



B.E/B.Tech (Full-Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2011  
**MATERIALS SCIENCE &ENGINEERING BRANCH**  
SEVENTH SEMSTER

**ML9403 – WELDING METALLURGY**

(REGULATIONS 2008)

Time: 3Hr

Max.Mark:100

Answer ALL Questions

Part –A (10x2=20 Marks)

1. State the significance of edge preparation.
2. Mention some of the advantages of preheating.
3. Draw the TTT diagram of a hypo eutectoid steel.
4. What do you mean by carbon equivalent?
5. Write short notes on hot cracking.
6. Draw the micro structure of ferritic grey cast iron indicating the different phases.
7. What do you mean by Haste alloy?
8. What is the main problem encountered while welding tough-pitch type copper?
9. List down some of the advantages of Non destructive testing.
10. Define: Weldability.

Part – B (5x16 = 80 Marks)

- 11            What do you mean by Continuous cooling transformation diagrams (CCT Curves)? 16  
How does CCT Curves differ from Time temperature transformation diagrams (TTT  
Diagrams)? Explain the significance of CCT Curves in welding engineering.
- 12a            What do you mean by Hydrogen assisted cracking or Cold cracking in steel welds? 16  
List the major factors responsible for cold cracking. Explain in detail how cold  
cracking can be prevented while welding steels.  
(OR)
- 12b            With the help of a neat diagram explain the Weld metal zone and Heat affected zone 16  
of a low carbon steel.
- 13a            Discuss on the following problems which are typically encountered while welding 16  
Austenitic Stainless steel  
(i) Ferrite and Sigma phase transformations ( 8 Marks)  
(ii) Carbide precipitation. ( 8 Marks)  
(OR)
- 13b            Mention the processes which can be used for welding Martensitic stainless steels. 16  
Explain the precautionary measures which can be adopted to overcome under bead  
cracking in martensitic stainless steel.

14a Discuss the welding of aluminium explaining clearly the chief problems encountered in welding. 16

(OR)

14b List down the general procedure to be adopted while welding Titanium and explain the weldability aspects of alpha,alpha-beta titanium alloys.

15a Discuss the causes and cures for 16

(i) Porosity (4 Marks)

(iii) Under cut (4 Marks)

(ii) Slag entrapment (4 Marks)

(iv) hot cracking (4 Marks)

(OR)

15b Explain any two of the following Weld tests.

(i) Tensile test (8 Marks)

(ii) Creep test (8 Marks)

(iii) Magnetic particle inspection technique (8 Marks)

(iv) Fluorescent penetrant inspection technique (8 Marks)