

Roll No.

22224

**M. Tech. 1st Sem. Mechanical Engg.
(Machine design)**

Examination – January, 2016

METAL FORMING ANALYSIS

Paper : M-807-A

Time : Three Hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Discuss stress-strain relation in elastic and plastic deformation of metals. 10
- (b) Explain the yield criteria for ductile material with the help of a proper graphical representation. 10
2. Explain the following : 10 + 10 = 20
 - (a) Upper and lower bound methods.

- (b) Slip Line Field Theory.
3. (a) Discuss the concept of friction and lubrication in Hot and Cold working processes. 10
- (b) Explain the effect of temperature and strain rate in metal working. 10
4. (a) Explain the technological aspects of Forging Process in detail. 10
- (b) Explain the following : 10
- (i) Deep drawing,
- (ii) Bending.
5. Explain the following with neat sketches : $10 \times 2 = 20$
- (i) Extrusion and its types,
- (ii) Wire drawing.
6. (a) Describe in details about stiffness matrices. 10
- (b) Differentiate between Lagrange and Eulerian approaches in relation to finite element methods. 10
7. (a) Write a short note on the international standards in metal forming and system design. 10

- (b) Explain various forming defects in products and their critical effects along with their remedies. 10
8. Explain the following : $5 \times 4 = 20$
- (i) Material Integration Schemes,
- (ii) Elasto-Plastic approximations,
- (iii) Stretch forming,
- (iv) Stress-Strain relation in elastic and plastic deformation.