

B. E. (Met.) Part-IV 8th Semester Examination, 2013

Sub: Metallurgy of Ferrous Materials

(Code: MT – 803/1)

Time: 3 hours

Full Marks: 70

Use **Single** answer script.

Answer any **Seven** questions.

All questions carry **Equal** marks.

1. (a) State the typical microstructural constituents of DP steel. Compare the tensile behavior of conventional automobile steel with that of DP steel.
(b) Compare the martensite that is formed in maraging steel with the martensite that is formed in carbon steel.
7+3
2. (a) What are TRIP-assisted steels? State the classical heat treatment used to generate the mixed microstructure of TRIP-assisted steel.
(b) Mention the chief industrial processing problem of high silicon TRIP-assisted steel.
8+2
3. (a) What are TWIP steels? State the underlying principle of use of high combination of Al and Si concentrations in these steels.
(b) Distinguish between definite chill and indefinite chill cast iron.
6+4
4. (a) Describe the scheme of industrial processing of hot rolled fully bainitic and ferrite – bainite steel.
(b) Compare the hole expansion behaviour of a DP, TRIP-assisted and ferrite bainite steel.
7+3
5. (a) Suggest the principle of development of new generation Q & P steel.
(b) Compare the mechanical properties of Q & P steel and other advanced high strength steels.
7+3
6. (a) What do you mean by martensitic white iron? Is it an alloy cast iron? Why this type of iron is used in several wear resistant applications?

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(b) Which is easier to weld in between carbon steel and cast iron? Give reasons of your choice.

7+3

7. (a) What is the purpose of magnesium treatment in producing S.G. iron?

(b) How austempering is achieved in S. G. iron castings? State the possible applications of austempered S. G. iron?

3+7

8. (a) State the desirable properties and application of low, medium and high carbon steel.

(b) What are the effect of chromium and molybdenum in low alloy steels?

7+3

9. (a) What is austenitic cast iron? How does it impart corrosion resistance against a wide range of corrosive media such as alkali, acids, salts etc.?

(b) What is stainless steel? What are the various types of stainless steels?

7+3

10. Write short notes on (any three):

10

(a) High strength steel for automobile bumpers

(b) Ship building steels

(c) Stainless steel rebar

(d) Rail steel

(e) Pipeline steel
