

125
15

Roll No.

23052

**M. Tech. 1st Sem. (Mech. Engg.)
(Manufacturing & Automation)**

Examination – December, 2014

METAL FORMING ANALYSIS

Paper : 831

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) Explain Work hardening and Anisotropy in Yielding in detail. 10
- (b) Discuss Stress-Strain relation in elastic and plastic deformation of metals. 10
2. (a) Explain in detail the yield criteria for ductile materials. 10
- (b) Explain the following :
 - (i) Slip line field theory
 - (ii) Upper and lower boundry methods 10

3. (a) Discuss the effect of temperature and strain rate in metal working. 10
- (b) What is the necessity of knowing true stress-strain diagram ? What are the utilities of these curves to a production engineer ? 10
4. (a) Explain and analyse the technological aspects of Forging process in detail. 10
- (b) Explain the following :
- (i) Stretch forming
- (ii) Deep Drawing 10
5. (a) Discuss Friction and various lubrication methods in hot and cold working processes. 10
- (b) Explain effects of temperature and strain rate in metal working. 10
6. (a) Differentiate between lagrangian and Eularian approaches in relation to finite element methods. 10
- (b) Describe the Implicit and explicit formulations in detail. 10
7. (a) Discuss various forming defects in products and their critical effects along with their remedies. 10
- (b) Write a short note on the use of international standards in metal forming problem solutions and system design. 10

8. Explain the following :

20

- (i) Stiffness matrices
 - (ii) Material Integration Schemes
 - (iii) Elasto-Plastic approximations
 - (iv) Extrusion process
-