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**B.E (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013**

**MATERIALS SCIENCE AND ENGINEERING - V Semester**

**ML 9301 – THEORY AND APPLICATION OF METAL FORMING**

(Regulation 2008)

6

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

**PART-A (10 x 2 = 20 Marks)**

1. What is meant by Yield criteria?
2. Define Stress Tensor.
3. State the applications of Finite Element Analysis.
4. Define slip and slip plane.
5. Name the various forging defects.
6. Differentiate open die and closed die forging process.
7. What are the variables affecting the extrusion process?
8. What is lateral extrusion process?
9. State the application of electro hydraulic forming.
10. What is the use of formability limit diagram?

**Part – B (5 x 16 = 80 marks)**

11. a) Discuss the state of stress concept with neat sketch. (8)  
b) Describe the Vonmises and Tresca Yield Criterias. (8)
12. a) (i) How are metal forming process classified? (4)  
(ii) Discuss the analysis of slab method. (12)

**OR**

- b) (i) Write a Short note on Twinning in metal forming. (8)  
(ii) Discuss the characteristics of lubricants used in metal forming. (8)
13. a) (i) Describe the following forging operation with neat sketch. (8)  
Swaging, Fullering, Drawing and Edging  
(ii) Discuss the method of mechanical press forging operation with neat sketch. (8)

**OR**

- b) (i) Differentiate between the hot and cold rolling process. (8)  
(ii) How to determine the rolling force, contact length and torque in strip rolling process? (8)
14. a) (i) Discuss the various dies used in the extrusion process with neat sketches. (8)  
(ii) Explain the various metal flow deformation patterns in extrusion process with neat sketches. (8)

**OR**

- b) (i) Describe the various extrusion defects and write its caused and remedies with neat sketches. (8)  
(ii) Explain the impact extrusion process with neat sketch and write its applications. (8)

15. a) (i) Discuss the metal flow in the deep drawing die with neat sketch. (8)  
(ii) Explain the edge bending and V bending process with neat sketches. (8)

**OR**

- b) (i) What is Superplasticity? Write its advantages and disadvantages. (8)  
(ii) Explain the working principle of electromagnetic forming with neat sketch. Write its advantages, disadvantages and applications. (8)