

21/11/13

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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

MATERIALS SCIENCE AND ENGINEERING

III Semester

4

ML8301- CASTING AND MACHINING PROCESS

(Regulation 2012)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What are the major advantages and limitations of the expandable mould casting?
2. Why should the allowance be provided on pattern in sand casting?
3. State the relationship for the maximum taper ratio of the sprue to minimize aspiration.
4. What are the four primary requirements of a moulding sand?
5. Why should the directional solidification be desirable in the production of cast product?
6. How are casting volume and surface area related in the chvorinov's rule for designing riser?
7. List two advantages and limitations of shell moulding.
8. How are foundry furnaces classified?
9. Distinguish between orthogonal and oblique cutting.
10. Sketch and label the basic motions in turning.

Part – B (5 x 16 = 80 marks)

11. (i) How does solidification of alloys differ from solidification of pure metal? (4)
(ii) The steel casting of a rectangular plate with dimensions 7.5x12.5x2.0cm is proposed to be made by sand casting. The results of previous observations on the similar casting have the total solidification time of 1.5 min. A cylindrical riser of diameter to height ratio of 1.0 on the side of a longer side is desired. Take chvorinov's exponent value (n) as=2
a) Determine the dimensions of riser if the total solidification time of 1.5 min. is desired. (8)
b) Sketch the riser and indicate its location relative to mould cavity. (4)
12. a) i) What are the features considered in the selection of pattern material? (4)
ii) Explain with a sketch the functional difference between solid and split pattern indicating typical applications of each pattern. (12)

(OR)

- b) i) Explain the characteristics of the core to function effectively. (4)
ii) Describe with a suitable sketch the stages of making green sand mould for circular disc. (12)

13. a) i) Explain the functions of (i) riser (ii) runner in a gating system. (4)
ii) Explain with a sketch the hot chamber process of die casting indicating advantages and applications. (12)

(OR)

- b) i) What are the major differences between true centrifugal casting and semi centrifugal casting? (4)
ii) Explain the typical stages in making investment casting stating the advantages and limitations. (12)

14. a) i) What are the attractive features electromagnetic casting? (4)
ii) Sketch and explain the constructional features of cupola, stating the different zones. (12)

(OR)

- b) i) Distinguish the principle of (i) ceramic (ii) squeeze casting. (4)
ii) Describe any two melt quality control for aluminium and carbon steel. (12)

15. a) i) What are the relevant attributes that distinguishes the machining from other manufacturing methods? (4)
ii) Describe with illustrations the different types of chip and the circumstance that promote such chips in metal cutting. (12)

(OR)

- b) i) What are the causes of tool wear? (4)
ii) Sketch a single point tool and indicate the various tool geometry. Explain the functions of any two primary angles. (12)