

**Faculty of Engineering
Prince of Songkla University**

**Midterm Examination : Semester I
Date : August 1, 2005.
Subject : 226-316 Foundry Engineering**

**Academic Year : 2005
Time : 9:00-12:00
Room : R300**

Introduction :

1. Do all 9 questions.
2. The score appears at the end of each problem.
3. Total score is 100.
4. Your choices for problem no. 1-15 are on page 4-8. You have to put ✓ and number of problem into

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 which is correspond to the choice.
5. Problem no. 16-19 must be done on page 3.
6. Note, books and calculator are allowed.
7. Don't ask.

Asst. Prof. Sane Thanthalugsana



Questions :

1. How heavy is the steel piece produce by powder metallurgy ? (4)
2. Why is the metal product made by powder metallurgy so small ? (4)
3. Why have we to design corner of pattern in round shape ? (4)
4. There are 4 molten metals as follow : Al-alloy,Cu-alloy, iron and steel. Which one does provide the heighest pressure against mold walls ? (4)
5. There are silica flour, wood dust, graphite powder and coke dust. Which one should be used as coating material for steel casting ? (4)
6. What do you use to find moisture of molding sand ? (4)
7. There are 4 defects of castings. A foundryman found most of castings cause by moisture. What do you call that defect ? (4)
8. There are 4 types of alloys. They are iron, steel, Zn-alloy and Al-alloy. What shouldn't be produce by die casting machine ? (4)
9. Of what is gating system composed ? (4)
10. Why should sprue be tapered ? (4)
11. What theory do we use to prove that sprue should be tapered ? (4)
12. How is good pouring basin be ? (4)
13. What is choke area ? (4)
14. On what does fluidity of molten alloy depend ? (4)
15. What do you utilise to make a CO₂-process mold ? (4)

16. Given iron product of 8 kgs, with 4 kgs. of gating and risering systems, 2000 castings have to be produced by cupola. How much iron should be charged into cupola ?
17. A foundryshop has yearly to pay 2.0 millions baht back to a bank and 0.7 million of fixed production cost. The unit cost is 800 and the unit selling price is 1,100. How many castings should be produced ? (9)
18. Given C.F. = 3.9, 2.0 inches of average thickness, 2700 °F pouring temperature and the weight of iron casting is 500 lbs. Find tp. (9)
19. Given $h = 6$ inches, $c = 5$ inches, single gate, the depth of pouring basin = 2.0 inches, $w = 150$ lbs, $tp = 10$ seconds, $d = 0.28$ lb/cu.in., gating ratio of 1:3:3 and $j = 0.88$. Find A_B , A_T , A_R and A_g of this top gating system. (13)

Remark: Scores for A_B , A_T , A_R and A_g are 6, 3, 2 and 2.



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Strength of casting could be obtained.

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Strength of casting and good molding could be obtained.

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Low production cost could be obtained.

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Molten Al-alloy.

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Molten Cu-alloy.

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Molten iron.

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Molten steel.

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Blowholes.

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Misrun.

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Contraction cracks.

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Flash.



Fluid theory.

Bernoulli's theorem.

Newton's theorem.

Static theorem.

Smooth flowing and partly unrequired material could be provided.

High flowing rate could be obtained.

Blowholes could be avoided.

To lessen defects of casting.

To protect turbulence.

To prolong freezing time.

To eliminate shrinkage cavities.



Less than 2 kgs.

More than 2 kgs.

Less than 20 kgs.

More than 20 kgs.

Silica flour.

Wood dust.

Graphite powder.

Coke dust.

Sand rammer and balance.

Universal sand strength testing machine.

Permeability testing machine.

Dryer and balance.

The production cost is very high.

High labour cost is required.

Steel product couldn't be produced.

Good product is hardly produced.

The smallest area that could control pouring rate.

The area that could control pouring rate.

The area that could provide good pouring rate.

Chemical composition and thickness.

Chemical composition and pouring temperature.

Thickness and weight of casting.

Iron and steel.

Steel.

Cu-alloy.

Al-alloy.



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Sprue.

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Sprue and runner.

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Sprue, runner, ingate and pouring basin.

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Sprue, runner, ingate and riser.

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CO₂, resin and sodium silicate.

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CO₂, sodium silicate and sand.

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CO₂, resin and sand.

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CO₂ and sand.