Uva Wellassa University, Sri Lanka
End Semester Examination – February/ March 2011
MRT 361-2 Mineral Processing Methods
Time: Two (02) hours

Total **05** questions
Answer **four (04)** questions only.

01) (i) What are the main mineral separation methods?

[10 marks]

(ii) Briefly discuss principles of gravity concentration in mineral processing industry.

[20 marks]

(iii) Derive Stoke's equation and calculate the diameter of a coal particle (S.G 1.4) which would settle in water at the same rate as a 40-microns diameter quartz (S.G 2.65) particle that settles in in water.

[70 marks]

02) (i) Why comminution is important in mineral processing as well as in construction industry?

[20 marks]

(ii) Briefly discuss;

a) Comminution theory

[25 marks]

b) Crushers/ plant, with aid of diagrams.

[20 marks]

(iii) Derive a formula for critical speed of Tumbling mill and calculate the percent critical speed, if the tumbling mill rotates at 13 rpm with grinding ball size of 0.1 m.

[35 marks]

03) (i) Explain primary and secondary dust collectors used in mineral processing industry with aid of a diagram.

[20 marks]

(ii) Explain, Mass Balancing Methods

[30 marks]

(iii) A laboratory hydro-cyclone is fed with a slurry of quartz (Density 2630 kg/m^3) at a pulp density of 1125 kg/m^3 . The under flow has a pulp density of 1290kg/m^3 and the over flow 1050 kg/ m^3. A 4-liter sample of under flow was taken in 6 sec. Calculate the mass flow rate of feed to the cyclone.

[50 marks]

04) (i) Explain dewatering processes and their importance in mineral processing industry.

[20 marks]

(ii) Briefly discuss efficiency of industrial screening.

[20 marks]

(iii) Calculate percentage finer and draw a graph for percentage finer vs. particle size diameter and determine d_{50} value.

[60 marks]

Sieve size(Microns)	Weight retained (g)
1140	1.6
850	190
710	76.7
600	15.0
550	10.0
425	5.0
355	1.0
275	0.5
180	0.2
125	0.0
90	0.0
pan	0.0

05) Explain the similarities and differences between the following terms as they are related to mineral processing. Use sketch diagrams in your answers.

(i) Jig / Sinking table.
(ii) Gyratory / Jaw crusher.
(iii) Autogenous / Ball mill.
(iv) Magnetic / High-tension separator.
(v) Hydro-cyclone / Air cyclone

[20*5 marks]

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