RollNo. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2025

INDUSTRIAL ENGINEERING
Third Semester
ME23C02 & MANUFACTURING PROCESSES
(Regulation2023)

Time:3hrs Max.Marks: 100

CO1	Explain the working principles of various metal casting processes
CO2	Categorize and select the appropriate metal joining process.
CO3	Compare the working principles of bulk deformation of metals.
CO4	Suggest suitable sheet metal forming processes for production of Engineering Components.
CO5	Explain the manufacturing of plastic components.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)
(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	List the different types of Pattern allowances	2	1	1
2	What is cold Shut in cast component?	2	1	1
3	Write the roles of fluxes used in SMAW Arc welding process.	2	2	1
4	What is power density? Write the relation between power density and Heat input in welding process.	2	2	2
5	What is extrusion ratio?	2	3	2
6	List any rolling defects.	2	3	2
7	List any four sheet metal operations that uses both tensile and compressive stresses.	2	4	1
8	What is spring back with respect to sheet metal operations?	2	4	1
9	What is glass transition temperature?	2	5	1
10	List the processing methods used for thermoplastics.	2	5	2

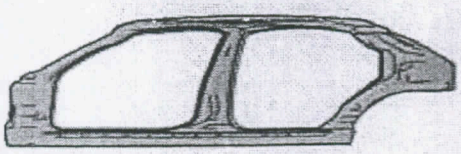
PART- B(5x 13=65Marks)
(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a)	Apply your understanding of moulding sand by explaining how any six of its properties influence the quality of a casting	13	1	3
	OR			
11 (b)	Apply your understanding of the investment casting process by illustrating its working principle with a neat sketch and analyzing its practical applications, advantages, and disadvantages in real-world manufacturing scenarios.	13	1	3
12 (a)	Apply your knowledge of the Cold Metal Transfer (CMT) arc welding process by explaining its working principle with the help of a neat sketch. Identify and relate key process parameters that influence weld quality, and illustrate its applications in industrial scenarios	13	2	4
	OR			

12 (b)	Apply your understanding of the Friction Stir Welding (FSW) process by describing its working principle with the help of a neat sketch. Identify and explain how key process parameters affect weld quality. Illustrate its advantages, disadvantages, and applications in real-world manufacturing contexts..	13	2	4
13 a	(i) Apply your understanding of metal forming to compare hot and cold working processes by analyzing their practical implications on material properties. (ii) Demonstrate the working principle of open die and impression die forging processes using neat sketches, and explain how these methods are applied in manufacturing different components	6+7	3	3
	OR			
13 (b)	(i) Apply your knowledge of metal forming by explaining the working principles of direct and indirect extrusion processes with the help of neat sketches. Relate each method to typical industrial applications. (ii) Draw any four standard cross-sectional shapes that can be produced using the extrusion process.	8+4	3	3
14 (a)	(i) Apply your understanding of sheet metal operations by explaining the working principles of the blanking and punching processes with the help of neat sketches. (ii) Define formability and apply the concept by explaining how the cupping test is used to evaluate the formability of sheet metals in practical scenarios	6+7	4	3
	OR			
14 (b)	(i) Explain Rubber Pad forming process with a neat sketch. (ii) Explain super plastic process with a neat sketch.	6+7	4	3
15 (a)	Apply your understanding of polymer processing by explaining the working principle of the injection moulding process with the help of a neat sketch.	13	5	3
	OR			
15 (b)	Apply your knowledge of polymer forming techniques by explaining the working principles of blow molding and vacuum bag forming processes with neat sketches. Discuss typical applications where each process is preferred.	13	5	3

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	 (i)Suggest the suitable manufacturing processes for the above outer side panel of a car body. (ii) Critically evaluate and justify why Wire Arc Additive Manufacturing (WAAM) may be a more suitable manufacturing process compared to traditional methods such as casting, forging, or machining for producing complex metal components.	7+8	2,3	5