

Ex/M.Met/7115/114/2006

M. MET. ENGINEERING EXAMINATION, 2006

(2nd Semester)

ADVANCES IN FERRO-ALLOY PRODUCTION

Time : Three hours

Full Marks : 100

Answer questions *No. 1* and

any *four* from the rest.

1. Define following 10×2
- a) Degree of metallization of Sponge Iron.
 - b) Reducibility of iron ore for Blast Furnace iron making.
 - c) Productivity of Blast Furnace.
 - d) Arcing in Electric Arc Furnace.
 - e) Dry slag and wet slag in steel making
 - f) Bond on ard Reaction in iron making
 - g) Killed Steel
 - h) Corex Process (i) slip in Blast Furnace
 - h) Diffusion De oxidation in steel making
2. a) What is meant by ferro alloy ? 2
- b) State different classifications of ferro alloys with example. 4
- c) State the uses of different ferro alloys

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- d) In the production of ferroalloys what are the different reduction processes. 3
- e) What are the present problems in Indian ferroalloy industry. 4
- f) State two remedies of the problems in Indian ferroalloy industry. 2
- g) Name four ferroalloy producing companies of India. 2
3. a) Describe the production process of High carbon Ferrochrome. 8
- b) Briefly describe the chemical reaction occurred in the production at High Carbon Ferro Manganese. 8
- c) Why High Carbon Ferro chrome is generally not used to produce austenitic stainless steel. 2
- d) What is the present Ferro manganese production at India. 2
4. a) Describe the production process of the following materials giving the details of raw materials, chemical reaction and other relevant matter
- Ferro Silicon
- Calcium Silicide
- Silicon Metal 18
- b) Why Ferro Silicon is important in iron and steel industry? 2

5. Write short notes on the followings (*any four*) 5×4

- a) Ferro Titanium
- b) Ferro Vanadium
- c) Ferro Molybdenum
- d) Ferro Tungsten
- e) Ferro Niobium

6. a) For the production process of low carbon Silico Manganese (LCSM) one company has installed one IMVA submerged EAR. The raw material for LCSM are Manganese Ore (A), Low Ash Metallurgical Cake (B), Mill Scale (C), Quartzite (D), Coal (E), Limestone (F) and Electrode Paste (G). The specific consumption of these raw materials (A to G) are 2100, 465, 90, 325, 200, 225 and 20 Kg per ton of LCSM respectively. The electrical energy consumption for the plant is 6000 KWh/ton of LCSM. The rate of the raw materials (A to G) are 2100, 6000, 900, 570, 3600, 400 and 20230 Rs/Ton respectively. The charge of electrical energy is Rs. 3.75/K.Wh. Find the ratio of expenses towards raw materials and electrical energy.

Given :

The load factor and the power factor for the furnace are 0.9 & 0.85

The operating days per year is 330 for furnace.

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The handling and moisture losses for the raw materials are 4% and the line loss for electricity is 3%. 12

- b) Why Manganese is essential iron and steel industry ? 2
- c) What is known as low carbon Ferromanganese ? 2
- d) How Low Carbon Ferrochrome (LCFeCr) is manufactured? 4