

BACHELOR OF METALLURGICAL ENGINEERING EXAMINATION, 2025
(3rd Year, 2nd Semester)
STEEL MAKING

Time : Three hours

Full Marks : 100

Answer Qusetion No. 1 & any four from the rest

			Marks
1	a) In a mini steel plant, production of billet is 3 mtpy The plant uses DRI & steel scrap as charge material to steel melting shop (SMS). The producer can install either electric arc furnace (EAF) or coreless induction furnace (IF). The plant has a billet caster & a ladle furnace(LF) other than EAF/IF What should be the size of steel melting & refining units for installing either EAF or IF ? What is the electrical energy consumption for the total steel melt shop (EAF/IF, LF & caster) for each case? What is the number of strands of billet caster, if EAF is the steel melting unit? Data Given : The yield of billet caster is 98.0% & that of LF is 99.6% For EAF the number of furnace is 4 For IF the number of furnace is 16 The charge mix for EAF or IF is 80% DRI and rest steel scrap. The electrical energy consumption for EAF & IF are 580 & 710 kwh/Ton of liquid steel for this charge mix. The electrical energy consumption for LF & caster are 33 & 11 kwh/Ton of their respective products. No. of days of operation for steel melt shop (SMS) is 320 Tap to tap time for EAF & IF are 72 min. & 120 min respectively Casting speed is 2.918 m/min & casting time is 75.0 min. The billet size is 125 mm X 125 mm	(CO 6)	6+4+5
	b) State the factors on his the design and layout of a steel plant is dependant on.	(CO 6)	5
2	Answer to the followings a) Differentiate between - Pipes and Blowholes - Narrow End Up (NEU) mould & Wide End Up (WEU) mould - Killed Steel and Rimming Steel Desulphurisation & Dephosphorisation b) State in detail about the continuous casting process of low carbon steel in a vertical type caster with a neat drawing	(CO 5)	3 X 3 11
3	Answer to the followings : a) Differntiate between Green, Blue, Black, Brown, Grey, Turquoise, Pink and White Hydrogen. Name two types of Hydrogen which are b) What is the concept of Green Steel? c) To increase EAF temp. which one of the followings is better option & why? - Increase arcing intensity - Oxygen injection d) Differntiate between pneumatic and slag transfer based process of steelmaking with example	(CO 3) (CO 3) (CO 1) (CO 1)	8 3 4 5

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3rd Year Met. Engg 2nd Semester 2025

Subject : Steel Making

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| 4 | Describe the conventional EAF process in details covering the following items :
Furnacer Description & Special Feature
Charging, Arcing, Melting & Refining
State the advantages of DC EAF over AC EAF
Compare Electric Arc Furnace with Induction Furnace to produce steel | (CO 3) | 5+6+4+5 |
| 5 | a) Answer to the followings :

i) State the objectives of secondary steelmaking
ii) Explain in detail about the injection metallurgy technique for desulphurisation | (CO 4) | 5
5 |
| | b) Describe in detail about the different raw materials for steelmaking | (CO 2) | 10 |
| 6 | Answer to the followings :

a) Explain why tap to tap time in LD process is less
b) State the advantages and disadvantages of OBM process over LD process
c) Explain the oxygen lancing procedure in LD process along with concept of Jet Force Number
d) Why BOF process is also known as LD process?
e) What changes in LDAC process has been done from LD process and why? | (CO 3) | 3
4
6
2
5 |