b) What do you understand by screening? Give different types of screens. What is the purpose of screening in Mineral Processing? **07**
- OR**
- (b) (i) What is Angle of Nip? **03**
- (ii) Explain washing, sorting, hand picking and recovery. **04**
- Q.3** (a) Explain briefly about comminution and differential flotation. **07**
- (b) What is free settling ratio? Derive the equation for it as per Newton's law. **07**
- OR**
- Q.3** (a) Give physical and chemical characteristics and sources of following minerals: **07**
- 1) Iron 2) Copper 3) Aluminium 4) Zinc
- (b) (i) Sizes of steel balls are 3.2, 3, 4.2, 4.3 in cm. Diameter of ball mill is 30.5 cm. Find out the critical speed of ball mill. **03**
- (ii) Write a note on operation of Jigging Machine. **04**
- Q.4** (a) Explain why flotation is used for fine particles only. Draw a flotation circuit consisting of rougher cells, cleaner cells and scavenger cells. **07**
- (b) What are the purpose of collector, frother, activator and depressant in flotation process? **07**
- OR**
- Q.4** (a) The pulp density of Galena/water pulp is 2700 Kg/m³. The pulp density of this pulp needs to be increased by siphoning out some water to 2750 Kg/m³. If density of Galena is 7500 Kg/m³, how much water needs to be removed? **07**
- (b) Write the note on Sedimentation and Thickening. **07**
- Q.5** (a) Explain benefits and limitations of flotation process. **07**
- (b) Explain Heavy Media separation process in brief. **07**
- OR**
- Q.5** (a) What is classification? Explain Air classifier with diagram in brief. **07**
- (b) Explain Kick's law and Rittinger's law of Grinding. What is grindability? **07**
