$$\frac{125}{15}$$

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