Roll. No.									

B.E (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2012

MECHANICAL ENGINEERING BRANCH

SEVENTH SEMESTER

(18)

ME 9041 – THEORY OF METAL FORMING

(REGULATIONS 2008)

Time: 3 Hrs Max Marks: 100

Answer ALL Questions

Part – A (10 x 2 = 20 Marks)

1. Why are the difference between engineering strain and true strain becomes larger as the strain increases?
2. Why do you understand by yield criteria?
3. Sketch a setup for plane strain compression test indicating the principal force acting.
4. State the conditions for instability in tension.
5. What is the physical significance of strain hardening exponent?
6. List any two assumptions made in slab method.
7. What are the process conditions that influence superplastic forming ?.
8. Distinguish between hot forging and cold forging.
9. How does stretch forging differ from deep drawing principally?
10. What is micro blanking?

Part –B (5 x 16 = 80 Marks)

11. a. Describe the principal factors affecting the plastic deformation. (8)

b. The state of stress of a deformable material is governed by the following:

σ_x= 80MPa, σ_y= 100MPa, ζ_{xy}=60MPa

If the yield strength of the material is 150MPa, determine whether yielding of material will occur or not accordingly to

(i) Tresca's Conditions

(ii) Von-Mises Conditions (8)

12. a. (i) Sketch and Explain the state of stress in (8)

(a) drawing round bar , (b) strip forging

		(ii)	Explain Salient features of Uniaxial tension test.	(8)
			(OR)	
	b.	(i)	Describe the importance of workability in metal forming.	(6)
		(ii)	Explain the role of flow stress in metal working processes.	(10)
13	a.	(i)	Discuss briefly different methods of analysis of forging load.	(8)
		(ii)	Describe the role of friction in metal flow and surface formation in metal forming.	(8)
			(OR)	
	b.	(i)	Why should the draw stress never exceed the yield strength of metal in wire drawing process?	(6)
		(ii)	Explain any one numerical method for plasticity problems.	(10)
14.	a.	(i)	Sketch the nature of stress acting on an element during drawing.	(6)
		(ii)	Describe the variables involved in deep drawing of a Cylindrical Cup.	(10)
			(OR)	
	b.	(i)	Why is spring back minimal in high energy rate forming?	(6)
		(ii)	Discuss with a neat sketch the process parameters and working principle of any one HERF techniques.	(10)
15.	a.		Describe the salient features of:	
			(i) orbital forging	(8)
			(ii) rubber pad forming	(8)
			(OR)	
	b.	(i)	Explain the process details of direct extrusion.	(6)
		(ii)	Describe with a sketch the stages of making P/M part by hot iso-static press.	(10)