Code No: 07A6EC10 **R07** **Set No. 2**

III B.Tech II Semester Examinations,December 2010
NON FERROUS EXTRACTIVE METALLURGY
Metallurgy And Material Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Draw a neat sketch of electroltic cell used for magnesium extraction. Name the various parts in it and discuss their working.
   (b) Explain in detail the electrolytic production of magnesium. [8+8]
2. With the help of flow sheet , explain the production of titanium from rutile concentrates. Explain the precautions to be taken during the process ? [16]
3. Write an essay and the details about the production of uranium in India ? [16]
4. (a) Why is a copper converter side blown? Why not bottom blown?
   (b) Give a brief account of the electrolytic refining of copper.
   (c) Briefly discuss about electric smelting of copper concentrate. [4+4+8]
5. (a) What is the principle of zone refining?
   (b) What material is used for the construction of the side walls of the vertical zinc retort? Justify its use.
   (c) Explain the important properties of zinc. [4+5+7]
6. In which combined form most of the Nickel ores are available. Which is the most prominent ore among them. Give the names of the important ores of Nickel. Also give their chemical formulae with help of a flow sheet. Explain the production of pure nickel from its sulphide ores. [16]
7. Write short notes on the following with respect to extraction of aluminum:
   (a) TOTH process.
   (b) ALCAN process. [8+8]
8. (a) What are the ores of lead and what is the lead content in them? What are the impurities present in lead ores? What are the concentration processes?
   (b) Explain the blast furnace smelting of lead concentrate. [10+6]

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Code No: 07A6EC10 **R07** **Set No. 4**

III B.Tech II Semester Examinations,December 2010
NON FERROUS EXTRACTIVE METALLURGY
Metallurgy And Material Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Discuss the hydrometallurgical route for zinc extraction. [16]
2. Explain the principle of leaching. Why is it done .What are the different methods of leaching ? Discuss. Explain the
   (a) alkali and
   (b) acid leaching of uranium concentrates ? [16]
3. Explain how nickel is produced from $Ni_3 S_2$ which is a product produced from the flotation treatment. Give the necessary flow chart and explain the details. Give all the necessary chemical reactions and explain them. [8+8]
4. Distinguish between the following:
   (a) Blast furnace smelting of copper and flash smelting of copper.
   (b) Reverberatory furnace smelting and electric furnace smelting of copper. [8+8]
5. Write short notes on the following:
   (a) OUTOKUMPU Flash Smelting.
   (b) Tundoo Blast Furnace. [8+8]
6. (a) Among the various magnesium ores which ore is abundantly available in the earth crust. Among which parts of the world it is occurring?
   (b) Does magnesium occur in native state also? Explain the reasons if your answer is no. what are the other metals which are associated with magnesium ores. Are they fully removed during refining process? Explain. [6+10]
7. (a) Explain the construction and operation of electrolytic cell used for reduction of alumina with a neat sketch.
   (b) Explain the influence of methane injection at anode during electrolytic reduction of alumina. [10+6]
8. (a) Draw a neat sketch of the electric arc furnace used for melting of titanium sponge and describe the furnace ?
   (b) Explain the upgrading of Ilmenite ores ? [10+6]

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Code No: 07A6EC10 **R07** **Set No. 1**

III B.Tech II Semester Examinations,December 2010
NON FERROUS EXTRACTIVE METALLURGY
Metallurgy And Material Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. With the help of a neat sketch and flow chart discuss in detail the preparation of magnesium chloride for electrolysis process. Give all the necessary chemical reactions associated. Also explain the chlorination of magnesium oxide. [16]

2. Distinguish between atoms and ions. Explain. What do you mean by ion exchange method ? Discuss the uranium purification by ion exchange method ? [16]

3. What are the chief sources of Nickel? Explain the extraction of Nickel from oxide and sulphide ores. Discuss the relative advantages and disadvantages. [16]

4. (a) Blast furnace smelting of copper ores is not employed now. Why?
   (b) Is it possible to electrorefine copper without prerefining? If so why?
   (c) Why is poling done towards the last stage of copper pyrometallurgical refining? How is the process controlled? [4+4+8]

5. What is chlorination process? Explain the process and discuss in detail,why ilmenite ore of titanium is not amenable for direct chlorination ? Give the alternate methods & Explain ? [16]

6. (a) Why lead concentrates are sintered by updrought sintering and not by down draught sintering?
   (b) Briefly discuss about the use of oxygen in non-ferrous extractive metallurgy. [4+12]

7. (a) What are the important ores of lead? Explain about the treatment of lead ore for the production of metal.
   (b) Explain the following steps in the production of lead.
      i. Treatment of Base bullion.
      ii. Drossing. [6+10]

8. (a) What is anode effect? How it is minimized during the process?
   (b) Explain the advantages and disadvantages of Kashmir aluminum ores. [8+8]

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Code No: 07A6EC10 **R07** **Set No. 3**

III B.Tech II Semester Examinations,December 2010
NON FERROUS EXTRACTIVE METALLURGY
Metallurgy And Material Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the applications of zinc?
   (b) What is the importance of the following places in the context of the non-ferrous metal industry of India? Explain.
      i. Damanjodi.
      ii. Angul.
      iii. Hyderabad.
      iv. Visakhapatnam.
      v. Ghatsila. [6+10]
2. Discuss about production of alumina and aluminum at HINDALCO. [16]
3. Using flow sheet discuss the steps involved in purification of impure lead. [16]
4. (a) Explain the principle of carbonyl process. Discuss the carbonyl process for refining of Nickel.
   (b) What is rolled gold? Explain. Discuss about the meaning of 14 carat gold. Also explain with suitable examples about heavy non-ferrous metals. [10+6]
5. (a) Explain the powder metallurgy operation used for the conversion of titanium sponge to titanium powder. Describe the various process used.
   (b) Explain the electric arc melting of Titanium metal. Describe the furnace used. [9+7]
6. What are the various methods available for the purification of leach liquors .Explain all of them in detail . Discuss their relative advantages and disadvantages ? [16]
7. (a) Explain the methods which are used for the concentration of leach liquors, obtained from lean ores.
   (b) What are the important functions of a leaching agent? Explain.
   (c) What are the various factors that are taken into consideration for selecting a leaching agent in any hydrometallurgy process. [8+4+4]
8. Crytically discuss the following:
   (a) Electrorefining of copper.
   (b) Electrowinning of zinc. [8+8]

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