Code No: R09221805 | R09 | SET-1

B.Tech II Year - II Semester Examinations, April-May, 2012
MINERAL DRESSING
(Metallurgy and Material Technology)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) What is mineral dressing? What are its scope and objectives?
b) What is Degree of Liberation? Explain liberation of size reduction and liberation by detachment in minerals of equal abundance.
c) Distinguish between
i) Bulk mining ii) selective mining. [5+7+3]

2.a) Explain the theory of ball mill operation.
b) Explain the major differences between crushing and grinding with regard to principle of operation, equipment used and product obtained. [6+9]

3.a) Explain laboratory sizing, elutriation and presentation of size analysis data.
b) Derive an equation for terminal velocity of a particle under Newton's Law.
c) What do you mean by sub-sieving? What are the various methods available for sub-sieve analysis? Explain them. [6+5+4]

4.a) What do you mean by efficiency of a classifier? Give the mathematical equation to find out the efficiency of a classifier. Explain the terms involved in the equation. How do you evaluate the efficiency of a classifier?
b) What are the different points considered for estimating the cost for classification process? Explain them in detail. [8+7]

5.a) What is the principle used in Heavy media separation? What are different media used?
b) Explain any one process each using Heavy Liquid and Heavy suspension [5+10]

6.a) What is Jigging? What is the principle involved in it? What is the effect of differential acceleration at beginning of fall on stratification?
b) Write in detail about Shaking tables and Wilfey table. [8+7]

7.a) What is Flotation? What is principle involved and factors effecting flotation?
b) Draw and explain briefly with the help of a flow sheet the Flotation process of Copper. [8+7]

8. Briefly answer any **three** of the following:
a) Principle involved in Magnetic separation.
b) Selectivity index and effectiveness of a screen.
c) Magnetic Susceptibility and Permeability.
d) Reduction Ratio and ratio of concentration.
e) Rake Classifier. [15]

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Code No: R09221805 | R09 | SET-2

B.Tech II Year - II Semester Examinations, April-May, 2012
MINERAL DRESSING
(Metallurgy and Material Technology)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Derive the Angle of Nip equation for Roll Crushers.
b) Compare and contrast between Jaw Crushers with Reduction Gyratory Crushers.
c) Explain the major steps involved in mineral dressing process. [3+7+5]

2.a) Write about the types of Grinding Operations.
b) Compare and contrast Rod mills and Tube mills.
c) Write about any one of the Comminution Laws. [7+5+3]

3.a) Explain about the screens Grizzles, Trommels, Vibrating screens and Shaking screens.
b) Explain the relation of Terminal velocity with size and also show the relation between time, velocity and distance traveled and velocity. [6+9]

4.a) What is principle involved in Classification? Explain the factors that influence classification?
b) Describe the operation of spiral classifiers and cyclones with a neat sketch. [8+7]

5.a) Explain about Washability curves of easy, normal and difficult coal.
b) Explain "DUPONT" process of heavy liquid separation. Discuss the advantages and disadvantages of this method. [8+7]

6.a) What are the features involved in a jig design? With the help of a neat sketch explain how a pneumatic jig works.
b) Describe the mechanism involved in Tabling.
c) Write about Humphrey's spiral classifier. [7+5+3]

7.a) Classify collectors and frothers. How their efficiency is affected? Discuss the effect of particle size and particle shape on flotation process.
b) What is a bubble? How a bubble can be produced in flotation process? Explain. [9+6]

8. Write briefly about any **three** of the following:
a) Flow sheet of heavy media separation.
b) Electrostatic separation.
c) Dewatering techniques.
d) Surface energy.
e) Modifying agents. [15]

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Code No: R09221805 | R09 | SET-3

B.Tech II Year - II Semester Examinations, April-May, 2012
MINERAL DRESSING
(Metallurgy and Material Technology)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1. Define the following
   a) Jigging ratio
   b) Hindered settling ratio
   c) Ratio of concentration
   d) Economic recovery. [3+4+4+4]

2.a) Define work index.
   b) What is the importance of coal washing?
   c) What is terminal velocity? Explain its significance in mineral dressing operations. [4+4+7]

3. Explain the following:
   a) Factors affecting the screening efficiency
   b) Factors affecting the Jigging process.
   c) Factors affecting the mineral behaviour in tabling. [5+5+5]

4.a) Discuss the theory liberation by size reduction.
   b) Discuss the theory of ball mill operation. [7+8]

5.a) Explain how stratification of particles occur in jigging process.
   b) Describe the weilfley table and particle separation using it. [7+8]

6. Explain the role of the following in froth flatation process.
   a) Frothers
   b) Activators
   c) PH modifiers
   d) Depressants. [3+4+4+4]

7.a) Discuss the theory of ball mill operation. What are the corrections that have been proposed for the existence of Davis zones?
   b) What are tube mills?
   c) What is an autogeneous grinding mill? [7+3+4]

8. Describe the following with neat sketches:
   a) Any one magnetic separator.
   b) Harz jig
   c) Pheumatic classifier. [5+5+5]

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Code No: R09221805 | R09 | SET-4

B.Tech II Year - II Semester Examinations, April-May, 2012
MINERAL DRESSING
(Metallurgy and Material Technology)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Explain the terms: concentrate, middling and tailing.
b) Define: Free particles, locked particles, locking factor and recovery of a metal in the concentrate.
c) Define free settling ratio. Compare with hindered settling ratio. What is its significance in mineral beneficiation? [5+5+5]

2.a) State Rittinger's, Kick's and Bond's law of comminution.
b) Explain the role of comminution in the choice of beneficiation process.
c) Compare grinding with crushing.
d) Explain stoke's law. Mention its limitations. [5+3+3+4]

3.a) Explain the following terms with necessary examples:
Collector, Activator, Deactivator, Depressant and Frother.
b) Discuss the principles and the use of magnetic separators in mineral beneficiation. [8+7]

4.a) What is a sample? What is sampling? What is the necessity of sampling?
b) Briefly explain the working principle of vezin sampler.
c) List down the various sources of errors in hand sampling. [5+5+5]

5.a) Compare: i) Dodge crusher Vs Blake crusher ii) Ball mill Vs Rod mill.
b) Define the following terms used in crushing:
i) gape ii) mouth
iii) throat iv) nip angle.
c) Derive an expression for angle of nip in roll crushing. [4+4+7]

6.a) Derive from fundamentals the Newton-rittinger equation for the terminal settling velocity of a spherical particle in a fluid medium.
b) Discuss the validity of the following statements with proper reasoning:
i) Two different mineral particles can be equal settling only when their sizes are same under a given set of conditions.
ii) The time required to attain the terminal velocity by any solid half of the terminal velocity.
c) Write short notes on liberation by size reduction and liberation by detachment. [5+6+4]

7.a) What is meant by efficiency of concentration and selectivity index?
b) What is economic recovery and what is its significance?
c) Write a note on sizing and sorting classifiers. [5+5+5]

8.a) Discuss the theory of jigging.
b) Describe plumb jig with the help of a neat sketch.
c) Explain why it is necessary to classify a feed for the jigging process. [5+5+5]

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