VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING
SESSION 2016 - 17 (ODD SEMESTER)

Total Pages—4

(Set-T_1)

B.Tech - 7th(M & M)

Mechanical Working of Metallic Materials

Full Marks : 70

Time : 3 hours

Answer six questions including Q. No. 1 which is compulsory

The figures in the right-hand margin indicate marks

Symbols carry usual meaning

1. Answer *all* questions : **2 × 10**

(*a*) Define and differentiate between plain stress and plain strain.

(*b*) Give relation between engineering strain and true strain.

(*c*) Briefly explain Bauscinger effect.

(*d*) Write short note on Frank-Read source.

(*e*) Mention and explain hall-petch relation.

(Turn Over)

(f) What do you understand by strain ageing ?

(g) What is function of flesh gutter ?

(h) Define contact angle and neutral point in rolling process.

(i) Write short note on tube drawing process.

(j) Give application of deep drawing.

2. (a) Classify various metal forming process based on the type of force applied. 5

(b) Explain difference between hot working and cold working in detail. 5

3. (a) Explain 'Von Mises' criteria and Tresca Criteria for yielding of ductile metals. 5

(b) Describe mechanism of slipping and twinning during plastic deformation of metals and alloys. 5

4. (a) Comments on plastic deformation of metals having FCC and BCC crystal structure. 5

(*b*) Explain various factors affecting flow stress in a material during forming process. 5

5. (*a*) Describe different types of rolling mill with suitable diagram. 5

(*b*) Derive relationship between geometry of rolls and force involved in a rolling process. 5

6. (*a*) Explain open and close die forging using suitable diagram. 5

(*b*) Describe various types of forging defects, their cause and remedy. 5

7. (*a*) Explain direct and indirect exterusion with suitable diagram. 5

(*b*) What do you understand by thermo-mechanical treatment ? Give suitable example. 5

8. Write short notes on any *two* : 5 × 2

(*i*) Warm Working

(*ii*) Role of lubricant in metal working

(*iii*) Production of seamless pipe

(*iv*) Strain hardening.
