

VII SEMESTER B.TECH. (I & P ENGINEERING)

END SEMESTER MAKE UP EXAMINATIONS DEC 2016/JAN 2017

SUBJECT: THEORY OF METAL FORMING [MME 413]

REVISED CREDIT SYSTEM (30/12/2016)

Time: 3 Hours

MAX. MARKS: 50

- * Answer ANY FIVE FULL questions.
- ✤ Missing data may be suitably assumed.

1 A .	With a neat sketch explain Tandom and Planetary rolling mill equipment. What are the features, advantages, disadvantages and applications of HERF		
1B.	process		
1C.	Explain with sketch three events in annealing process		
2A.	Sketch and describe following i) Plastic deformation by slip and twinning ii) Explain friction in metal forming		
2B.	Explain magnetic pulse forming	2	
	Determine the press capacity for forging 1m long cylindrical bloom to		
	hexagonal section, each with 300mm side. The yield stress is initially 40 MPa		
	, which gradually increases to 650MPa at the end of operation. Assume,	3	
2C.	a) A case with partial, coefficient of friction =0.3		
	 b) A case with no lubrication (striking friction, with m=1) 		
	Also determine the maximum stress		
	Sketch and describe following operations.		
3A.	i) Open die forging	5	
	ii) Explosive forming		
3B.	Explain forward extrusion		
3C.	Derive an expression for drawing force.	3	
	A 300mm wide aluminum alloy strip is hot rolled from an initial thickness of		
4A.	25mm to a final thickness of 15mm. The diameter of the rolls is 1m and	5	
	rotates at 120rpm. The plane strain flow stress is 70Mpa at the entrance and		

110Mpa at the exit from the roll gap due to increasing velocity. What would be the rolling load and the power required. Assume the coefficient of friction = 0.25, and λ =0.5.

4B.	Explain residual stress in rolling						
4C.	Derive	an expression for Tresca's Yield Criterion	3				
5A.	A bras	s billet is to be hot extruded into a rod using a square die. The					
	diamete	er of the billet is 150mm and the diameter of the extruded rod is	4				
	30mm.	Taking the yield strength of brass as 250MPa, estimate the extrusion	4				
	force. N	leglect the frictional losses.					
5B.	Sketch and explain lubrication mechanisms						
5C.	Differer	ntiate between hot working and cold working	3				
6A.	Write a	note on following	llowing				
	i)	Stretch forming					
	ii)	Defects in drawn products	10				
	iii)	Crack formation in metal working	10				
	iv)	Gravity drop hammers					
	V)	Electro forming					