

### Course Material

Name of the Course : **MANUFACTURING PROCESS (MFP)**  
Name of the Unit : **CASTING AND MOLDING**  
Name of the Topic : **SAND CASTING PROCESS**

1. **AIM AND OBJECTIVES:** To develop ideas on various casting process

2. **PRETEST- MCQ**

1. Clays are what type of binders?

- a) Organic
- b) Patented
- c) Inorganic
- d) other binders

2. Which of the following is not a characteristic property of any moulding sand?

- a) Flowability
- b) Hardenability
- c) Green strength
- d) Dry strength

3. What is the amount of clay needed in green sand?

- a) 5% – 10%
- b) 5% – 15%
- c) 15% – 30%
- d) 25% – 40%

3. **PRE-REQUISITES:**

To have a basic knowledge of Casting Processes

## **4. THEORY BEHIND**

### **INTRODUCTION**

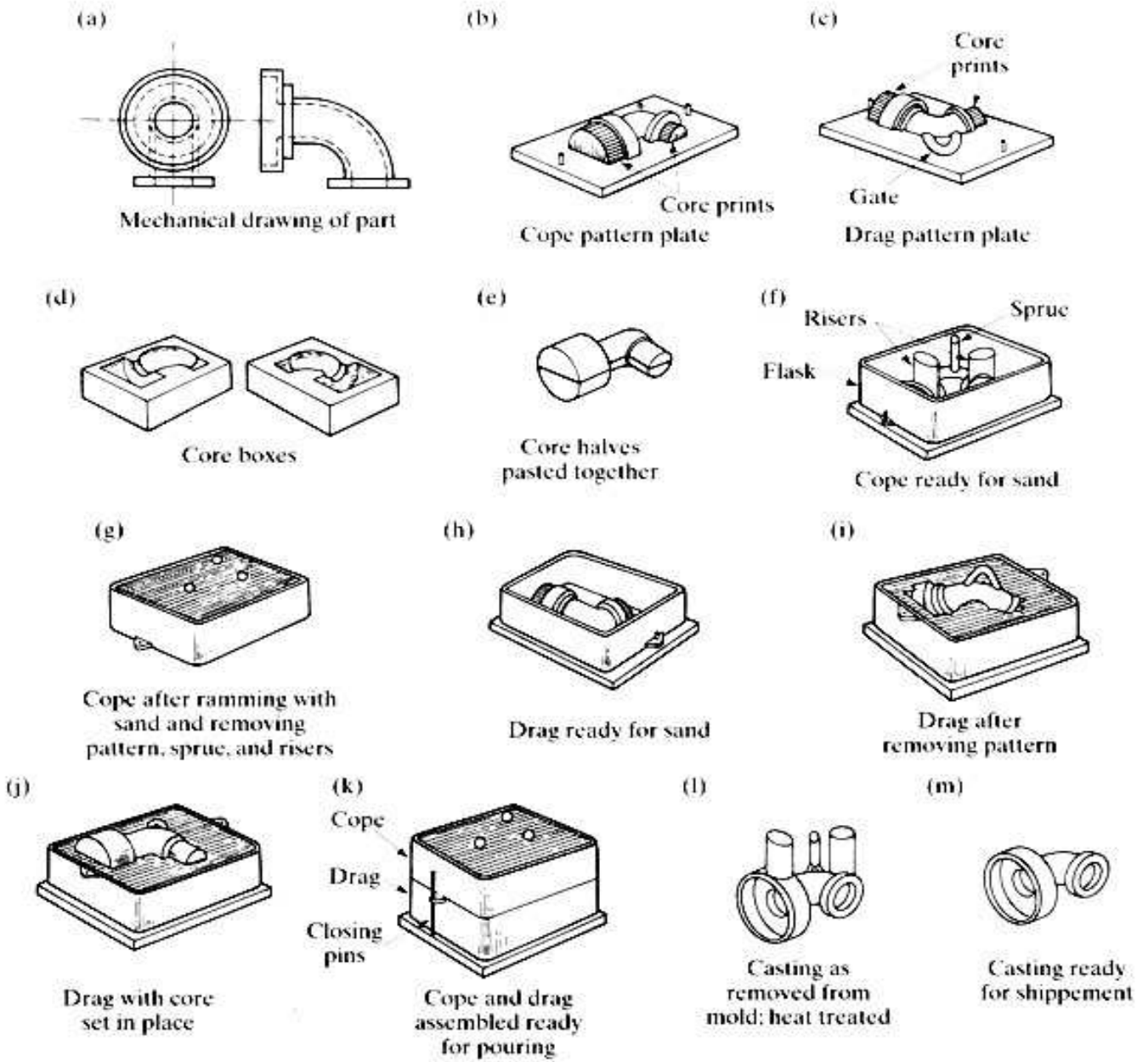
Casting is a manufacturing process in which a liquid material is usually poured into a mold, which contains a hollow cavity of the desired shape, and then allowed to solidify. The solidified part is also known as a casting, which is ejected or broken out of the mold to complete the process.

### **TYPES OF CASTING PROCESS**

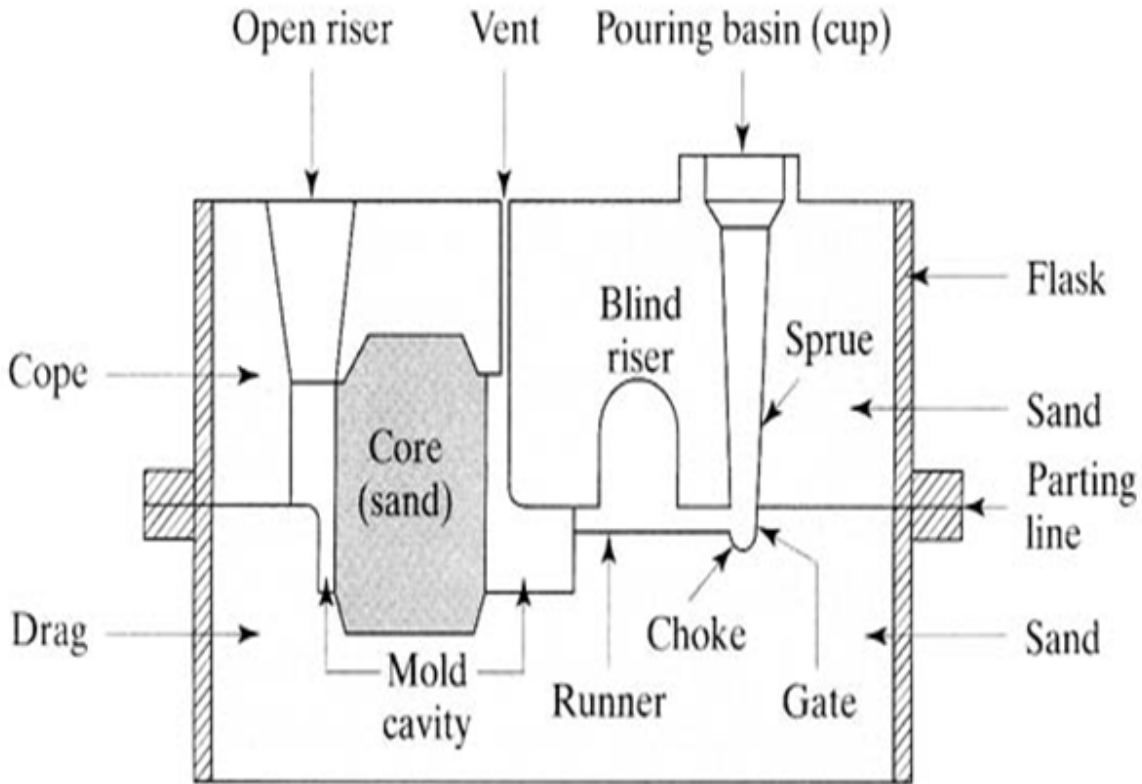
- 1. SAND CASTING
- 2. SHELL MOULD CASTING
- 3. PLASTER CASTING
- 4. VACUUM CASTING
- 5. INVESTMENT CASTING
- 6. DIE CASTING

### **STEPS INVOLVED IN THE PREPARATION OF SAND CASTING**

- Preparation of a pattern
- Preparation of molding sand
- Preparation of mold and core
- Melting of metal
- Pouring of metal into the mold
- Cooling & solidification
- Removing the casting from the mold
- Fettling
- Heat treatment
- Testing & inspection



**Figure 1: Shows Steps Involved In Sand Casting Process**



**Figure 2. Sand Casting Mold Features**

**ADVANTAGES & LIMITATIONS**

1. No limit on size and shape
2. All metal can cast
3. Low equipment cost
4. Economical for low volume production
5. Intricate shaping of metals that are difficult to machine
  - a) Product give rough surface
  - b) Thin projection not practical
  - c) Machining always necessary

Sand casting is used for a variety of applications to produce a wide range of parts including:

1. Air compressor pistons.
2. Bearings.
3. Blowers & impellers.
4. Bushings.
5. Cams.
6. Electronic equipment.
7. Engine crankcases.
8. Engine oil pans.

**6. MCO- POST TEST**

1. The most preferred process for casting gas turbine blades is
  - A. die casting
  - B. shell molding
  - C. investment molding
  - D. sand casting
  
2. Which of the following material can be used for making patterns?
  - A. Aluminium
  - B. Wax
  - C. Lead
  - D. all of these
  
3. A sand employed on the faces of the pattern before molding, is called
  - A. green sand
  - B. dry sand
  - C. loam sand
  - D. parting sand
  
4. In permanent mold casting method

- molten metal is poured in a metallic mold, retained in the mold long enough for the outer skin to solidify and finally mold is turned over to remove molten metal still in molten condition
- A. skin to solidify and finally mold is turned over to remove molten metal still in molten condition
  - B. molten metal is poured and allowed to solidify while the mold is revolving
  - C. molten metal is forced into mold under high pressure
  - D. none of the above

## **7.CONCLUSION**

1. A successful casting requires that every aspect of the process be examined
2. Every aspect from the desired grain structure to the desired finish of the product should be considered during design stages
3. Efforts should be made to minimize cracking and defects
4. There are a variety of processes to improve castings and they should all be considered during the design phase

## **8.REFERENCES**

1. **R.K. Rajput** “A Text Book Of Manufacturing Technology (Manufacturing Processes)” by Laxmi Publications
2. **S.K. HAJRA CHOUDARY** “Elements of Workshop Technology. Vol. I: Manufacturing Processes”

## 9. **VIDEOS**

[https://www.youtube.com/watch?v=pwaXCko\\_Tkw](https://www.youtube.com/watch?v=pwaXCko_Tkw)

## 10. **ASSIGNMENTS**

1. Write in detail about sand casting with neat sketch?
2. Explain the steps involved in sand casting with neat sketch .Also state its advantages and limitations?