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NPTEL

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Unit 10 - Iron Making Week 8

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Interactive Session with

Assignment 8

The due date for submitting this assignment has passed. **Due on 2018-04-04, 23:59 IST.**

Submitted assignment

1) Questions 1 to 8: true or false: *0.25 points*
Sponge iron production in rotary kiln is based on co-current operation.

○ True
○ False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

2) Coal based rotary kiln are popular in those countries where environmental norms are   *0.25 points*
very strict.

○ True
○ False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

3) H_2 is better reducing agent than CO in a blast furnace.   *0.25 points*

○ True
○ False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

4) The catalyst used in reforming process is consumed in the course of reaction.   *0.25 points*

○ True
○ False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

5) Non-sticking of ore in HYL III process ensures uniform burden distribution.   *0.25 points*

○ True

○ False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

6) In smelting reduction, liquid iron is indirectly produced from coal and ore   *0.25 points*
fines/concentrates.

○ True
○ False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

7) Smelting reduction processes cause severe environmental pollution.   *0.25 points*

○ True
○ False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

8) CO_2 is reduced to CO in the upper part of smelting reactor before it exits the reactor and *0.25 points*
this process is called post combustion.

○ True
○ False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

9) Questions 9 to 12: fill in the blanks:
COREX process operates at high pressures upto ___ bars.
(enter your answer as a number; e.g: if your answer is 1, enter 1; not one.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 5

                                                                                        0.25 points

10)FINEX process is _____ bed based reactor process.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) fluidized
(Type: String) fluidised

                                                                                        0.25 points

11)Greenhouse gas is a gas that absorbs and emits _____ energy.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) infrared

0.25 points

12) COREX process is a _____ stage smelting process.
(answer in word form. eg: if your answer is one, enter one; not 1)

[   ]

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) two

0.25 points

13) Questions 13 to 20: Multiple Choice Questions: *0.5 points*
The lowest energy consumption in steel making is by:

- ○ SR-BOF route
- ○ DRI-EAF route
- ○ BF-BOF route
- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
BF-BOF route

14) The main advantage of DRI process in comparison to BF is: *0.5 points*

- ○ Higher productivity
- ○ Elimination of coke
- ○ Final product is liquid
- ○ Final product is without any impurities

No, the answer is incorrect.
Score: 0

Accepted Answers:
Elimination of coke

15) Kinetics of smelting reduction is same as: *0.5 points*

- ○ DRI process
- ○ BF process
- ○ Fluidized bed reduction process
- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of the above

16) In DRI process, no metallic iron will form if percentage of reduction is less than: *0.5 points*

- ○ 80%
- ○ 60%
- ○ 50%
- ○ 30%

No, the answer is incorrect.
Score: 0

Accepted Answers:

30%

17) Percentage of metallization, which is related to formation of metallic iron in direct reduced **0.5 points** iron process, is defined as:

- ○ $(\text{weight of metallic iron}/\text{total iron weight in sample}) \times 100$
- ○ $(\text{total iron weight in sample}/\text{weight of metallic iron}) \times 100$
- ○ $(\text{total iron weight in sample - weight of metallic iron}/\text{total iron weight in sample}) \times 100$
- ○ $(\text{total iron weight in sample - weight of metallic iron}/\text{weight of metallic iron}) \times 100$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$(\text{weight of metallic iron}/\text{total iron weight in sample}) \times 100$

18) Carbon deposition reaction in direct reduced iron process helps in   **0.5 points**

- ○ Preventing re-oxidation
- ○ Increasing melting point of direct reduced iron
- ○ Making reduced product more dense
- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Preventing re-oxidation

19) In topochemical reaction mechanism, which one of the following step is not involved?   **0.5 points**

- ○ Diffusion of reactant gas through gas boundary.
- ○ No diffusion in the porous layer of iron, and gas reaches the reaction surface immediately.
- ○ Reaction at the interface of iron oxide.
- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
No diffusion in the porous layer of iron, and gas reaches the reaction surface immediately.

20) The primary greenhouse gases in the Earth's atmosphere are: **0.5 points**

- ○ Water vapour and CO_2
- ○ CO_2 and CH_4
- ○ Nitrous oxide and ozone
- ○ All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

21) Sponge iron is being produced in a shaft furnace using the reducing gases which are   **3 points** coming from the combustion of coal by air.
The shaft length and diameter are 10m and 6m respectively.

Gas input rate is 1000 Nm^3/THM, operating pressure is 1.5atm and production rate is 2000THM/day.

Specific surface of the particle is 3cm^{-1} and temperature is 800^0C, void fraction is 0.45 and viscosity of the gas is 4.0x10^{-5}kg/m.s.
The density of the gas and Reynolds number in the shaft would (approximately) respectively be:
Data: $CO_2+C=2CO$, $\Delta G=33,300-30.4T$ cal

- ○ 1.4kg/m^3, 1044
- ○ 2.4kg/m^3, 2044

○ 1.4kg/m^3, 2044

○ 2.4kg/m^3, 1044

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.4kg/m^3, 1044

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