

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK

ME 3393- MANUFACTURING PROCESSES

SANCTET

UNIT-1 METAL CASTING PROCESSES

Sand Casting: Sand Mould – Type of patterns – Pattern Materials – Pattern allowances – Moulding sand Properties and testing – Cores – Types and applications – Moulding machines – Types and applications; Melting furnaces : Blast and Cupola Furnaces; Principle of special casting processes : Shell - investment – Ceramic Mould – Pressure die casting - Centrifugal Casting - CO₂ process – Stir casting; Defects in Sand casting.

PART-A (2 marks)

Q. No	Questions	BT Level	Competence
1	Define the characteristics of core.	BT1	Remembering
2	Give the names of the alloys which are generally die cast. Why are aluminum alloys preferably cast in cold chamber die casting machines?	BT2	Understanding
3	Point out the types of furnace used for melting ferrous material and Why?	BT4	Analyzing
4	Define core print.	BT1	Remembering
5	Point out the factors to be considered in calculating the shrinkage allowance.	BT4	Analyzing
6	Make a note on loam Mould.	BT6	Creating
7	Differentiate sand blasting and shot blasting.	BT4	Analyzing
8	List out the casting defects occur due to improper ramming.	BT1	Remembering
9	Examine the causes for the formation of blow holes in the sand casting.	BT1	Remembering
10	Differentiate Shrinkage and Porosity.	BT4	Analyzing
11	Name the Materials used for making Patterns.	BT1	Remembering
12	Compare the advantages of metal moulds over sand (expandable) moulds.	BT4	Analyzing
13	Illustrate the function of flux in melting metals and alloys.	BT3	Applying
14	Describe the essential requirements of a core sand briefly.	BT2	Understanding
15	Explain about pattern briefly.	BT5	Evaluating

16	Define Casting.	BT1	Remembering
17	Generalize the properties of molding sand.	BT6	Creating
18	Classify the different types of patterns.	BT3	Applying
19	Discuss any Four casting defects.	BT2	Understanding
20	Explain the ideal profile of a sprue.	BT5	Evaluating
PART –B (13 marks)			
Q. No.	Questions	BT Level	Competence
1	(i) Describe the preparation of sand moulding process.(7) (ii) Explain the various types of pattern used in mould Making. (6)	BT-2 BT-4	Understanding Analyzing
2	(i) Classify the materials used for pattern making and write about them.(7) (ii) What are the allowances given while making Pattern? Explain.(6)	BT-5 BT-4	Evaluating Analyzing
3	(i) Classify the different types of moulding sand and explain.(7) (ii) Explain the method of moulding sand testing.(6)	BT-5 BT-5	Evaluating Evaluating
4	(i) Describe the various properties required for the moulding sand.(6) (i) Explain types of cores and its application.(7)	BT-1 BT-4	Remembering Analyzing
5	Identify and Explain the various steps involved in sand core manufacturing.	BT-1	Remembering
6	(i) Explain squeeze Jolting machine with neat sketch.(6) (ii) Explain sand Slinger machine with neat sketch.(7)	BT-4 BT-4	Analyzing Analyzing
7	(i) Explain the Jolting Machine with neat sketch.(7) (ii) Explain construction and operation of Blast furnace with necessary sketch. (6)	BT-4 BT-4	Analyzing Analyzing
8	(i) Describe the constructional feature of cupola furnace.(7) (ii) Describe the operation of Cupola furnace with necessary sketch.(6)	BT-1 BT-2	Remembering Understanding
9	(i) Enumerate the steps in sequence for producing shell moulding.(7) (i) Explain lost wax - Investment casting processes with neat sketch(6)	BT-4 BT-4	Analyzing Analyzing
10	(i) Explain ceramic moulding with a sketch.(6) (ii) With the help of neat Sketch, describe in detail, the process of producing components by pressure die casting (7)	BT-4 BT-1	Analyzing Remembering

11	(i) Describe with a neat sketch of cold chamber die casting machine.(6)	BT-2	Understanding
	(ii) Describe the procedure of making castings by the true centrifugal	BT-2	Understanding

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	casting and write its advantages and disadvantages.(7)		
12.	(i) Briefly describe hot chamber die casting process.(6) (ii) Describe any one type of Centrifugal casting with neat diagram(7)	BT-2 BT-1	Understanding Remembering
13	Explain how the pipes and cylinder liners are made by centrifugal casting Process.	BT-4	Analyzing
14	(i) Explain stir casting method with a sketch.(7) (ii) Name any five casting defects and explain the remedies for those defects.(6)	BT-5 BT-1	Evaluating Remembering
PART-C (15 marks)			
Q.No	Questions	BT Level	Competence
1	Recommend the basic rules to be followed in Good casting design.	BT-5	Evaluating
2	Explain the requirements for the pattern material. Discuss the suitability of following materials: Wood, Aluminum, Rubber, Brass and white metal.	BT-5	Evaluating
3	Chocolate is available in hollow shapes. What process is used to make these candies	BT-6	Creating
4	Recommend a suitable casting process for making small toys with suitable Example.	BT-6	Evaluating

UNIT-2 JOINING PROCESSES

Operating principle, basic equipment, merits and applications of: Fusion welding processes Gaswelding
 - Types – Flame characteristics; Manual metal arc welding – Gas Tungsten arc welding- Gas metal arc welding
 – Submerged arc welding – Electro slag welding; Operating principle and applications of : Resistance welding
 - Plasma arc welding – Thermit welding – Electron beam welding– Friction welding and Friction Stir Welding
 Brazing and soldering; Weld defects: types, causes and cure.

PART-A (2 marks)

Q.No	Questions	BT Level	Competence
1	Explain why shielding of weld area during welding is required.	BT-4	Analyzing
2	Point out the different types of Oxyacetylene flame by sketches.	BT-4	Analyzing
3	List out the various types of welding.	BT-1	Remembering
4	List out the flame characteristics.	BT-1	Remembering
5	Define the role flux in welding operation.	BT-1	Remembering
6	Explain the principle of manual metal arc welding.	BT-4	Analyzing
7	Define spelter and give the composition of some commonly used spelters.	BT-1	Remembering
8	List the advantages of AC equipment over DC equipment in arc Welding.	BT-1	Remembering
9	Explain the difference between soldering and brazing.	BT-5	Evaluating
10	Define Brazing process.	BT-1	Remembering
11	Define Soldering Process.	BT-1	Remembering
12	Define Friction welding.	BT-1	Remembering
13	Formulate the process parameters in FSW.	BT-6	Creating
14	Explain thermit welding briefly.	BT-5	Evaluating
15	Differentiate between transferred and Non-Transferred Plasma arc welding.	BT-2	Understanding
16	Evaluate why spot welding is commonly used in automotive bodies and in large appliances.	BT-5	Evaluating
17	Show that the seam welding is an application of spot welding.	BT-3	Applying
18	Give the meaning of Nugget in Electric Resistance Welding.	BT-2	Understanding
19	List any four welding defects.	BT-1	Remembering

20	Examine the causes of Welding defects.	BT-3	Applying
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PART B (13 marks)

Q.No	Questions	BT Level	Competence
1	Describe various types of welding joints with neat sketch and list out the types of edge preparation before Welding Process.	BT-1	Remembering
2	(i) Distinguish between Gas Welding and Arc Welding.(7) (ii) Distinguish between MIG and TIG Welding.(6)	BT-4 BT-4	Analyzing Analyzing
3	(i) List out the types of arc welding process and list out the arc welding equipment's and selection factors for power sources. (6) (ii) Describe with neat sketch the various components of Oxy-Acetylene gas welding equipment. .(7)	BT-1 BT-1	Remembering Remembering
4	(i) Explain the various types of oxy-acetylene flames with sketches.(7) (ii) Explain the Manual Metal Arc Welding Process with neat sketch.(6)	BT-4 BT-4	Analyzing Analyzing
5	(i) Explain about the equipment and operation of GTAW process.(6) (ii) Explain about the Advantages and Disadvantages of GTAW(7)	BT-5 BT-5	Evaluating Evaluating
6	(i) Explain Gas metal Arc Welding Process with neat diagram.(7) (ii) Explain the Advantages, Disadvantages and Application of Gas Metal Arc welding process.(6)	BT-4 BT-4	Analyzing Analyzing
7	(i) Describe the submerged arc welding process with neat diagram.(6) (ii) State its advantages and application of submerged arc welding process.(7)	BT-1 BT-1	Remembering Remembering
8	(i) Describe the process of Electro Slag Welding and mention their major application.(7) (ii) Explain the Resistance spot welding Process with a neat sketch.(6)	BT-1 BT-4	Remembering Analyzing
9	(i) Explain with neat sketch the principle of resistance welding.(7) (ii) Differentiate between upset welding and flash welding.(6)	BT-4 BT-4	Analyzing Analyzing
10	(i) Explain the Advantages, Disadvantages and limitation of Resistance welding process.(7) (ii) Explain in detail the Plasma Arc Welding process and write its applications and demerits. (6)	BT-4 BT-4	Analyzing Analyzing

11	(i) Explain thermit welding Process with neat sketch.(7)	BT-4	Analyzing
	(ii) Briefly explain the principle of operation advantages and limitations of Electron beam welding.(6)	BT-4	Analyzing

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12	(i) Explain the principle and application of Friction welding process.(6) (ii) Explain the principle of Friction stir welding.(7)	BT-5 BT-4	Evaluating Analyzing
13	(i) Explain the advantages of Friction stir welding.(6) (ii) Compare and Contrast Brazing and Soldering Process.(7)	BT-4 BT-5	Analyzing Evaluating
14	Classify and enumerate the various welding defects with causes of occurrences and describe a method of detecting cracks on a weld surface.	BT-3	Applying

PART-C (15 marks)

Q.No	Questions	BT Level	Competence
1	How do you compare ac and dc arc welding? What are the advantages of each of the several sources of current for arc welding? What do you understand by the term "polarity" and what is the advantage/disadvantage of having different polarities?	BT-6	Creating
2	Explain the principle of atomic hydrogen welding and role of hydrogen in this welding ?	BT-5	Evaluating
3	Summarize suitable NDT methods to examine welding defects.	BT-6	Creating
4	Briefly discuss about under water welding.	BT-6	Creating

UNIT-3 METAL FORMING PROCESSES

Hot working and cold working of metals – Forging processes – Open, impression and closed die forging – forging operations. Rolling of metals– Types of Rolling – Flat strip rolling – shape rolling operations – Defects in rolled parts. Principle of rod and wire drawing – Tube drawing – Principles of Extrusion – Types – Hot and Cold extrusion.

PART-A (2 marks)

Q.No	Questions	BT Level	Competence
1	Define hot working of metals.	BT-1	Remembering
2	Define cold working of metals.	BT-1	Remembering
3	Analyse why surface finish of a rolled products better in cold rolling than in hot rolling.	BT-4	Analyzing
4	Define angle of bite in rolling.	BT-1	Remembering
5	Define lateral Extrusion.	BT-1	Remembering
6	Classify the various forming processes.	BT-3	Applying
7	Identify various defects in rolled parts.	BT-1	Remembering
8	Summarizes the effects of cold working.	BT-5	Evaluating
9	Define ironing.	BT-1	Remembering
10	Differentiate between compound dies and progressive dies.	BT-4	Analyzing
11	List out some common applications where extrusion is used.	BT-1	Remembering
12	Point out the advantage of cold extrusion.	BT-4	Analyzing
13	Name the types of forging machines.	BT-1	Remembering
14	Define upsetting and Drawing down in forging operation.	BT-1	Remembering
15	Sketch the different types of rolling mills.	BT-3	Applying
16	Differentiate between hot and cold forging.	BT-4	Analyzing
17	Differentiate extrusion and forging.	BT-4	Analyzing
18	Define fullering.	BT-1	Remembering
19	Explain recrystallization temperature.	BT-4	Analyzing
20	List out any four parts that can be manufactured by shape rolling operations.	BT-1	Remembering

Q.No	PART-B (13 marks)	BT Level	Competence
1	(i) Explain hot working and cold working processes. (6) (ii) Explain various forging operation(7)	BT-4 BT-4	Analyzing Analyzing
2	(i) Explain the steps involved in drop forging with neat sketches (7) (ii) Describe open die forging. (6)	BT-4 BT-1	Analyzing Creating
3	(i) Formulate the advantages and limitations of closed die forging. (6) (ii) Explain the Precision forging Process with neat sketch and also compare with Closed Die Forging process(7)	BT-4 BT-1	Analyzing Remembering
4	(i) Explain flashless forging operation. (6) (ii) Explain about Impression die forging (7)	BT-6 BT-4	Creating Analyzing
5	(i) Explain in detail about the defects occurred in forging operations. (6) (ii) Draw a simple sketch showing rolling process and make a short note on deformation of grains in rolling(7)	BT-4 BT-4	Analyzing Analyzing
6	(i) Describe the ring rolling and thread rolling process(6) (ii) Classify and write notes on various Rolling Stand Arrangement in detail.(7)	BT-1 BT-3	Remembering Applying
7	(i) Discuss the types of Rolling mills.(6) (ii) Discuss the types defects in rolled parts.(7)	BT-2 BT-2	Understanding Understanding
8	A 300 mm wide strip 25 mm thick is fed through a rolling mill with two powered rolls each of radius = 250 mm. the work thickness is to be reduced to 22 mm in one pas at a roll speed of 50 rev/min. the work material has a flow curve defined by $K = 275 \text{ MPa}$ and $n = 0.15$ and the coefficient of friction between the rolls and the work is assumed to be 0.12. Determine if the friction is sufficient to permit the rolling operation to be accomplished. if so, calculate the roll force,torque and horsepower.	BT-3	Applying
9	(i) Explain in detail about wire drawing (7) (ii) Explain with neat sketches the process of tube drawing of metals. (6)	BT-4 BT-4	Analyzing Analyzing
10	(i) Explain with a neat sketch the process of Rod Drawing. (6) (ii) Explain about Hot and Cold Extrusion. (7)	BT-5 BT-5	Evaluating Evaluating

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Explain the forward and backward extrusion process.

BT-4

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12	Analyze and Sketch variation in pressure during the Extrusion process by direct and indirect methods.	BT-4	Analyzing
13	(i) Compare direct and indirect Extrusion process. (6) (ii) Write short notes on impact extrusion and hydro static extrusion. (7)	BT-5 BT-4	Evaluating Analyzing
14	With neat diagram explain the process of forward extrusion and also explain how hollow sections can be produced in this process.	BT-5	Evaluating
PART-C (15 marks)			
Q.No	Questions	BT Level	Competence
1	Formulate the mathematical expression for the flat strip metal rolling process to calculate the rolling load.	BT-6	Creating
2	Inspect various plastic components in your car, and identify the processes that could have been used in making them.	BT-6	Creating
3	Explain a suitable process to form heads in fasteners such as nails and bolts.	BT-5	Evaluating
4	Recommended the safety rules regulation in smithy shop.	BT-6	Creating

UNIT-4 SHEET METAL PROCESSES

Sheet metal characteristics – shearing, bending and drawing operations – Stretch forming operations– Formability of sheet metal – Test methods –special forming processes-Working principle and applications – Hydro forming – Rubber pad forming – Metal spinning– Introduction of Explosive forming, magnetic pulse forming, peen forming, Super plastic forming – Micro forming.

PART-A (2 marks)

Q.No	Questions	BT Level	Competence
1	Define shear angle. Why is it given in punches and dies?	BT-1	Remembering
2	Define spring back.	BT-1	Remembering
3	List out test methods for testing formability of material	BT-1	Remembering
4	Distinguish between piercing and blanking	BT-2	Understanding
5	Examine how sheet metal operations classified and what are they.	BT-3	Applying
6	Formulate the categories of sheet metal working processes.	BT-6	Creating
7	Explain spring back effect and how it is overcome in sheet metal work.	BT-4	Analyzing
8	Point out the various types of sheet metal dies.	BT-4	Analyzing
9	Discuss spring back in bending operation.	BT-2	Understanding
10	Differentiate between stretch forming and bending.	BT-4	Analyzing
11	Analyze the Purpose of detonator in explosive forming.	BT-4	Analyzing
12	Point out the basic requirement of super plastic forming.	BT-4	Analyzing
13	Differentiate between a cut -off operation and a parting operation	BT-4	Analyzing
14	List the advantages of super plastic forming processes.	BT-1	Remembering
15	Analyse the reason for providing proper clearance between the punch and die in a shearing operation.	BT-4	Analyzing
16	Define lancing operation that is done on sheet metals.	BT-1	Remembering
17	Explain the limitations of Explosive forming.	BT-5	Evaluating
18	List out the advantages of hydro forming process.	BT-1	Remembering
19	Defines peen forming.	BT-1	Remembering
20	Define micro forming.	BT-1	Remembering

PART-B (13 marks)

Q.No	Questions	BT Level	Competence
1	Summarize the sheet metal characteristics.	BT-5	Evaluating
2	(i) Write a short notes on sheet bending and perforating operation(7) (ii) Explain the important factors of bending operation. (6)	BT-5 BT-4	Evaluating Analyzing
3	Write short notes on the following a. Shearing (3) b. Blanking(3) c. clearance in shearing(3) d. Spring back in bending(4)	BT-1	Remembering
4	(i)Explain the different types of bending process. (13)	BT-4	Analyzing
5	(i) Explain various sheet metal drawing operations with sketches. (6) (ii) Describe with a neat sketch any two type of stretch forming operations. (7)	BT-5 BT-1	Evaluating Remembering
6	(i)Explain the Formability of sheet metals and formability test methods. (6) (ii)Compare Conventional forming with high strain rate forming technique. (7)	BT-5 BT-5	Evaluating Evaluating
7	(i) Explain with a neat sketch hydro forming. (6) (ii) Describe Rubber Pad Forming with suitable sketch. (7)	BT-5 BT-1	Evaluating Remembering
8	(i)Explain Metal spinning operation with a diagram. (7) (i)Summaries the advantages and application of metal spinning. (6)	BT-4 BT-5	Analyzing Evaluating
9	(i) Explain the working principle of explosive forming with sketch and also Formulate the process variables in Explosive Forming (6) (ii) Describe Magnetic Pulse Forming with a neat sketch. (7)	BT-6 BT-1	Creating Remembering
10	(i) Explain peen forming with sketch. (7) (ii) Describe super plastic forming and Explain with neat sketch. (6)	BT-4 BT-1	Analyzing Remembering
11	(i) Explain Micro forming. (7) (ii) Describe the die cutting and slitting operations. (6)	BT-4 BT-2	Analyzing Understanding
12	(i) Describe the nibbling and notching operations. (6) (ii) Explain in detail the Coining and Embossing Process. (7)	BT-2 BT-4	Understanding Analyzing

13	(i) Point out the advantages and limitation of compound dies over Progressive dies. (6)	BT-4	Analyzing
	(ii) Analyse the reasons to provide proper clearance between the punch. (7)	BT-4	Analyzing

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14	(i) Differentiate single die and multiple operation die with neat sketch (6) (ii) Discuss the advantages and limitations of single and multiple die operation. (7)	BT-2 BT-2	Understanding Understanding
PART-C (15 marks)			
Q.No	Questions	BT Level	Competence
1	Recommend the steps involved in manufacturing metal kitchen sinks with neat sketches.	BT-6	Creating
2	Examine some of the products in your home that are made of sheet metal, and discuss the process by which you think they were made.	BT-5	Evaluating
3	Explain with necessary sketch, application of following sheet metal forming operation :Shaving ,Slitting, Notching.	BT-6	Creating
4	Explain a method for manufacturing, honeycomb panels for aircraft wings.	BT-5	Evaluating

UNIT-5 MANUFACTURE OF PLASTIC COMPONENTS

Types and characteristics of plastics – Moulding of thermoplastics – working principles and Typical applications – injection moulding – Plunger and screw machines – Compression moulding, Transfer Moulding – Typical industrial applications – introduction to blow moulding –Rotational moulding – Film blowing – Extrusion – Thermoforming – Bonding of Thermoplastics.

Part-A (2 marks)

Q.No	Questions	BT Level	Competence
1	Define polymerization.	BT-1	Remembering
2	List out any four types of adhesives used in adhesive bonding of plastics.	BT-1	Remembering
3	Analyse the need for rotational moulding in manufacturing plastic Components.	BT-4	Analyzing
4	Point out some applications of transfer moulding.	BT-4	Analyzing
5	Define Elastomers.	BT-1	Remembering
6	Discuss a few application of plastics.	BT-2	Understanding
7	Define reinforced plastics and where is it applied.	BT-1	Remembering
8	Point out the industrial uses of fibres and filaments.	BT-4	Analyzing
9	Explain briefly film blowing.	BT-4	Analyzing
10	Point out some examples of reinforced plastics.	BT-4	Analyzing
11	Name the types of plastics.	BT-1	Remembering
12	Define thermoforming.	BT-1	Remembering
13	Define polythene.	BT-1	Remembering
14	Name the common thermosetting plastics.	BT-1	Remembering
15	List out the different type's compression moulds.	BT-1	Remembering
16	Define Pulse forming.	BT-1	Remembering
17	Explain Calendaring in processing of Plastics.	BT-5	Evaluating
18	Describe briefly the principle of film blowing.	BT-2	Understanding
19	Name two differences between thermoplastics and thermosetting plastics.	BT-1	Remembering
20	Name two adhesive that are used for adhesive bonding of plastics.	BT-1	Remembering

PART-B (13 marks)

Q.No	Questions	BT Level	Competence
1	(i) Explain the types of Plastics. (6) (ii) State the purpose of the following plastics(7) 1. Plasticizers 2. Filler 3. Stabilizers	BT-5 BT-5	Evaluating Evaluating
2	Discuss about a few Commercial Plastics.	BT-2	Understanding
3	(i) List out and write the various processes of joining plastics.(7) (ii) Summarize the various differences between thermoplastics and thermosetting plastics.(6)	BT-1 BT-5	Remembering Evaluating
4	(i) Explain the injection blow moulding process.(6) (ii) Enumerate injection moulding of plastic.(7)	BT-4 BT-2	Analyzing Understanding
5	(i) Describe the process Equipment for Injection moulding. (6) (ii) Explain the working principle of plunger and screw type injection machines. (7)	BT-2 BT-5	Understanding Evaluating
6	(i) Explain Positive, semi positive and flash type Compression. (6) (ii) State the typical industrial applications of Transfer moulding. (7)	BT-4 BT-1	Analyzing Remembering
7	(i) Explain transfer moulding. Discuss its advantages and limitations. (6) (ii) Explain the process of compression moulding with neat diagram. (7)	BT-4 BT-5	Analyzing Evaluating
8	(i) Compare blow moulding and rotational moulding. (6) (ii) Explain the Process Rotational moulding. (7)	BT-5 BT-4	Evaluating Analyzing
9	(i) Explain the Extrusion blow moulding process. (7) (ii) Describe the Blown-film Extrusion process. (6)	BT-4 BT-1	Analyzing Remembering
10	(i) Explain the calendaring process. (7) (ii) Enumerate and write about various methods of bonding thermoplastics. (6)	BT-5 BT-4	Evaluating Analyzing
11	(i) Discuss in detail the various thermosetting and thermoplastic compound and their application. (7) (ii) Describe any two types of thermoforming process. (6)	BT-2 BT-1	Understanding Remembering

12	Explain various types of thermoforming method shaping Thermoplastics.	BT-4	Analyzing
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13	Explain the structure of thermo plastic and thermosetting plastics.	BT-5	Evaluating
14	Explain the various methods of Bonding of Thermoplastics.	BT-5	Evaluating
PART –C (15 marks)			
Q.No	Questions	BT Level	Competence
1	Explain a method for manufacturing, plastic ball point pen outer body.	BT-5	Evaluating
2	Recommend a suitable manufacturing process for producing plastic bottles and plastic foot balls.	BT-6	Creating
3	An increasing environmental concern is the long time required for degradation of polymers in landfills. Recommend the trends and developments in the production of biodegradable plastics.	BT-6	Creating
4	Inspect several electrical components, such as light switches, outlets and circuit breakers and describe the process used in making them.	BT-6	Creating