

7. Discuss :

- a) Chovorinov's Rule, Bernoulli's Theorem, Scab, Radiographic Testing, Misrun. 2×5
- b) Derive the filling times for top and bottom gating systems and compare them. What is pressurized gating system ? What is Blind riser ? 8+1×2

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B. METALLURGY ENGG. PART-I EXAMINATION, 2008
(2nd Semester)

FOUNDRY METALLURGY

Time : Three hours

Full Marks : 100

Answer any **five** questions.

All questions carry equal marks.

Assume any data, you feel necessary.

1. a) Explain : 2×5
Clay, AFS Clay, Active Clay, Dead Clay, Ball Clay.
- b) What are structures of Montmorillonite and Kaolinite ? 2×2
- c) Describe the formation of clay water Bond. 4
- d) What is the handicap of this bond ? 2
2. a) Explain : 2×5
Wrought iron, White iron, Chilled iron, Grey iron, Mottled iron. With their microstructures.
- b) What is Coke bed ? How Cupola operator does measure the adequacy of coke bed height ? How do you light a Cupola ? What is Cupola capacity ? What is Coke rate ? 2×4+1+1

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(2)

3. How do you justify the following :
- (i) The height : diameter and Tayerc area : Cupola area in selecting proper Cupola Design.
 - (ii) High Mn Pig and High Si Pig in cast iron melting.
 - (iii) Cast iron is a section sensitive material.
 - (iv) Nickel bearing electrodes are used in cast iron welding.
 - (v) Low-S iron, high temperature and nodulisers are essential for ductile iron production.
 - (vi) Malleable iron cannot be produced in Cupola.
 - (vii) Sea-coal is used in cast iron foundries. 3×6+2
4. a) Deduce the relationship between, thermal supercooling and critical nucleus size during solidification of a pure metal. How does the thermal supercooling affect, from investment casting to splat cooling, in grain structure development ? 8+2
- b) What is constitutional supercooling ? What is dendrite ? How does the thermal gradient change the freezing process in case of alloys ? 2×2+4
- How can you distinguish between short freezing with long freezing range alloys. 2
5. How can you explain the following :
- (i) Sprues are tapered.
 - (ii) Bottom pouring produces better castings than top pouring.

(3)

- (iii) Thin sections are difficult to feed.
 - (iv) Zincon sand is used in investment castings.
 - (v) Shell molding requires metal patterns.
 - (vi) In plate casting, gates, away from sprue, fill the mold quick.
 - (vii) Molases often is used in steel castings.
 - (viii) Polyesterene patterns can be seen in EPC process.
 - (ix) Plate sections are not recommended for risering.
 - (x) Divided blast reduces coke rate in Cupolas. 2×10
6. a) Describe (briefly) : Jolting, Loam molding, Thixo-Castings, Steadite, Modulus. 2×5
- b) Explain :
- (i) Why are popular cast metals of Eutectic Composition ?
 - (ii) What are draw backs of sand molding ?
 - (iii) Why too much fines are undesirable in foundry sand ?
 - (iv) Why core sand does have lower GFN than molding sand ?
 - (v) What is AFS standard sand sample. 2×5

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