NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI

Dept. of Metallurgical and Materials Engineering (MME)

Question paper for **end Semester Examination**

B.Tech. (MME) – V Sem. (2011 – 2015 batch)

MT 303 IRON MAKING AND STEEL MAKING

Saturday, **Nov. 23,** 2013 200 pm – 500 pm Max. Marks: 50

(Same question paper to be used for supplementary candidates, with weightage of 100 marks.)

1. Differentiate between the terms, within each pair: 10 X 1 = 10

   (a) Flux and Slag (b) Coal and Coke

   (c) Carbon steel and alloy steel (d) Direct Reduction and Indirect Reduction

   (e) Scrap and DRI (f) Haemetite and Magnetite

   (g) Scaffolding and Pillaring (h) Blowing–in and blowing–out

   (i) Heat Loss and Heat Recovery (j) Briquette and Nodule

2. Write short notes (within five sentences each) on the following: 10 X 1 = 10

(a) Reducibility Test (b) Stamp Charging

(c) Cast – house (d) Acid Sinter

(e) Rist Diagram (f) Solution – Loss Reaction

(g) Mini – blast furnace (h) Electro-thermal smelting

(i) Degree of metallization (j) COREX process

3. Consider a steel plant being set up for producing four million Tonnes of saleable steel (flat products) per annum. Assume iron making by blast furnace route and steel making by LD route. Incorporate suitable secondary treatment/s, to be followed by continuous

casting. Try to visualize various operations / processes / details, moving from ore to cast strands. Reasonable assumptions / simplifications permitted. **Provide a quantitative outline of the plant, with following details** (and brief explanation / justification): 10

- Number of blast furnaces; hourly output per blast furnace per day; capacity required for coke making; tonnage of blast furnace slag generated per day;
- Number of converters; hourly output per converter per day; tonnage of LD slag produced per day;
- Type/s of secondary treatment/s required; tapping temperature w.r.t. converter;
- Type of casting c/s required; number of casting machines / moulds required; tonnage cast per day; amount of mould powder required; superheat value;

(The answers need not be precise, but should be reasonable, in tune with plant practices.)

4. Describe, in detail, the construction and operation of LD converter. 10
5. (a) Describe, briefly, the role of slags in Phosphorous control during steel making. 3

(b) Describe, briefly, how solidification of liquid steel takes place in the continuous casting mould. 3

(c) A customer has complained to you (the steel maker) about cracks and inclusions in the rolled product. Explain, briefly, how you would follow up this complaint and how you would identify the cause/s. 4

Bonus questions: (Marks will be awarded IFF all three answers are correct. Three marks will be added, for students scoring less than twenty five (out of fifty) in this exam. Two marks will be added, for students scoring twenty five and above in this exam.)

B 1. Name the person who has taken over recently as the MD of Tata Steel (India and SE Asia).

B 2. Indicate the nature / area of the technical problem that was posed in the recent world steel university challenge.

B 3. List some saleable products being produced by SSP SAIL Salem and JSW Mecheri / Salem.

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