

DEPARTMENT OF MECHANICAL ENGINEERING

ME3393 – MANUFACTURING TECHNOLOGY-1

QUESTION BANK

UNIT-I - METAL CASTING PROCESSES

PART-A

1. Name any four types of commonly used patterns
2. What is the merit of CO₂ process?
3. State the essential properties of moulding sand
4. Give any two merits and demerits of investment casting process
5. Mention any two merits and demerits of die casting
7. List out any four defects in casting
8. What is meant by split pattern?
9. Define the term mould
10. What are the defects caused by low pouring temperature?
11. What is meant by match plate pattern making?
12. How will you calculate grain fineness number?
13. How patterns differ from casting?
14. What are the tests carried out to determine the quality of casting?
15. What are the functions of riser?
16. What are core prints?
17. What are the functions of gating and risering?
18. What is the composition of moulding sand?
19. What is the function of core?
20. Which process is called “Lost wax process”? Why?

PART-B

1.
 - i. Discuss the properties of moulding sand
 - ii. What are the various moulding methods, explain them
2.
 - i. Explain the working principle of investment casting
 - ii. Discuss the casting defects and their inspection methods
3.
 - i. What are the pattern making allowances and briefly explain them
 - ii. Describe centrifugal casting process
4.
 - i. Describe the shell moulding process
 - ii. Explain the ceramic moulding process and state its merits and demerits
5.
 - i. What are the factors which govern the selection of a proper material for pattern making?
 - ii. What are the specific advantages of match plate patterns? Explain how they are used for making mould
6.
 - i. Classify the types of patterns and sketch any three of them
 - ii. What is core and explain how to make a core?
7.
 - i. Explain the construction and operation of Cupola furnace with diagram
 - ii. Write a short note on “Chills”
8.
 - i. Describe various materials used for making patterns. What are its merits and demerits
 - ii. What are the basic requirements of core sand? How does it differ from the moulding sand?
9.
 - i. What are the different types of furnace used in foundry? Describe in detail with neat sketches any one of them
 - ii. Describe the steps involved in the preparation of green sand mould with cope and drag pattern
10.
 - i. Briefly explain cold-chamber die casting process with a neat sketch
 - ii. What are the advantages of centrifugal casting?

UNIT- II- JOINING PROCESSES

PART-A

1. What is the principle of resistance welding?
2. What is the role of fluxes in welding? Or function of flux in welding?
3. List out any four arc welding equipment.
4. What is the principle of Thermit welding?
5. What are the different types of gas flames? How are they formed?
6. Differentiate soldering and brazing.
7. What is the chemical reaction occurs in thermit welding?
8. What are the advantages of carbon arc welding?
9. Differentiate between oxy-acetylene and air-acetylene welding
10. What are the advantages of A.C arc welding?
11. What is the principle cause of cracks in weld metals?
12. How do you specify an electrode?
13. What is the function of shielding gas in welding?
14. Why laser welding is used only for micro-welding applications?
15. Define resistance welding
16. What is flux? Why is it essential to use it in some welding situations?
17. What are the defects that are generally found in welding?
18. List any four applications of TIG welding process.
19. Is flux necessary in Brazing process? If yes why?
20. How slag inclusions in welding be avoided?

PART-B

1. i. Distinguish between gas and arc welding
ii. What are the advantages of welding?
iii. Explain percussion welding
2. i. Describe Electro slag welding
ii. Distinguish between soldering and brazing
3. i. Explain spot welding
ii. Explain submerged arc welding
4. i. Explain the electron beam welding process with a neat sketch
ii. Write a brief note on “Welding defects”
5. i. Sketch the three types of Oxy-acetylene flames and state their characteristics and applications.
ii. Describe the electro-slag welding process with a neat sketch.
6. i. What is the principle of resistance welding and explain the seam welding?
ii. Describe plasma arc welding
7. i. What are the different types of electrode? What are the functions of flux coating?
ii. What is the principle of friction welding?
8. i. Describe metal inert Gas arc welding process with a neat sketch.
ii. Briefly explain on butt welding process
9. i. Give a brief account of classification of welding processes?
ii. Explain TIG welding process variables and enumerate its advantages
10. i. Describe shielded metal arc welding process with suitable diagram. What are its applications?
ii. What is the difference between welding, brazing and soldering process?

UNIT- III-METAL FORMING PROCESSES

PART-A

1. List out the types of forging machines
2. What are the types of rolling mills?
3. What are the four major draw backs of hot working?
4. Classify the types of extrusion
5. State any two effects produced by Cold-working
6. What are the two basic types of forging process?
7. What do you understand by forging? What are the advantages?
8. List out the forging defects
9. Classify the types of forging machines
10. State the defects in rolled parts.
11. What are the advantages of cold forming?
12. What is the purpose of piercing operation?
13. Name any four limitations of hot forging
14. Write the limitations of hot working process
15. What is the difference between stretch forming and bending?
16. What do you understand by recrystallisation and recrystallisation temperature?
17. What are the general advantages of forging as a manufacturing process?
18. List the functions of Back-up rollers in rolling operation?
19. Discuss in brief open die and closed die forging
20. What is the principle of impact forging?

PART-B

1. Classify the types of forging machines and explain any one
2. Explain the forward and back extrusion process
3. i. classifies the types of rolling mills and sketches them.
ii. List out various forging defects
4. i. Describe hydrostatic extrusion process.
ii. Compare press forging and hammer forging
5. i. Explain the tube piercing process
ii. Distinguish hot and cold extrusion process and briefly explain one in each.
6. i. Describe the principle of rolling. Write the various kinds of rolling mills along with their applications
ii. What are the types of power hammers available and explain the pneumatic hammer with a neat sketch
7. i. Describe the difference between a bloom, a slab and a billet. Explain the features of different types of rolling process.
ii. Discuss the effects of temperature, strain rate and friction on metal forming process
8. i. Explain with a sketch, what is meant by flat strip rolling.
ii. Explain the procedure for making the head of Bolt by forging operation
9. i. Name the hand forging operation and explain briefly about them.
ii. Explain with a neat sketch of roll forging process.
10. Describe the following processes
 - a. Roll die forging
 - b. Skew rolling
 - c. Ring rolling

UNIT- IV- SHEET METAL PROCESSES

PART-A

1. What is blanking?
2. What is punching operation?
3. What are the different types of metals used in sheet metal work?
4. Mention any four products produced by spinning process?
5. In which member the clearance should be given for blanking and piercing?
6. What is the difference between stretch forming and bending?
7. List various operations generally performed in a sheet metal shop
8. Show the details of punching process with the help of a simple sketch
9. Give the difference between punching and blanking
10. List the various sheet metals that can be formed in press working
11. Define the term spring back
12. What are the advantages of stretch forming operation?
13. What are the types of special forming processes?
14. What are the advantages of hydro forming process?
15. State the limitations and applications of rubber pad forming process
16. What is metal spinning process?
17. State the advantages and applications of explosive forming process
18. What is peen forming process?
19. What are the advantages and disadvantages of peen forming process?
20. What are the applications of super plastic forming process?

PART-B

1. i. Explain any one stretch forming operation
ii. Define formability and how it is tested?
iii. What is drawing operation?
2. i. Explain the metal spinning operation
ii. Describe the magnetic pulse forming process
3. What is deep drawing operation? Explain with a neat sketch.
4. i. Explain rubber pad forming process
ii. Describe the electro hydraulic forming process
5. i. Describe the explosive forming process
ii. How are aluminium kitchen utensils produced?
6. i. Describe the process of hydro forming
ii. Describe the various methods of rubber forming. Where are these processes used?
7. i. What is super plastic forming?
ii. Describe the hydro forming process with the help of neat diagram
8. i. Explain the characteristic features of sheet metal used in forming process
ii. Explain peen forming process
9. i. Find the total pressure, dimensions of tools to produce a washer 5cm outside dia with a 2.4 cm diameter hole, from a material 4 mm thick, having shear strength of 360 N/mm^2
ii. Determine a) blank diameter b) least no. drawing operations c) force and energy for the first draw with 40% reduction to produce a cup of 5 cm in diameter and 7.5cm deep to be drawn from 1.5mm thick drawing steel with a tensile strength of 315 N/mm^2

10.i. Estimate the blanking force to cut a blank 30mm and 35 mm long from a 1.5 mm thick metal strip,if the ultimate shear stress of the material is 450 N/mm^2 . Also determine the work done if the percentage penetration is 25% of material thickness

ii. A blank has a perimeter of 31.75cm. The metal is 1mm thick cold worked 0.15% carbon steel with a shear strength of 420 N/mm^2 and percent penetration of 25%. Two holes of 1.25cm diameter each are to be pierced during the same stroke when the piece is blanked. What are the forces required for blanking and for piercing? What is the maximum force the press must exert at any one time without shear?

iii. Estimate the blanking force to cut a blank 30 mm wide and 35 mm long from a 1.8mm strip if the ultimate shear stress of the material is 450 N/mm^2 .Also determine the work done if the percentage penetration is 25% of material thickness.

UNIT-V- MANUFACTURING OF PLASTIC COMPONENTS

PART-A

1. What are the applications of laminated plastics?
2. Enumerate the advantages of Electro-hydraulic forming process
3. Write any two limitations of Electro-magnetic forming process
4. What are the characteristics of thermosetting plastics?
5. Classify thermoplastics
6. What is meant by high energy rate forming?
7. Name any four thermosetting plastics, used in industries.
8. Give four examples of thermo plastics
9. Give two examples of thermoplastics and thermosetting plastics
10. What is blow moulding process?
11. Which type of plastic is used for manufacturing electrical switches? Why?
12. What is meant by rotational moulding?
13. List the advantages and disadvantages of rotational moulding

14. Define thermoforming
15. What is meant by transfer moulding?
16. Which type of moulding is used for making bottles?
17. What are the types of compression moulding?
18. What is bonding of thermoplastics?
19. List the advantages and disadvantages of transfer moulding
20. What is meant by film blowing?

PART – B

1. Explain the principle of injection moulding process
2. i. Describe any method of bonding thermoplastics
ii. What is laminating? Explain the low pressure method of laminating
3. i. Explain the transfer moulding process
ii. Why screw injection moulding machine is better than a ram type injection moulding machine?
4. i. Describe the compression moulding process
ii. Describe briefly any two thermoplastics and thermosetting plastics
5. What are the processes used for processing of thermoplastic. Explain any one process with suitable sketches
6. What is thermoforming process? Explain with a neat sketch
7. Describe film blowing operation
8. Explain Rotational moulding
9. i. Explain blow moulding process with its salient features
ii. What are the additives to be mixed in processing plastics and explain the purpose of each.
10. i. Describe different types of plastics with applications of each type
ii. How do thermoplastics differ from thermosetting plastics?