PSN COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University)

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Department of Mechanical Engineering

QUESTION BANK

Degree/Branch: B.E. Mechanical Engineering

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Subject Code/Title: ME630203/ MANUFACTURING TECHNOLOGY-I

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Unit I – METAL CASTING PROCESS			
Part A (2 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	Define mould	**BTL-1**	**Remembering**
2	What are the pattern materials?	**BTL-1**	**Remembering**
3	Define casting	**BTL-1**	**Remembering**
4	Name any four types of commonly used patterns	**BTL-1**	**Remembering**
5	State the important factors to be considered for choosing a pattern materials	**BTL-2**	**Understanding**
6	List any four allowance considered while designing a pattern	**BTL-1**	**Remembering**
7	What are the properties of good moulding sand ?.	**BTL-1**	**Remembering**
8	State the various methods for testing moulding sand .	**BTL-2**	**Understanding**
9	What is core print? Mention is its purpose	**BTL-1**	**Remembering**
10	what is the merits of co2 process	**BTL-1**	**Remembering**
11	What is lost-wax method?	**BTL-1**	**Remembering**
12	What is meant by precision investment casting ?	**BTL-1**	**Remembering**
13	What are the different type of moulding sand ?	**BTL-1**	**Remembering**
14	What are the uses of runner and riser?	**BTL-1**	**Remembering**
15	What are the causes for formation of blow holes in the sand casting?	**BTL-2**	**Understanding**
16	Which types of furnace are suitable for melting of ferrous material and why?	**BTL-1**	**Remembering**

17	How does hot chamber die casting process differ from cold chamber die casting process?	**BTL-2**	**Understanding**
18	What is die casting?	**BTL-1**	**Remembering**
19	Name any four casting defects	**BTL-1**	**Remembering**
20	Mention any two reasons of acurring swell in casting	**BTL-2**	**Understanding**
Part B (13 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	Explain the various types of patern used for making mould	**BTL-2**	**Understanding**
2	What are pattern allowance?Explain briefly each	**BTL-2**	**Understanding**
3	Explain various properties required for the moulding sand	**BTL-2**	**Understanding**
4	Describe constructional feature and working of a cupola furnace	**BTL-2**	**Understanding**
5	Describe shell moulding process with neat skeches	**BTL-2**	**Understanding**
6	Explain the centrifugal casting process and its applications,advantages and disadvantages	**BTL-2**	**Understanding**
7	. Discuss the CO2 process in molding machines. Explain how CO2 is used to improve the mold quality and casting properties. Describe the functioning of CO2 molding machines and their advantages over other molding processes.	**BTL-2**	**Understanding**
8	Compare and contrast investment casting and pressure die casting processes. Discuss their applications, advantages, and limitations. Explain the key differences in terms of mold preparation, casting techniques, and the types of products produced.	**BTL-2**	**Understanding**
Part c (15 marks)			
1	Explain the centrifugal casting process and its applications. Discuss the advantages of centrifugal casting over other casting methods and provide examples of products that are commonly produced using this technique.	**BTL-2**	**Understanding**
2	Discuss common casting defects encountered in metal casting processes. Explain the causes, effects, and preventive measures for each defect. Illustrate your answer with suitable examples.	**BTL-2**	**Understanding**

*** BT Levels – BTL1 to BTL6**

 # Competence – Remember, understand, apply, analyze, evaluate, create

Unit II – METAL JOINING PROCESS			
Part A (2 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	Name two types of gas welding techniques.	**BTL-1**	**Remembering**
2	What are the common equipment used in gas welding?	**BTL-1**	**Remembering**
3	What is the function of electrode coatings in welding?	**BTL-1**	**Remembering**
4	Name two types of resistance welding techniques	**BTL-1**	**Remembering**
5	Describe the characteristics of a neutral flame in gas welding	**BTL-1**	**Remembering**
6	List three components of an arc welding setup	**BTL-2**	**Understanding**
7	What is the principle behind gas metal arc welding (GMAW)?	**BTL-1**	**Remembering**
8	Which welding process uses a consumable electrode and a granulated flux?	**BTL-1**	**Remembering**
9	What is the primary purpose of tungsten inert gas (TIG) welding?	**BTL1**	**Remembering**
10	Name a welding process that uses a high-temperature chemical reaction to join metals.	**BTL-2**	**Understanding**
11	Identify three common defects that can occur in welds	**BTL-1**	**Remembering**
12	What is the main difference between brazing and soldering?	**BTL-1**	**Remembering**
13	Name two typical filler materials used in gas welding	**BTL-1**	**Remembering**
14	What are the fluxes used in gas welding?	**BTL-1**	**Remembering**
15	Which welding process utilizes a focused plasma arc for joining metals?	**BTL-1**	**Remembering**
16	What is the purpose of flux in thermit welding?	**BTL-1**	**Remembering**
17	Name a welding process that uses a high-energy beam of electrons to melt and join metals	**BTL-2**	**Understanding**
18	Which welding process utilizes a highly focused laser beam for precision welding?	**BTL-1**	**Remembering**
19	Describe two welding defects commonly encountered in welding processes.	**BTL-2**	**Understanding**
20	Difference between brazing and soldering processes in terms of temperature requirements and joint strength.	**BTL-2**	**Understanding**
Part B (13 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	Describe with a neat diagram the components of oxy-acetylene gas welding equipment	**BTL-2**	**Understanding**
2	Sketch the three types of flames in oxy-acetylene gas welding and state their characteristics	**BTL-2**	**Understanding**
3	Explain MIG welding and TIG welding process with suitable diagram	**BTL-2**	**Understanding**
4	Critically analyze the various types of welding defects that can occur in welding processes. Discuss the causes of these defects, their impact on the joint integrity, and the measures that can be taken to prevent or minimize their occurrence.	**BTL-2**	**Understanding**
5	Describe submerged arc welding with suitable sketch and mention their merits ,demerits and applications	**BTL-2**	**Understanding**

6	Investigate the principles and process capabilities of friction stir welding (FSW) and its applications in joining dissimilar materials. Evaluate the advantages of FSW over conventional fusion welding methods in terms of joint strength, microstructure, and heat-affected zone.	**BTL4**	**Analyzing**
7	What is the principle of thermit welding? Explain with a neat sketch of welding arrangement	**BTL-2**	**Understanding**
8	Evaluate the challenges and advancements in laser beam welding (LBW) technology. Discuss the factors affecting LBW process efficiency, joint quality, and productivity. Analyze the applications and benefits of LBW in industries such as aerospace and automotive.	**BTL-5**	**evaluating**
Part C (15 marks)			
1	. Critically assess the principles and applications of ultrasonic welding (USW) in joining plastic components. Discuss the factors that affect the weld quality in USW and the measures taken to optimize the process parameters for achieving reliable and strong joints.	**BTL-2**	**Understanding**
2	Describe PLASMA arc welding with suitable sketch and mention their merits ,demerits and applications	**BTL-2**	**Understanding**

*** BT Levels – BTL1 to BTL6**

 # Competence – Remember, understand, apply, analyze, evaluate, create

Unit III – FUNDAMENTALS OF MACHINING			
Part A (2 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	Define material removal processes and provide two examples	**BTL-1**	**Remembering**
2	Name two types of machine tools commonly used in machining operations	**BTL-1**	**Remembering**
3	Explain the concept of chip formation in metal cutting	**BTL-2**	**Understanding**
4	Describe orthogonal cutting and its significance in machining	**BTL-2**	**Understanding**
5	What are shear zones in metal cutting? Explain their role in the machining process.	**BTL-1**	**Remembering**
6	Explain the Merchants circle and its application in metal cutting	**BTL-2**	**Understanding**
7	Discuss the importance of cutting tool geometry in machining operations	**BTL-1**	**Remembering**

8	Name two commonly used cutting tool materials and their respective advantages.	**BTL-1**	**Remembering**
9	Define tool wear and explain its impact on machining performance	**BTL1**	**Remembering**
10	What is meant by tool life in machining? How is it determined?	**BTL-1**	**Remembering**
11	Explain the significance of surface finish in machining operations	**BTL-1**	**Remembering**
12	How do cutting fluids influence the machining process? Name two functions of cutting fluids.	**BTL-1**	**Remembering**
13	. Discuss the influence of tool angles on machining performance	**BTL-1**	**Remembering**
14	Explain the influence of tool height on machining operations	**BTL-1**	**Remembering**
15	Describe the concept of metal cutting theory and its relevance in machining	**BTL-2**	**Understanding**
16	What are the three primary types of cutting tool materials used in machining?	**BTL-1**	**Remembering**
17	Discuss the factors that affect tool life in metal cutting.	**BTL-2**	**Understanding**
18	Explain the role of cutting fluids in controlling chip formation and improving tool life	**BTL- 2**	**Understanding**
19	What are the advantages of using high-speed steel (HSS) cutting tools in machining?	**BTL-1**	**Remembering**
20	How does the selection of cutting tool geometry impact surface finish in machining?	**BTL-1**	**Remembering**
Part B (13 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	Describe the mechanics of metal cutting in detail, including the various forces involved and their effects on the workpiece and cutting tool	**BTL-2**	**Understanding**
2	Explain the concept of chip formation in metal cutting, discussing the different types of chips and the factors that influence their formation.	**BTL-2**	**Understanding**
3	Discuss the significance of tool wear in machining operations. Explain the different types of tool wear and their effects on the machining process	**BTL-2**	**Understanding**
4	Explain the principles of the Merchants circle and its application in optimizing cutting conditions for achieving desired tool life and surface finish	**BTL-2**	**Understanding**
5	Discuss the factors that influence tool life in machining. Explain how cutting speed, feed rate, depth of cut, and tool material affect tool life	**BTL-2**	**Understanding**
6	Describe the influence of cutting fluids on machining operations. Discuss the functions of cutting fluids and the factors to consider when selecting a suitable cutting fluid.	**BTL-2**	**Understanding**

7	Explain the role of cutting tool geometry in metal cutting. Discuss the importance of tool angles, such as rake angle and relief angle, and their impact on cutting forces and surface finish	**BTL-2**	**Understanding**
8	Discuss the different cutting tool materials used in machining. Compare and contrast the characteristics of high-speed steel (HSS), carbide, and ceramic tool materials.	**BTL-2**	**Understanding**
Part C (15 marks)			
1	Explain the concept of surface finish in machining. Discuss the factors that affect surface finish, such as cutting speed, feed rate, and tool geometry.	**BTL-2**	**Understanding**
2	Discuss the influence of cutting parameters, such as cutting speed, feed rate, and depth of cut, on the surface roughness and dimensional accuracy of the machined part.	**BTL-2**	**Understanding**

*** BT Levels – BTL1 to BTL6**

 # Competence – Remember, understand, apply, analyze, evaluate, create

Unit IV – GEAR MANUFACTURING AND SURFACE FINISHING			
Part A (2 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	What are the three gear manufacturing processes?	**BTL-1**	**Remembering**
2	Name a gear machining process used for creating gears through material removal	**BTL-1**	**Remembering**
3	What is the primary purpose of gear shaping?	**BTL-1**	**Remembering**
4	Which abrasive process is commonly used for cylindrical grinding?	**BTL-1**	**Remembering**
5	What is the goal of surface grinding?	**BTL-1**	**Remembering**
6	Name a type of grinding process that does not require a center point	**BTL-1**	**Remembering**
7	What factors should be considered when selecting a grinding wheel?	**BTL-1**	**Remembering**
8	Name a fine finishing process used to improve the surface quality of gears	**BTL-1**	**Remembering**
9	What is powder metallurgy ?	**BTL-1**	**Remembering**
10	Name a process used for removing small amounts of material from a gear surface	**BTL-1**	**Remembering**
11	What is the primary objective of polishing and buffing in surface finishing?	**BTL-1**	**Remembering**
12	Name a process used for cleaning and deburring gears using rotating brushes	**BTL-1**	**Remembering**

13	What is the purpose of tumbling in gear manufacturing?	**BTL-1**	**Remembering**
14	What is the main advantage of metal spraying in surface finishing?	**BTL-1**	**Remembering**
15	Name a method used for applying a metallic coating to a gear surface	**BTL-1**	**Remembering**
16	What is the purpose of gear extrusion in gear manufacturing?	**BTL-1**	**Remembering**
17	Name a gear machining process that involves the use of a rotating cutter and a gear blank.	**BTL-1**	**Remembering**
18	What is the primary advantage of powder metallurgy in gear manufacturing?	**BTL-1**	**Remembering**
19	Name a common type of grinding process used for achieving a precise and accurate gear profile	**BTL-1**	**Remembering**
20	What is the function of gear hobbing in gear manufacturing?	**BTL-1**	**Remembering**
Part B (13 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	Explain the gear manufacturing processes of extrusion, stamping, and powder metallurgy in detail. Discuss their advantages and limitations.	**BTL-2**	**Understanding**
2	Describe the gear machining process of gear hobbing. Discuss the steps involved and explain how accurate gear teeth profiles are achieved.	**BTL-2**	**Understanding**
3	Discuss the different types of abrasive processes used for surface finishing in gear manufacturing. Compare and contrast cylindrical grinding, surface grinding, and centerless grinding.	**BTL-2**	**Understanding**
4	Explain the factors that should be considered when selecting a grinding wheel for gear manufacturing. Discuss the importance of grinding wheel specifications in achieving desired surface finishes.	**BTL-2**	**Understanding**
5	Describe the fine finishing processes of honing, lapping, and superfinishing. Discuss their applications in gear manufacturing and explain how they improve surface quality.	**BTL-3**	**applying**
6	Discuss the principles and applications of gear forming processes such as extrusion, stamping, and powder metallurgy. Compare and contrast these processes, highlighting their advantages and limitations	**BTL-2**	**Understanding**
7	Explain the gear generating process and gear shaping in detail. Discuss the differences between these two methods of creating gear teeth and their applications in gear manufacturing.	**BTL-2**	**Understanding**
8	Describe the surface finishing processes of polishing, buffing, and power brushing in gear manufacturing. Discuss their	**BTL-2**	**Understanding**

	objectives and the techniques used to achieve desired surface finishes.		
	Part C (15 marks)		
1	Discuss the process of gear metallization in surface finishing. Explain its purpose, advantages, and applications in gear manufacturing.	**BTL-2**	**Understanding**
2	Compare and contrast the gear manufacturing processes of extrusion, stamping, and powder metallurgy. Discuss their suitability for different gear applications and the factors to consider when selecting the appropriate process.	**BTL-2**	**Understanding**

*** BT Levels – BTL1 to BTL6**

 # Competence – Remember, understand, apply, analyze, evaluate, create

Unit V – MACHINE TOOLS FOR NON-CIRCULAR COMPONENTS AND HOLE MAKING			
	Part A (2 marks)		
Q.No	**Question**	**BT Level***	**Competence#**
1	Name three types of reciprocating machine tools used for shaping and planing operations	**BTL-1**	**Remembering**
2	What is the main function of a shaper machine?	**BTL-2**	**Understanding**
3	Describe the construction details of a slotter machine	**BTL-1**	**Remembering**
4	What are the two main types of milling machines based on their spindle orientation?	**BTL-2**	**Understanding**
5	Discuss the specifications and parts of a horizontal milling machine	**BTL-1**	**Remembering**
6	What are milling cutters? Explain their function in milling operations	**BTL-1**	**Remembering**
7	Name a work holding device used in milling operations to hold the workpiece securely	**BTL-2**	**Remembering**
8	Describe the operations performed on a milling machine	**BTL-2**	**Understanding**
9	What is the purpose of hole making processes in machining?	**BTL-2**	**Understanding**
10	Name a common hole making process used for creating holes of varying diameters.	**BTL-1**	**Remembering**
11	Explain the process of drilling in hole making.	**BTL-2**	**Understanding**
12	What is the purpose of reaming in hole making?	**BTL-1**	**Remembering**
13	Name a process used for enlarging an existing hole to achieve a precise diameter and surface finish.	**BTL-1**	**Remembering**
14	Describe the tapping process in hole making	**BTL-2**	**Understanding**

15	What is the purpose of sawing in hole making?	**BTL-1**	**Remembering**
16	What are the construction parts of a planer machine ?	**BTL-1**	**Remembering**
17	Explain the specifications and parts of a vertical milling machine	**BTL-2**	**Understanding**
18	What is the function of milling cutters in milling machines?)	**BTL-1**	**Remembering**
19	Name a work holding device used in hole making processes.	**BTL-1**	**Remembering**
20	Describe the operations performed in hole making processes such as drilling, reaming, boring, and tapping.	**BTL-2**	**Understanding**
Part B (13 marks)			
Q.No	**Question**	**BT Level***	**Competence#**
1	. Explain the construction details of a milling machine and discuss the functions of its main components. Provide labeled diagrams to support your answer.	**BT-L2**	**Understanding**
2	Compare and contrast the operations performed on a shaper machine and a planer machine. Discuss their respective advantages and limitations.	**BTL-2**	**Understanding**
3	Discuss the types of milling cutters used in milling operations. Explain their design features, applications, and advantages.	**BTL-2**	**Understanding**
4	Describe the process of hole making using drilling, reaming, boring, and tapping operations. Discuss the tools, techniques, and considerations for each operation.	**BTL-2**	**Understanding**
5	Compare and contrast the horizontal milling machine and the vertical milling machine. Discuss their respective advantages, applications, and limitations.	**BTL-2**	**Understanding**
6	Explain the principles and applications of non-circular machining processes, such as gear shaping and gear hobbing. Provide examples and discuss the advantages of each process	**BTL-2**	**Understanding**
7	What are the types of work holding devices used in milling operations. Explain their design, applications, and advantages for holding different work pieces securely.	**BTL-2**	**Understanding**
8	Describe the different surface finishing processes used in machining, such as grinding, honing, lapping, and polishing. Discuss their principles, applications, and advantages.	**BTL-2**	**Understanding**
Part C (15 marks)			

1	Explain the principles and applications of metal spraying and metallization in surface finishing processes. Discuss their advantages, limitations, and typical applications.	**BTL-2**	**Understanding**
2	Discuss the principles and applications of sawing in hole making processes. Explain the different types of sawing machines and their advantages for cutting various workpiece materials.	**BTL-2**	**Understanding**

*** BT Levels – BTL1 to BTL6**

 # Competence – Remember, understand, apply, analyze, evaluate, create