

Enrollment No: \_\_\_\_\_

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech MID Semester Exam**

**Semester: VI**  
**Subject Code: 203113363**  
**Subject Name: MP-II**

**Date: (29/01/2024)**  
**Time: (1hr: 30min)**  
**Total Marks: 40**

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Sr. No. Marks

Q.1 (A) Five One line Questions

1. Enlist the different types of patterns used in the casting process.
2. What is gating ratio?
3. Determine the approximate length of the riser with & without end wall effect.  
Take number of risers = 2
4. A cast steel slab of  $300 * 200 * 100 \text{ mm}^3$  is poured horizontally using a side riser. The riser is cylindrical in shape with diameter equal to 250 mm. What is the freezing ratio by Caine's method? 05
5. For a bottom gating system, the height of the down sprue is 200 mm and circular ingate diameter is given as 30 mm. Gating ratio is 1:2:2. Determine the cross sectional area of sprue (in  $\text{cm}^2$ ).

(B) Five Fill in the blanks/Multiple Choice Questions

1. \_\_\_\_\_ is used for withdrawing pattern from the mold.  
a) riddle c) vent wire  
b) slick d) draw spike
2. If pattern is made from \_\_\_\_\_ material then draft allowance is provided.  
a) wax c) polystyrene  
b) mercury d) sugar pine wood
3. In a gating design dimension of the cavity is given by  $50 \text{ cm} * 25 \text{ cm} * 15 \text{ cm}$  is filled with top gating system with a pouring height of 15 cm. cross-sectional area of the gate is  $5 \text{ cm}^2$ . What will be the mold filling time (in sec) taken to fill the cavity? 05  
a) 21.86 c) 16.56  
b) 28.86 d) 10.56
4. The permeability of moulding sand was determined using a standard AFS sample by passing  $2000 \text{ cm}^3$  of air at a gauge pressure of  $10 \text{ g/cm}^2$ . If the time taken for the air to escape was 1 min, the permeability number is \_\_\_\_\_.  
a) 40.12 c) 55.12

- b) 50.12  
d) 45.12
5. The part of a gating system which regulates the rate of molten metal is \_\_\_\_\_.
- a) sprue  
b) runner  
c) choke  
d) ingate

- Q.2 Attempt any four (Short Questions) 12
1. During sand mold casting process, it took 155 sec for a cube-shaped casting to solidify. The cube is 50 mm of side. (i) Determine the value of the mold constant in Chvorinov's rule. (ii) If the same alloy and mold type were used, find the solidification time for a cylindrical casting in which the radius ( $r$ ) = 15 mm and length ( $l$ ) = 50 mm.
  2. What is pressurized and non-pressurized gating system? What type of gating system should be chosen for aluminum alloys and for steels? Why?
  3. Explain with neat sketch, steps involve in investment casting process. Also state its applications.
  4. Explain the following defects, causes and remedies of casting defects: blow holes, cold shut, misrun.
  5. Enlist properties of moulding sand. Explain any four properties of moulding sand.
- Q.3 Attempt any two questions 08
1. Illustrate pattern allowances with a neat sketch.
  2. Derive an equation of pouring time for bottom gating system.
  3. (i) Why a down sprue is made tapered in a gating system?  
(ii) What is indication of the black, red and yellow color in patterns?
- Q.4 (A) Draw the schematic of gating elements for casting and also discuss the following casting terms: pouring basin, sprue, gate, runner, riser, strainer, splash core and skim bob. 05
- (B) A hollow cylindrical of height 15 mm having outer and inner radii of 8 mm and 4 mm respectively has to be casted using sand casting process. Determine the shape factor of the casting. 05
- OR
- (B) Determine the dimensions of square cylindrical riser used to compensate shrinkage of casting of  $200 \times 100 \times 20 \text{ mm}^3$  side. Take shrinkage volume as 2.6 % 05