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[4857]-1017

S.E. (Mechanical/Automobile) (Second Semester) EXAMINATION, 2015
ENGINEERING METALLURGY
(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

- N.B. :—** (i) Solve Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4;
Q. No. 5 or Q. No. 6 and Q. No. 7 or Q. No. 8.
(ii) Figures to the right indicate full marks.
(iii) Draw the neat sketch wherever necessary.

1. (a) What do you mean by widmanstatten structure ? Explain the factors responsible for it. [4]
(b) What is nucleation ? What are the types of nucleation mechanisms ? [4]
(c) Draw a neat labelled Fe–Fe₃C equilibrium diagram. [5]
- Or*
2. (a) Draw and explain the cooling curve for off eutectic alloy. [4]
(b) Write a short note on sulphur printing. [4]
(c) How are steels classified on the basis of their carbon percentage ? Give *one* application of each class. [5]
3. (a) Give classification of surface hardening treatments and explain any *one* process in detail with suitable example. [6]
(b) Is it possible to improve corrosion resistance by adapting proper design and fabrication ? If yes, explain **3** factors in design and fabrication to support your answer. [6]

P.T.O.

Or

4. (a) How intergranular corrosion can be prevented ? Explain in detail. [6]
- (b) What is hardenability ? Explain any *one* method of evaluation of hardenability and discuss factors affecting hardenability. [6]
5. (a) What do you mean by chilled cast iron ? Explain the chill test used to find out chill depth for such cast iron. [7]
- (b) State various factors affecting the microstructure and properties of cast iron. Explain their influence in brief. [6]

Or

6. (a) Compare white cast iron and Malleable cast iron on the basis of microstructure. Method of production, composition, mechanical properties and give *one* typical application of each. [7]
- (b) Compare grey cast iron and S.G. iron on the basis of manufacturing method, microstructure, properties and applications. [6]
7. Write true *or* false and justify your answer (any *four*) : [12]
- (1) Alpha brasses can be cold worked.
- (2) Invar is used in making measuring scales.
- (3) Bearings are manufactured from homogeneous materials
- (4) Addition of zinc in brass is done for changing the colour of brass
- (5) Any non-ferrous alloy can be strengthened by precipitation hardening.

Or

8. (a) Give typical composition, important properties and applications of the following (any *three*) : [9]
- (i) Elinvar
 - (ii) Admiralty brass
 - (iii) Sn-based babbits
 - (iv) Gun metal.
- (b) Aluminium alloys are widely used in aeronautic and automobile applications.” Comment. [3]