11. Derive : 10+10

a) i) Terminal velocity of coarse particles in a suspension.

ii) The condition required to ensure nip between a pair of rolls

Describe :

b) i) Various laws of comminution.

ii) Functional diagram of a double toggle jaw crusher.

12. i) State the principle of classification. Describe the selective flotation with an example. 8+12

ii) Describe the different types of Ball Mills.

13. Short notes : 7+7+6

i) Gyratory crusher

ii) Wilfley Table

iii) Wet drum-type magnetic separator

Bachelor of Metallurgical Engineering Examination, 2012

(2nd Year, 1st Semester)

Geology and Mineral Beneficiation

Time : Three Hours Full Marks - 100

(50 Marks for each Group)

Use a separate Answer-Script for each Part

Part - I

Group - A

Answer any **5 (Five)** 5x5=25

1. Write about internal structure of the Earth. How do you know about internal structure of the Earth? 3+2=5

2. Define mineral and crystal. How does crystallization occur? 3+2=5

3. What is magma? What is rock? Give examples of rock. How does sedimentary rock form? Give example of sedimentary rock. 1+2+2=5

4. Write differences between extrusive and intrusive igneous rocks. Give examples. 4+1=5

5. Write with neat sketches about the types of geometric operation by which homogeneous patterns can be generated. 5

6. Explain enantiomorphous and glide reflection. What is the difference between symmetry operations and symmetry elements? 3+2=5

7. Write with neat sketches about the rotoinversion operation. 5

8. Write chemical composition and main uses of following minerals :
Olivine, calcite, feldspar, talc, chromite, serpentine, gypsum, sphalerite, chalcopyrite, galena.

Group - B

9. Answer any **Five** questions : 5x5=25

a) What is 'Clark value'? Is it same for each element? Do you consider the phenomenon of ore deposition as a 'normal' or an 'abnormal' consequence in nature?

b) Define 'Ore' mineral. Why definition of ore is technology dependent? Discuss why size and quantity of ore are two important parameters to define any ore-deposit.

c) Discuss briefly about different processes involved in magmatic ore deposit.

d) What is 'hydrothermal deposit'? What are the factors that control precipitation from hydrothermal solutions?

e) Discuss about the process of metasomatic replacement. What metal and non-metal resources are probably deposited through metasomatic replacement?

f) What is 'placer deposit'? Enumerate in detail the basis for differentiating placer deposit.

g) Why Chromite is considered as 'strategic' mineral? Briefly discuss about the grades and associated rocks of Chromite deposits of India.

h) Which deposit is considered the principal producer of lead-zinc ore in India? Discuss about the associated rocks, origin and grade of ore of this deposit.

Part - II

Q. No.1 and any **two** questions from the rest

10. i) Distinguish between mineral and ore. 2x5=10

ii) Write the several factors on which the economy of extraction is dependent.

iii) Distinguish between comminution and sizing.

iv) Define concentration and classification.

v) Distinguish between Angle of nip and contact angle.