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(FC)  
B.E / B.Tech END SEMESTER EXAMINATIONS – APR / MAY 2019

Material Science and Engineering  
Semester V

ML8503– Theory and Application of Metal Forming  
(Regulation 2012)

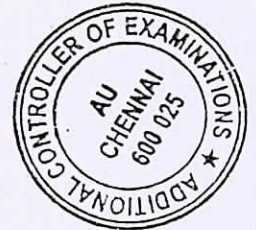
Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is meant by octahedral stress?
2. What are the ways plastic deformation of metals occurred?
3. Write the classification of metal forming process.
4. Write the application of lubrication in metal forming process.
5. Write the classifications of forging processes
6. Name the various rolling defects.
7. What are the variables affecting the extrusion processes?
8. What is meant by impact extrusion?
9. Write the various sheet metal forming process.
10. What is meant by standoff distance in explosion forming?



Part – B (5 x 16 = 80 Marks)

11. a) i) Describe the factors affecting plastic deformation. (8)  
ii) The state of stress at a point is given by  $\sigma_x = 76$  MPa,  $\sigma_y = 126$  MPa,  $\tau_{xy} = 40$  MPa. If the yield strength for the material is 130 MPa. Determine in a uniaxial tensile. (8)
12. a) Describe the analysis of following metal forming process. (16)  
1) Slab method, 2) Upper bound method  
OR  
b) i) Describe the effect of variables on metal forming processes. (8)  
ii) Write short note on deformation zone geometry on metal forming processes. (8)
13. a) i) Explain the working principle of pneumatic forging hammer with neat sketch. (8)  
ii) Differentiate between open forging and closed forging with neat sketch. (8)  
OR

- b) Write the following analysis of rolling processes. (16)
- i) Angle of bite
  - ii) Velocities
  - iii) Forward slip
  - iv) Forces acting during rolling
  - v) Stress distribution
14. a) i) An aluminium rod 6.25 mm diameter is drawn into a wire 5.6 mm diameter. Neglecting friction between the rod and the dies, determine the drawing stress and the reduction in area when yield stress for aluminium is  $35 \text{ N/mm}^2$ . Also calculate the tangential stress at the exit. (8)
- ii) Differentiate between direct and indirect extrusion with neat sketch. (8)
- OR
- b) i) Explain the tube extrusion process with neat sketch. (8)
- ii) Describe the method of production of seamless pipe and tube with neat sketch. (8)
15. a) i) Explain the working principle of electromagnetic forming process with neat sketch. Write its advantages and limitations. (8)
- ii) Explain working principle of electro hydraulic forming method with neat sketch. Write its advantages and limitations. (8)
- OR
- b) i) Briefly describe the fine blanking method with neat sketch. (8)
- ii) Explain the deep drawing process with neat sketch. (8)

