SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur– 603203.

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK

III SEMESTER

ME3365 MANUFACTURING PROCESSES

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DEPARTMENT OF MECHANICAL ENGINEERING

ME3365 MANUFACTURING PROCESSES

UNIT I - METAL CASTING

Casting terminology, hand moulding, pattern material, allowance; Pattern types: Single piece, split, gated; Core prints, moulding sand properties, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Melting furnaces: Blast and Cupola Furnaces; Principle of special casting processes: Shell - investment - Ceramic mould - Pressure die casting - Centrifugal Casting - Stir casting; Defects in Sand casting.

PART A (2 MARKS)

Q.No.	Question	BT Level	Competency
1	Define casting.	BT-1	Remembering
2	Define hand moulding.	BT-1	Remembering
3	List any two pattern materials used in casting.	BT-1	Remembering
4	Define pattern allowance.	BT-1	Remembering
5	Define single-piece pattern.	BT-1	Remembering
6	Define split pattern.	BT-1	Remembering
7	State the purpose of core prints.	BT-2	Understanding
8	List the properties of moulding sand.	BT-1	Remembering
9	Explain the need for pattern allowances.	BT-2	Understanding
10	State the factors influencing pattern design.	BT-2	Understanding
11	Define solidification.	BT-1	Remembering
12	State the purpose of a riser.	BT-2	Understanding
13	State the function of a gating system.	BT-2	Understanding
14	Define blast furnace.	BT-1	Remembering
15	Explain the working principle of a cupola furnace.	BT-2	Understanding
16	Define shell mould casting.	BT-1	Remembering
17	Define investment casting.	BT-1	Remembering
18	Define ceramic mould casting.	BT-1	Remembering
19	Define pressure die casting.	BT-1	Remembering
20	Define centrifugal casting.	BT-1	Remembering
21	Define stir casting.	BT-1	Remembering
22	List any two casting defects.	BT-1	Remembering
23	Explain how a riser reduces casting defects.	BT-2	Understanding
24	Define permeability of moulding sand.	BT-1	Remembering
25	State one application of ceramic mould casting.	BT-1	Remembering

PART B (16 MARKS)				
Q.No.	**Question**	**Marks**	**BT Level**	**Competency**
1	Explain the casting terminology such as sprue, runner, gate, riser, core and mould with neat sketches.	16	BT-2	Understanding
2	Compare green sand moulding and dry sand moulding with respect to procedure, advantages, limitations and applications.	16	BT-4	Analyzing
3	Explain the different pattern materials used in casting and discuss their properties and applications.	16	BT-2	Understanding
4	Explain the different types of pattern allowances with suitable examples.	16	BT-2	Understanding
5	Explain the construction, features and applications of single-piece, split and gated patterns. Compare their suitability for different castings.	16	BT-4	Analyzing
6	Explain the purpose, design and applications of core prints with neat sketches.	16	BT-3	Applying
7	Explain the properties of moulding sand and discuss their influence on casting quality.	16	BT-3	Applying
8	Explain the design considerations for patterns, moulds and cores used in casting.	16	BT-3	Applying
9	Explain the principles of solidification and cooling in casting and discuss their effect on casting quality.	16	BT-3	Applying
10	Explain the design and functions of risers and gating systems. Discuss their role in reducing casting defects.	16	BT-3	Applying
11	Compare blast furnace and cupola furnace with respect to construction, working principle, advantages, limitations and applications.	16	BT-4	Analyzing
12	Explain the principles, advantages and applications of shell mould casting with neat diagram	16	BT-4	Analyzing
13	Explain the principles, advantages and applications of investment casting with neat diagram			
14	Explain the pressure die casting process with neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
15	Explain the centrifugal casting process with neat sketch and discuss its advantages, limitations and applications.	16	BT-3	Applying
16	Explain the stir casting process used for producing metal matrix composites. Discuss its advantages and applications.	16	BT-3	Applying
17	Explain the common defects in sand casting. Discuss their causes and remedial measures.	16	BT-4	Analyzing
18	Explain the principles, advantages and applications of ceramic casting with neat diagram	16	BT-4	Analyzing
19	Explain the construction and working principle of Cupola Furnace with neat sketch. Discuss its advantages and applications.	16	BT-4	Analyzing

UNIT II - JOINING PROCESSES

Operating principle, basic equipment, merits and applications of fusion welding processes: Gas welding - 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, soldering and adhesive bonding; Weld defects: types, causes and cure

PART - A (2 Marks)

Q. No.	Revised Question	BT Level	Competency
1	Define fusion welding.	BT-1	Remembering
2	List the basic equipment used in gas welding.	BT-1	Remembering
3	State any two advantages of gas welding.	BT-2	Understanding
4	Define a neutral flame and mention its characteristics.	BT-2	Understanding
5	Differentiate between oxidizing flame and carburizing flame.	BT-2	Understanding
6	List the types of gas welding flames.	BT-1	Remembering
7	State the principle of Manual Metal Arc Welding (MMAW).	BT-2	Understanding
8	Mention any two applications of Gas Tungsten Arc Welding (GTAW).	BT-1	Remembering
9	State any two advantages of Gas Metal Arc Welding (GMAW).	BT-2	Understanding
10	State the principle of Submerged Arc Welding (SAW).	BT-2	Understanding
11	Define Electro Slag Welding (ESW).	BT-1	Remembering
12	State the operating principle of resistance welding.	BT-2	Understanding
13	List any two applications of resistance welding.	BT-1	Remembering
14	Mention any two advantages of Plasma Arc Welding (PAW).	BT-2	Understanding
15	Define Thermit welding and mention one application.	BT-1	Remembering
16	State any two advantages of Electron Beam Welding (EBW).	BT-1	Remembering
17	Define friction welding.	BT-1	Remembering
18	Differentiate between Friction Welding and Friction Stir Welding.	BT-2	Understanding
19	Define brazing.	BT-1	Remembering
20	Differentiate between brazing and soldering.	BT-2	Understanding
21	Define adhesive bonding and mention one application.	BT-2	Understanding
22	List any four weld defects.	BT-1	Remembering
23	State any two causes of porosity in welding.	BT-1	Remembering
24	Mention any two methods to prevent weld cracks.	BT-2	Understanding
25	State the effect of improper welding parameters on weld quality.	BT-2	Understanding

PART B (16 MARKS)

Q.No.	Revised Question	Marks	BT Level	Competency
1	Explain the operating principle, equipment, advantages, limitations and applications of gas welding. Discuss the characteristics of different gas welding flames.	16	BT-3	Applying

2	Explain the operating principle, equipment, working, advantages, limitations and applications of MMAW.	16	BT-2	Understanding
3	Compare Gas Tungsten Arc Welding (GTAW) and Gas Metal Arc Welding (GMAW) with respect to principle, equipment, advantages, limitations and applications.	16	BT-4	Analyzing
4	Describe the Submerged Arc Welding (SAW) process with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
5	Explain the operating principle of Electro Slag Welding (ESW). Discuss its advantages, limitations and applications.	16	BT-3	Applying
6	Describe the operating principle and types of resistance welding. Compare spot, seam and projection welding processes.	16	BT-4	Analyzing
7	Explain the operating principle, equipment, advantages, limitations and applications of Plasma Arc Welding (PAW).	16	BT-3	Applying
8	Describe the Thermit welding process with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
9	Explain the operating principle of Electron Beam Welding (EBW). Discuss its advantages, limitations and applications.	16	BT-3	Applying
10	Compare Friction Welding and Friction Stir Welding with respect to principle, advantages, limitations and applications.	16	BT-4	Analyzing
11	Describe the brazing process with a neat sketch. Compare brazing and soldering. Discuss the applications of brazing.	16	BT-4	Analyzing
12	Explain the principle of soldering. Discuss its advantages, limitations and applications in electronic assembly.	16	BT-3	Applying
13	Describe the principle and applications of adhesive bonding. Compare adhesive bonding with welding processes.	16	BT-4	Analyzing
14	Identify the common weld defects. Explain their causes and suggest suitable remedies for each defect.	16	BT-4	Analyzing
15	Explain the characteristics of neutral, oxidizing and carburizing flames. Discuss their effect on weld quality and applications.	16	BT-3	Applying
16	Compare Gas Metal Arc Welding (GMAW) and Manual Metal Arc Welding (MMAW). Discuss the applications where GMAW is preferred.	16	BT-4	Analyzing
17	Describe the Submerged Arc Welding (SAW) process. Discuss the effect of welding parameters on weld quality.	16	BT-3	Applying
18	Explain the operating principle and applications of Plasma Arc Welding (PAW). Compare PAW with Gas Tungsten Arc Welding (GTAW) for precision welding.	16	BT-4	Analyzing

UNIT III - BULK DEFORMATION 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.	Revised Question	BT Level	Competency
1	Define hot working and cold working.	BT-1	Remembering
2	Define open die forging.	BT-1	Remembering
3	Differentiate between impression die forging and closed die forging.	BT-2	Understanding
4	List any four forging operations.	BT-1	Remembering
5	List the different types of rolling mills.	BT-1	Remembering
6	State the principle of flat strip rolling.	BT-2	Understanding
7	Define shape rolling.	BT-1	Remembering
8	List any four defects in rolled products.	BT-1	Remembering
9	State the principle of rod and wire drawing.	BT-2	Understanding
10	Define tube drawing.	BT-1	Remembering
11	Define extrusion.	BT-1	Remembering
12	Differentiate between hot extrusion and cold extrusion.	BT-2	Understanding
13	State any two advantages of hot working.	BT-1	Remembering
14	State any two advantages of cold working.	BT-1	Remembering
15	Mention any two applications of open die forging.	BT-2	Understanding
16	State any two advantages of impression die forging.	BT-2	Understanding
17	Mention any two applications of closed die forging.	BT-1	Remembering
18	State any two causes of rolling defects.	BT-2	Understanding
19	Mention any two applications of shape rolling.	BT-2	Understanding
20	State any two applications of rod and wire drawing.	BT-2	Understanding
21	Mention any two applications of tube drawing.	BT-2	Understanding
22	Differentiate between direct extrusion and indirect extrusion.	BT-2	Understanding
23	State any two advantages of cold extrusion.	BT-2	Understanding
24	Mention any two applications of hot extrusion.	BT-1	Remembering
25	State any one method to prevent edge cracks during rolling.	BT-2	Understanding

PART B (16 MARKS)

Q.No.	Revised Question	Marks	BT	Competency
1	Compare hot working and cold working with respect to principle, advantages, limitations and applications.	16	**BT-4**	Analyzing
2	Explain Open Die Forging with neat sketch. Discuss its advantages, limitations and applications..	16	**BT-3**	Applying
3	Explain the sequence of forging operations. Discuss their effect on the quality of forged products.	16	**BT-3**	Applying
4	Compare flat strip rolling and shape rolling with respect to principle, equipment, advantages and applications.	16	**BT-4**	Analyzing
5	Analyze the common defects in rolled products. Explain their causes and suitable remedies.	16	**BT-4**	Analyzing

6	Explain the principle of rod and wire drawing. Discuss the factors affecting the quality of drawn products.	16	**BT-3**	Applying
7	Explain the tube drawing process with a neat sketch. Discuss its advantages and applications.	16	**BT-3**	Applying
8	Compare hot extrusion and cold extrusion with respect to principle, advantages, limitations and applications.	16	**BT-4**	Analyzing
9	Describe the different types of extrusion processes. Discuss their advantages, limitations and applications.	16	**BT-2**	Understanding
10	Explain the effect of temperature on hot working and cold working processes. Discuss its influence on product quality.	16	**BT-3**	Applying
11	Explain Impression Die Forging with neat sketch. Discuss its advantages, limitations and applications.	16	**BT-3**	Applying
12	Explain the methods used to control the dimensions of rolled products. Discuss their role in reducing rolling defects.	16	**BT-3**	Applying
13	Compare rod drawing and tube drawing with respect to principle, equipment, advantages and applications.	16	**BT-4**	Analyzing
14	Explain the effect of process parameters on the tube drawing process. Discuss their influence on product quality.	16	**BT-3**	Applying
15	Analyze the advantages and limitations of hot extrusion and justify its suitability for manufacturing complex components.	16	**BT-4**	Analyzing
16	Explain Cold Extrusion with neat sketch. Discuss its advantages, limitations and applications.	16	**BT-3**	Applying
17	Explain the rolling process with a neat sketch. Discuss the different types of rolling mills and their applications.	16	**BT-3**	Applying
18	Analyze the influence of process parameters on rolling, drawing and extrusion processes. Discuss their effect on product quality.	16	**BT-4**	Analyzing

UNIT IV - 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 - Hydroforming - Rubber pad forming - Metal spinning Introduction of Explosive forming, magnetic pulse forming, Super plastic forming - Micro forming.

PART - A (2 Marks)

Q. No.	Question	BT Level	Competency
1	Define sheet metal.	BT-1	Remembering
2	State any two characteristics of sheet metal.	BT-2	Understanding
3	Define shearing operation.	BT-1	Remembering
4	Define bending operation.	BT-1	Remembering
5	Define drawing operation.	BT-1	Remembering
6	Define stretch forming.	BT-1	Remembering
7	Define formability of sheet metal.	BT-1	Remembering

8	List any two tests used to determine sheet metal formability.	BT-1	Remembering
9	Define hydroforming.	BT-1	Remembering
10	State the principle of hydroforming.	BT-2	Understanding
11	Define rubber pad forming.	BT-1	Remembering
12	Define metal spinning.	BT-1	Remembering
13	Define explosive forming.	BT-1	Remembering
14	Define magnetic pulse forming.	BT-1	Remembering
15	Define superplastic forming.	BT-1	Remembering
16	Define micro forming.	BT-1	Remembering
17	State any two applications of hydroforming.	BT-2	Understanding
18	State any two advantages of rubber pad forming.	BT-2	Understanding
19	Mention any two applications of metal spinning.	BT-2	Understanding
20	Differentiate between explosive forming and magnetic pulse forming.	BT-2	Understanding
21	State any two applications of superplastic forming.	BT-2	Understanding
22	Mention any two applications of micro forming.	BT-2	Understanding
23	State any two advantages of stretch forming.	BT-2	Understanding
24	Mention any two applications of drawing operation.	BT-2	Understanding
25	State the importance of formability in sheet metal forming.	BT-2	Understanding

PART B (16 MARKS)				
Q.No.	**Question**	**Marks**	**BT**	**Competency**
1	Compare the characteristics of sheet metals and discuss their influence on sheet metal forming processes.	16	**BT-4**	Analyzing
2	Explain the Shearing process with neat sketch. Discuss its advantages, limitations and applications..	16	**BT-3**	Applying
3	Explain the bending operation and discuss the factors affecting bending quality.	16	**BT-3**	Applying
4	Compare Shearing and Drawing with respect to principle, advantages, limitations and applications.	16	**BT-4**	Analyzing
5	Explain the stretch forming process. Discuss its advantages, limitations and industrial applications.	16	**BT-3**	Applying
6	Analyze the concept of sheet metal formability. Discuss the commonly used test methods for evaluating formability.	16	**BT-4**	Analyzing
7	Compare hydroforming with conventional sheet metal forming processes with respect to principle, advantages, limitations and applications.	16	**BT-4**	Analyzing
8	Explain the working principle of rubber pad forming. Discuss its advantages, limitations and applications.	16	**BT-3**	Applying
9	Compare metal spinning with conventional sheet metal forming processes based on principle, advantages and applications.	16	**BT-4**	Analyzing
10	Compare explosive forming and magnetic pulse forming with respect to principle, advantages, limitations and applications.	16	**BT-4**	Analyzing
11	Analyze the principle, advantages, limitations and applications of superplastic forming. Justify its suitability for manufacturing complex components.	16	**BT-2**	Understanding
12	Explain the working principle of micro forming. Discuss its advantages and industrial applications.	16	**BT-3**	Applying
13	Compare Hydroforming and Rubber Pad Forming.	16	**BT-4**	Analyzing

14	Analyze the influence of material properties on the formability of sheet metals with suitable examples.	16	**BT-4**	Analyzing
15	Explain the different formability test methods used for sheet metals. Discuss their industrial significance.	16	**BT-3**	Applying
16	Analyze the common defects encountered during sheet metal forming operations. Discuss their causes and suitable remedies.	16	**BT-4**	Analyzing
17	Explain the drawing operation with a neat sketch. Discuss the factors affecting the quality of drawn components.	16	**BT-3**	Applying
18	Compare Explosive Forming and Magnetic Pulse Forming.	16	**BT-4**	Analyzing

UNIT V - POWDER METALLURGY AND PLASTIC PROCESSING

Production of metal powder: Atomization, crushing; Blending; Compacting: Die pressing, iso-static pressing; Sintering: Principle, continuous sintering process; Plastic processing: Injection, Blow moulding, Rotational moulding, Film blowing and Thermoforming.

PART - A (2 Marks)

Q.No.	Questions	BT Level	Competency
1.	Define powder metallurgy.	BT-1	Remembering
2.	Define atomization.	BT-1	Remembering
3.	Define the crushing method used for metal powder production.	BT-1	Remembering
4.	State the purpose of blending in powder metallurgy.	BT-2	Understanding
5.	Define die pressing.	BT-1	Remembering
6.	Define isostatic pressing.	BT-1	Remembering
7.	State the principle of sintering.	BT-2	Understanding
8.	Define continuous sintering.	BT-1	Remembering
9.	List the basic steps involved in powder metallurgy.	BT-1	Remembering
10.	Differentiate between die pressing and isostatic pressing.	BT-2	Understanding
11.	State any two advantages of powder metallurgy.	BT-2	Understanding
12.	Mention any two applications of powder metallurgy.	BT-1	Remembering
13.	Define injection moulding.	BT-1	Remembering
14.	Define blow moulding.	BT-1	Remembering
15.	Define rotational moulding.	BT-1	Remembering
16.	Define film blowing.	BT-1	Remembering
17.	Define thermoforming.	BT-1	Remembering
18.	State any two applications of injection moulding.	BT-2	Understanding
19.	Mention any two products manufactured by blow moulding.	BT-2	Understanding
20.	State any two applications of rotational moulding.	BT-2	Understanding
21.	Mention any two applications of film blowing.	BT-2	Understanding
22.	State any two applications of thermoforming.	BT-2	Understanding
23.	Differentiate between atomization and crushing methods.	BT-2	Understanding
24.	State any two advantages of continuous sintering.	BT-2	Understanding
25.	Differentiate between injection moulding and blow moulding.	BT-2	Understanding

PART B (16 MARKS)

Q.No.	Question	Marks	BT Level	Competency
1	Explain the atomization process used for metal powder production with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying

2	Explain the crushing method used for metal powder production. Discuss its advantages, limitations and applications.	16	BT-3	Applying
3	Explain the blending process in powder metallurgy. Discuss its importance and applications.	16	BT-3	Applying
4	Explain the die pressing process with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
5	Explain the isostatic pressing process with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
6	Explain the principle of sintering. Discuss the continuous sintering process with a neat sketch and its applications.	16	BT-3	Applying
7	Explain the working principle of injection moulding with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
8	Explain the working principle of blow moulding with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
9	Explain the working principle of rotational moulding with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
10	Explain the working principle of film blowing with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
11	Explain the thermoforming process with a neat sketch. Discuss its advantages, limitations and applications.	16	BT-3	Applying
12	Analyze the atomization and crushing methods with respect to principle, advantages, limitations and applications.	16	BT-4	Analyzing
13	Compare die pressing and isostatic pressing with respect to principle, advantages, limitations and applications.	16	BT-4	Analyzing
14	Compare injection moulding and blow moulding with respect to working principle, advantages, limitations and applications.	16	BT-4	Analyzing
15	Compare rotational moulding and thermoforming with respect to working principle, advantages, limitations and applications.	16	BT-4	Analyzing
16	Analyze the sequence of operations involved in powder metallurgy from powder production to sintering. Discuss the significance of each stage.	16	BT-4	Analyzing
17	Compare powder metallurgy and conventional manufacturing processes with respect to process sequence, advantages, limitations and applications.	16	BT-4	Analyzing
18	Compare Blow Moulding and Rotational Moulding.	16	BT-4	Analyzing