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238515(38)

Diploma in Engg. (Fifth Semester) Examination, Nov.-Dec., 2015

(Mett. Branch)

SECONDARY STEEL MAKING

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

***Note** : Attempt any five questions. All questions carry equal marks.*

1. (a) Great tonnage of steel is already produced through EAF & BOP. What are the deficiency of these processes & how it overcome by the secondary processes of steel making? 10

(b) What are the techniques applicable for the homogenisation of temperature & composition of steel? Discuss the advantages & disadvantages with each one technique. 10

2. (a) What is NMI? How it forms? 5

(b) Describe the ladle injection technology. What are its scope & limitation? Explain with a example. 7

(c) What are the scope of ladle furnace in secondary processing of steel? Explain why it become the integral part of SMS now a days. 8

3. (a) What is the Desulpherisation? How sulfide affects the character of NMI? 7

(b) What are the problems associated with high tapping temperature of steel? Is there any need to tap steel at very high temp. (1680°C) from primary furnaces? 6

(c) Compare the two vaccume degassing process viz (i) stream degassing (ii) ladle degassing. What are the limitations of both processes? 7

4. (a) Composition of steel bath sample is as follow : 10

C = 0·15, Mn = 0·05, Si = 0·02

S & P are less than 0·025%.

The composition of steel to be prepared is give as :

C = 0·18 to 0·20

Mn = 0·5 to 0·7

Si = 0·3 to 0·5

S/P = 0·025 to 0·030

How much high carbon Fe-Mn & Fe-Si is required to be added? What should be the % C in the bath for blocking the heat?

Given :

Fe-Mn contain 70% Mn & 7%C

Fe-Si contains 75% Si

The heat size is 100 ton recovery of Ferro-alloys are 95%.

(b) What is the reason of using most of the alloys as Ferro-alloys? Give the name of alloys which are directly added in pure state & which are converted into Ferro-alloy. 10

5. (a) Give the name of some industries producing Ferro alloys. 5

(b) What are the different grades of Ferro-chrome and their specific uses? 5

(c) Describe the physico-chemical principle of reduction quartz for the production of (Fe-Si). 10

6. (a) What is the use of submerged entry nozzel (SEN) in continuous casting & its advantage? 3

(b) Why molten (Fe-Si) alloy is tapped in shallow pan rather than in ladle? 3

(c) What are the physico-chemical principle of stain less steel production? 7

(d) Describe the procedure & blowing of stainless steel making in AOD? 7

7. (a) Does VAD is superior to VOD & VD? Compare these processes in light of : 12

(i) Production time involved

(ii) Energy requirements

(iii) Level of degassing

(iv) Refractory

(b) What is Deoxidation? What is complex deoxidation & its advantages? 8