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B.E DEGREE END SEMESTER EXAMINATIONS

April- May 2013

B.E./B.Tech (Full Time)

Materials Science and Engineering

V SEMESTER

27

ML 9301 – Theory and Applications of metal forming (R 2008)

Time: 3 Hrs

Max Marks: 100

Answer ALL Questions

Part – A (10 x 2 = 20 Marks)

1. Define Principle stress.
2. What is stress tensor?
3. Differentiate between open die and closed die forging.
4. State the types of rolling mills.
5. Name the various rolling defects.
6. What are the various forging defects?
7. State the important variables affecting extrusion process.
8. Draw a port hole extrusion die.
9. Define the term sheet metal formability.
10. What are the important process variables for explosive forming?

Part –B (5 x 16 = 80 Marks)

11. (i) Write short notes on Octahedral shear stress and shear strain. (12)
(ii) Define the term strain rate tensor. (4)
12. (a) (i) Describe the flow stress determination in metal forming process.
(ii) State the effect of temperature and strain rate on metal working. (8+8)

(OR)

- (b) Write short notes on the following terms
(i) Slip (ii) Twinning (iii) Workability (iv) Residual stresses. (4x4)
- 13 (a) Explain the working principle of pneumatic forging hammer. Write its applications, advantages and disadvantages.
(OR)
(b) Derive an expression on rolling process for calculating rolling load, torque and power.
14. (a) (i) Discuss the various deformation patterns of extruded products. (8)
(ii) Differentiate between direct and indirect extrusion process. (8)
(OR)
(b) (i) Describe the following processes with neat sketches.
(i) Tube extrusion (ii) Production of seamless pipe (8)
(ii) Derive an expression for simple analysis of direct extrusion process (8)
- 15 (a) Describe the following forming methods.
(i) Blanking (ii) Bending (iii) Stretch forming (iv) Deep drawing (4x4)
(OR)
(b) What is meant by high velocity forming? Explain the electro hydraulic forming process with neat sketches and write its applications, advantages, and disadvantages.