



Roll No.

--	--	--	--	--	--	--	--	--	--

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, May / June 2024

Materials Science and Engineering  
IV<sup>th</sup> Semester  
ML5402 & Iron and Steel Making  
(Regulation 2019)

Time: 3hrs

Max.Marks: 100

CO 1	To identify the suitable preliminary treatments to be given to the iron ore for the beneficiation of ores.
CO 2	To explain the construction of Blast furnace, its operation and the various reactions that takes place in the various zones of blast furnace.
CO 3	To interpret the slag theories and slag functions in the steel making processes
CO 4	To compare the various steel making processes and analyse the advantages and limitations of the different processes
CO 5	To identify suitable secondary refining processes for producing a good quality steel

**BL – Bloom's Taxonomy Levels**

(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analyzing, L5 - Evaluating, L6 - Creating)

**PART- A (10 x 2 = 20 Marks)**  
(Answer all Questions)

Q. No	Questions	Marks	CO	BL
1	List the locations of coal and iron mines in India?	2	1	L1
2	Why do the blast furnace iron is called as "pig iron"?	2	1	L3
3	What is the necessity of oxygen enrichment in the blast furnace?	2	2	L4
4	Draw Fe-O-C phase diagram?	2	2	L1
5	Classify the steel making process based on source of heat?	2	3	L2
6	What is slag and its basicity?	2	3	L1
7	Describe the regeneration principle of OHF?	2	4	L1
8	What are the functions of ferroalloy in the steel making process?	2	4	L2
9	What are the characteristics of tool steels?	2	5	L2
10	Why do secondary steel making process is called with that name?	2	5	L3

**PART- B (5 x 13 = 65 Marks)**  
(Restrict to a maximum of 2 subdivisions)

Q. No	Questions	Marks	CO	BL
11 (a)	What is the burden in blast furnace? Write the importance and the factors affecting the burden distribution in blast furnace?	13	1	L2
OR				
11 (b)	Describe the sintering process of iron ore?	13	1	L2

12 (a)	Draw a neat sketch of the blast furnace and indicate reactions corresponding to different zones in it.	13	2	L2
<b>OR</b>				
12 (b)	Draw the RIST diagram based on elemental mass balance? Explain it in detail?	13	2	L2
13 (a)	How do the layout of steel making shops are planned?	13	3	L2
<b>OR</b>				
13 (b)	Outline briefly on desulphurization, dephosphorization in steel making process?	13	3	L2
14 (a)	Compare the Bessemer and open-hearth steel making furnaces?	13	4	L3
<b>OR</b>				
14 (b)	Describe and differentiate in detail about electric arc furnace and induction furnace?	13	4	L2
15 (a)	Compare the killed, rimmed and capped steels?	13	5	L2
<b>OR</b>				
15 (b)	Explain about ingot defects and their remedies?	13	5	L2

**PART- C (1 x 15 = 15 Marks)**  
(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16.	Explain the methods of testing burden materials?	15	4	L2

