Code No: RR321803 **Set No. 1**

III B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
FOUNDRY TECHNOLOGY
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Identity the important problem/challenges in the Indian metal casting industry. Give your suggestions to over the same. [8+8]
   (b) Name and Explain the importance industries using castings. Give typical Examples.
2. Explain in detail the properties desired for a good molding sand. [16]
3. (a) Discuss the criterion for the selection of a centrifugal casting process. How do you find out the speed of rotation in a centrifugal casting process. [5+5+6]
   (b) Explain why steel castings are not made by pressure-die casting process.
   (c) Differentiate between centrifugal casting process centrifuging process.
4. Explain with figures the various types of gates. Describe how the problems are avoided by using such gating systems. [16]
5. (a) Explain the differences between equilibrium solidification and non-equilibrium solidification with the help of a suitable example. [8+8]
   (b) What are the important characteristics of liquid metals. Explain them in brief.
6. (a) What is carbon equivalent? How is it computer? If a cast iron has $3-4\%$ carbon and 2% silicon is it hypo or Hyper eutectic cast iron? Why? [7+9]
   (b) Explain the significance of the following factors in the operation of cupola.
   (i) Coke-bed height ? (ii) Blast pressure (iii) air flow rate.
7. What is full mold process. Explain the process fully. What are the advantages disadvantages and applications of the above process. [16]
8. (a) From which source do Blowholes appear to originate most frequently? Explain them. [8+8]
   (b) Explain specifically how mold restraint could contribute to hot tears in castings.

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Code No: RR321803 **Set No. 2**

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FOUNDRY TECHNOLOGY
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Compare the construction, applications and limitations of sweep pattern with skeleton pattern giving sketches. [8+8]
   (b) Mention and explain casting defects that can occur due to improper pattern equipment.
2. (a) List some of the common and special types of cores employed in foundry practice. [8+8]
   (b) Describe the process for determining sand grain fineness number.
3. (a) Write the step by step procedure for making a casting by die casting process. [8+8]
   (b) Explain why die casting method is mainly used for Non Ferrous metals.
4. (a) Explain with neat sketches pouring Basin and down sprue. [8X8=16]
   (b) Explain the parameters which cause the pouring time of a given casting to vary.
5. (a) Differentiate between dendrite, nucleus crystal and grain. [8+8]
   (b) Suggest and Explain methods to get uniform grain size in a casting having thick and thin sections.
6. Give the Basic purposes of melting and describe, the sequential steps followed in using cupola. In what ways the melting in cupola differs from other types of melting furnaces? State how the materials to charge in to the cupola area selected. [16]
7. (a) Describe in detail about isocyanate process. [8+8]
   (b) With a neat sketch explain the working principle of continuous casting of aluminium strips.
8. (a) From which source do Blowholes appear to originate most frequently? Explain them. [8+8]
   (b) Explain specifically how mold restraint could contribute to hot tears in castings.

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Code No: RR321803 **Set No. 3**

III B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
FOUNDRY TECHNOLOGY
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Identity the important problem/challenges in the Indian metal casting industry. Give your suggestions to over the same. [8+8]
   (b) Name and Explain the importance industries using castings. Give typical Examples.
2. (a) List some of the common and special types of cores employed in foundry practice. [8+8]
   (b) Describe the process for determining sand grain fineness number.
3. With neat sketches explain the investment casting process. What are the advantages, disadvantages and applications of the above process. [16]
4. Explain with figures the various types of gates. Describe how the problems are avoided by using such gating systems. [16]
5. (a) Distinguish fully between Hamogeneous Nucleation and Heterogeneous Nucleation. [8+8]
   (b) Calculate the size of critical radius and the number of atoms in the critical radius the number of atoms in the critical nucleus when solid copper forms by homogeneous nucleation for the following data.
   Surface free energy $\sigma = 177 \times 10^{-3} J/m^3$
   Freezing temp of copper = $1085^0 C$
   Latent heat of fusion = $1628 \times 10^6 J/m^3$
   Under cooling temp = $236^0 C$
   Lattice parameter of Cu = $3.61 SoA$
6. (a) What type of cast iron family is suitable for malleabilising? [4+6+6]
   (b) Explain in detail mechanism and cycle of Malleabilising.
   (c) What are the ways of reducing malleabilizing cycle time. Explain them.
7. What do you mean by continuous casting. What is the main principle of continuous casting. What are the different types of continuous casting method. Explain the relative merits and demerits of each of these methods. Explain any one method of continuous casting process with the help of a neat sketch. [16]
8. What is Fettling. What are the casting defects caused due to wrong fettling operation. What are the specific reasons for their occurance. Suggest the remedial measures for the same. [16]

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Code No: RR321803 **Set No. 4**

III B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
FOUNDRY TECHNOLOGY
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Briefly explain the various types of pattern making tools. [6+10]
   (b) Steel castings are to be produced from the brats pattern which is to be made from a wooden pattern. If one dimension of the component part as taken from its drawing is 75mm. Calculate the correct dimension on the wooden pattern considering the abrinkage onlu.
   Shrinkage allowance for Brass: $15.3mm/metre$.
   Shrinkage allowance for Steel : $20.8mm/metre$.

2. (a) What are the ingredients of molding sands? Give the typical composition of green molding sand for grey iron foundry practice. [8+8]
   (b) Explain the effect of the following additives on the behavior/ properties of sand molds.

3. (a) Distinguish fully between 'True' and semi-centrifugal casting Processes. [6+10]
   (b) Explain the principle of CO_2 molding process. Enlist the advantages and disadvantages.

4. (a) What do you mean by centre line feeding resistance. Explain its importance in solidification of castings [8+8].
   (b) Explain the importance of cores.

5. Explain the following: [4X4=16]
   (a) Chill zone
   (b) Columnar zone
   (c) Equi-axed zone
   (d) Interdendritic porosity

6. (a) Explain the methods you employ for degassing the following metals in a foundry. [3X3=9]
      i. Aluminium
      ii. low carbon steel
      iii. Brasses
   (b) Discuss the melting practice for copper alloys with a neat sketch. Discuss the necessary precautions to be taken during melting practice.

7. Write an essay on the 'Full mold process'. Explain their advantages, limitations and application of the above process. [16]

8. List some of the common types of casting defects which are nomlally detected only after cleaning / fettling. Explain them fully. [16]

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