Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech. Supplementary, Winter 2017 - 18 Examination

Semester: 2 **Date: 08/01/2018**
Subject Code: 03208151 **Time: 2:00 pm to 4:30 pm**
Subject Name: Theory of Metal Forming **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Distinguish between engineering stress and true stress. **(05)**

B) Define roll gap, neutral point, and draft. **(05)**

C) Make the comparison between hot and cold working of material. **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

A) Discuss the significance of sliding friction model in open die forging. Also, derive the equation for calculating the mean forging pressure for the same.

B) Explain open die forging and closed die forging. Also, justify the importance of flash during forging.

C) How does extrusion differ from rolling and forging?

D) What types of defects may occur in (a) extrusion and (b) drawing process?

Q.3 A) What is the need for plain strain compression test? Derive the equations for effective stress and effective strains associated with it. **(07)**

B) In a single pass rolling operation, a 15 mm thick plate with plate width of 100 mm, is reduced to 10 mm. The roller radius is 250 mm and rotational speed is 10 rpm. The average flow stress for the plate material is 300 MPa. Calculate the power required for the rolling operation in kW. **(08)**

OR

B) A billet of Stainless steel 20 mm x 20 mm x 100 mm is pressed between flat dies to a size of 10 mm x 40 mm x 100 mm. If the uniaxial flow stress is 300 MPa, determine pressure distribution over the 100 mm dimension and mean forging load. **(08)**

Q.4 A) Derive expression of Considere's criteria. **(07)**

OR

A) How are seamless tubes produced? Why is the surface finish of a rolled product better incold rolling than in hot rolling? **(07)**

B) Explain the process of annealing heat treatment by considering various stages involved in it. **(08)**