

Code No: 07A6EC11

R07**Set No. 2**

III B.Tech II Semester Examinations, APRIL 2011
FOUNDARY TECHNOLOGY
Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Discuss the importance of adding following additives to the molding sand. Cereals, asphalt, sea coal, fuel oil, wood flour, silica flour, iron oxide, molasses. [16]
2. Explain shell moulding process in detail from making of shells to obtain casting. [16]
3. What is shell molding? Explain the principle of shell molding process. Also mention its advantages and limitations. [16]
4. (a) Discuss the formation of shrinkage defects in castings due to:
 - i. Melt (material properties)
 - ii. Pouring conditions?
 (b) Distinguish between centre-line, and gross-shrinkage? [10+6]
5. (a) What do you mean by flux? What are the functions of flux in melting metals and alloys? What are the various types of fluxes. Give their composition and applications.
 (b) What does normally constitute the charge in a cupola furnace? Explain the part played by each of the charge materials. [10+6]
6. What is URH process? What is its working principle? How is it carried out? What are its merits over other sand casting processes? Discuss. [16]
7. Write short notes on the following:
 - (a) Motion of molten metal in top casting
 - (b) Motion of liquid metal along channels. [8+8]
8. (a) Explain about the casting defects caused by low pouring temperatures & high pouring temperatures.
 (b) What are various types of metallurgical defects? What are the causes and remedies for such defects? Explain. [8+8]

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R07**Set No. 4**

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1. (a) Describe the solidification process of a pure metal in terms of nucleation and growth of crystals?
- (b) With neat sketches explain the differences between planar growth and dendritic growth? [8+8]
2. Write a brief account on different molding equipment used in foundry. [16]
3. (a) What factors are to be controlled in the production of S.G Iron? Discuss. What methods are used for:
 - i. desulphurization and
 - ii. modularizing treatment.
 Explain about them.
- (b) Explain the special precautions that are to be taken in the case of aluminum alloys. [11+5]
4. What are the laws of fluid dynamics? Explain their role in designing a gating system. [16]
5. (a) What are the most harmful gases soluble in molten metals. Discuss the corresponding gas holes formed in the castings and explain the remedial measures.
- (b) Explain about the following casting defects:
 - i. Rat tails
 - ii. Scabs. [8+8]
6. (a) Explain with sketches how hollow sections are produced using the continuous casting process.
- (b) What is thixo casting process? Explain its working principle. Discuss its advantages and disadvantages. [8+8]
7. Discuss on the following with respect to Investment casting:
 - (a) Selection of pattern material
 - (b) Removal of patterns
 - (c) Coating of patterns
 - (d) Advantages and limitations of the process [4×4]

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8. (a) Distinguish between Floor and Pit molding and Cement bonded sand molding.
(b) Compare and contrast between core molds and skin-dried molds. [8+8]

FIRSTRANKER

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R07**Set No. 1**

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1. (a) Explain the important common features in different molding processes.
(b) Classify the different molding processes. [8+8]
2. (a) Distinguish between equilibrium cooling and non equilibrium cooling?
(b) Draw the cooling curves for a short freezing range alloy and long freezing range alloy and explain the salient points in it? [8+8]
3. (a) Explain different types of slag traps.
(b) Differentiate between parting gates and branch gates with examples. [8+8]
4. (a) Discuss about various steps involved in green-sand molding process along with a neat sketch.
(b) Explain their advantages and limitations. [10+6]
5. (a) What are the various raw materials used in cold box molding process. Explain the part played by each one of them in cold box molding process.
(b) Explain the oil - oxygen process of making cores and molds. [8+8]
6. (a) What are some of the attractive features of electromagnetic casting? Explain in detail.
(b) What type of cast iron family is suitable for malleabilising? Explain in detail the Mechanism & cycle of malleabilising. [8+8]
7. Explain why the following are encountered in foundries. Suggest suitable remedial measures in each case:
 - (a) sand expansion defects
 - (b) mold dilation
 - (c) burn on
 - (d) metal mold reaction. [16]
8. What is shell moulding process? Discuss the various steps to be followed in obtaining the shells from the moulding materials along with neat sketches. Explain about the raw materials required in the process. [4+8+4]

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R07**Set No. 3**

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Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
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1. Explain CO₂ process of moulding from raw materials to making of casting. [16]
2. Draw neat sketch of a gating system and explain different parts and their role in casting. [16]
3. Write a detailed notes on various types of furnaces, their constructional details etc, that are used in foundries. [16]
4. With a neat sketch explain the principle of continuous casting of aluminium strips. Explain the advantages and disadvantages of this process. [16]
5. (a) What is a misrun & how could such a defect be avoided? Explain.
 (b) What are various types of porosity defects. What are the causes for those defects. Discuss them. Suggest suitable remedial measures. [6+10]
6. Discuss the following:
 - (a) Antioch Process
 - (b) Ceramic molding
 - (c) Plaster molds [5+5+6]
7. (a) Distinguish between undercooling and supercooling. Explain how does the degree of undercooling affect the critical nucleus size for homogeneous nucleation conditions?
 (b) How is that surface energy term is no more important in growth process? Explain?
 (c) Explain about non-equilibrium solidification? [8+4+4]
8. Write short notes on the following:
 - (a) Inter dependence of sand grains and permeability
 - (b) Role of sand grains and refractoriness
 - (c) Effect of sand grains and expansion
 - (d) Role of clay and water on molding properties [4×4]
