

Name.....ID no.....

Prince of Songkla University
Faculty of Engineering

Final Examination : Semester I
Date : 13 October 2005
Subject :226-316 Foundry Engineering

Academic Year : 2005
Time : 09.00-12.00
Room : R300

ทูลริตในการสอบ โทษขันต่ำปรับตกลในรายวิชานั้นและพัทการเรียน 1 ภาคการศึกษา

Instruction:

1. *Do all 21 questions.*
2. *Total score is 100.*
3. *Write your name and ID no. on page 1 and 10.*
4. *Each of problem no.1-20 is 4 marks and no.21 is 20 marks.*
5. *Your choices for problem no 1-20 are on page 4-9. You have to put 3 letters into

--	--	--

 which corresponds to the choice.*
6. *All answers must be shown on page 10.*
7. *Don't ask.*

Asst. Prof. Sane Thanthalugsana

Prof. Sane Thanthalugsana

1. There are 3 castings of steel with equal mass but different surface area. The surface area of A, B and C are 1, 1.1 and 1.3 square feet. Which one is the shortest freezing time?
2. What is the difference of cooling curve between normal alloy and eutectic alloy?
3. How many stages of alloy contraction are there after pouring? What do you call the stage which concerns with the design of risering system?
4. What is modulus of solidification?
5. What is freezing range of grey iron?
6. After pouring molten alloy, how many zones are there during solidification? What are they?
7. What is the feeding distance?
8. There are 3 molding materials. They are iron, copper alloy and molding sand. Which one provides the most thickness during the same freezing time?
9. Why is blind riser smaller than open riser?
10. Why should the modulus of riser be less than of riser neck?
11. How many types of Al-alloy are there? What are they?
12. How many types of alloy solidification are there? What are they?
13. What does you coat the crucible before melting?
14. Only cast iron products are yearly manufactured. If you don't want to pay millions baht on furnace investment, what melting furnace have you to choose?
15. Normally what alloys could be produced by crucible furnace?
16. What is ceroxide?
17. How is nodular iron produced?
18. How is malleable iron produced?
19. What is the difference between arc furnace and induction furnace?

20. If one faces the problem of junction solidification, what is your suggestion?
21. A carbon steel plate of 3x16x51 in. Given $H/D = 3/4$. Find the risering system.

F O U The ratio of volume and surface area.

U F O The ratio of volume and cooling surface area.

F U O The ratio of mass and surface area.

O F U The ratio of mass and cooling surface area.

E I G Iron.

I E G Copper-alloy.

G I E Molding sand.

O N E A. Because it is the smallest surface area.

N E O B. Because it is the largest of cooling surface area.

E N O C. Because it is the largest surface area.

N I E The cooling surface area of blind riser is less.

I E N The cooling surface area of open riser is more.

N E I Heat loss of blind riser is less.

Handwritten signature

E	I	N
---	---	---

Heat loss of open riser is more.

T	W	O
---	---	---

Liquidus temperature of utectic alloy is higher .

W	O	T
---	---	---

Liquidus temperature of utectic alloy is lower.

T	O	W
---	---	---

Utectic alloy has zero freezing range but normal alloy is not.

W	T	O
---	---	---

Freezing range of utectic alloy is shorter.

T	L	V
---	---	---

2. Directional and progressive freezing.

L	T	V
---	---	---

3. Directional , fruzing.

T	V	L
---	---	---

3. Liquid, solid and both.

T	H	R
---	---	---

2. Liquid and solid shrinkage.

T	R	H
---	---	---

3. Liquid, solidification and solid shrinkage.

T	H	R
---	---	---

3. Liquid, freezing and solidus shrinkage.

T	R	E
---	---	---

Graphite slip.

R	T	E
---	---	---

Coke slip.

E	T	R
---	---	---

Limestone slip.

T	E	N
---	---	---

Riser could be liquid longer.

E	T	N
---	---	---

Riser neck could be liquid longer.

N	E	T
---	---	---

Riser neck should be less cooling surface area.

F	L	V
---	---	---

3. Solid, liquid and both.

L	F	V
---	---	---

3. Solid, mushy and liquid zone.

F	V	L
---	---	---

2. Solid and liquid zone.

L	V	F
---	---	---

2. Mushy and liquid zone.

F	E	N
---	---	---

Cu-alloy and Al-alloy.

N	F	E
---	---	---

Cu-alloy and iron.

F	N	E
---	---	---

Al-alloy and steel.

E	N	F
---	---	---

Iron and Al-alloy.

J	K	L
---	---	---

2400 – 2000 °F

K	L	J
---	---	---

2200 – 1900 °F

L	J	K
---	---	---

2600 – 2100 °F

L	K	J
---	---	---

2300 – 2000 °F

S	V	E
---	---	---

The smallest area that could control flowing rate.

V	S	E
---	---	---

The longest distance that riser could feed.

E	V	S
---	---	---

The distance that riser could feed.

X	Y	Z
---	---	---

To do the padding.

Y	Z	X
---	---	---

To increase thermal gradient.

Z	Y	X
---	---	---

To make cored hole.

M	N	R
---	---	---

Crucible furnace.

N	R	M
---	---	---

Induction furnace.

R	N	M
---	---	---

Cupola.

M	R	N
---	---	---

Arc furnace.

O	P	Q
---	---	---

To do inoculation during melting and then desulfurization.

P	O	Q
---	---	---

To desulfurize the molten iron, fill nodulant and then inoculation.

Q	P	O
---	---	---

To inoculate, fill nodulant and then desulfurization.

N	V	X
---	---	---

Clay.

V	N	X
---	---	---

Oxides of metals.

N	X	V
---	---	---

Ceramic material.

V	X	N
---	---	---

Metal oxides of low melting point.

A	B	C
---	---	---

To produce iron and then heat-treat the iron.

A	C	B
---	---	---

To produce white iron and then heat-treat the iron.

--	--	--

iron is not.

E	D	F
---	---	---

Induction furnace could produce any kind of metal but arc furnace only produces steel.

F	D	E
---	---	---

We could find induction furnace at some in foundry shop but arc furnace for steel mill in Thailand.

Handwritten signature

B	A	C
---	---	---

To make hard iron and then heat-treat the iron.

D	E	F
---	---	---

Arc furnace is one of electric furnaces but induction furnace iron is not.

E	D	F
---	---	---

Induction furnace could produce any kind of metal but arc furnace only produces steel.

F	D	E
---	---	---

We could find induction furnace at some in foundry shop but arc furnace for steel mill in Thailand.

E	L	N
---	---	---

2. Heat and non-heat treatable.

L	E	N
---	---	---

3. Al-bronze, Al-Cu and Al-Si-Mg.

N	E	L
---	---	---

4. Al-bronze, Al-Cu, Al-Si and Al-Mg.

Handwritten signature

Name.....ID no.....

1.			
----	--	--	--

11.			
-----	--	--	--

2.			
----	--	--	--

12.			
-----	--	--	--

3.			
----	--	--	--

13.			
-----	--	--	--

4.			
----	--	--	--

14.			
-----	--	--	--

5.			
----	--	--	--

15.			
-----	--	--	--

6.			
----	--	--	--

16.			
-----	--	--	--

7.			
----	--	--	--

17.			
-----	--	--	--

8.			
----	--	--	--

18.			
-----	--	--	--

9.			
----	--	--	--

19.			
-----	--	--	--

10.			
-----	--	--	--

20.			
-----	--	--	--

21.