

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- VIth SEMESTER-EXAMINATION – MAY- 2012****Subject code: 162503****Date: 17/05/2012****Subject Name: Metal Forming Processes****Time: 10:30 am – 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) With the help of schematic diagram explain slip and twinning mechanism that cause plastic deformations in metals and alloys. **07**
- (b) (i) Compare and contrast: Hot working and Cold working process. **04**
- (ii) The flat strip when rolled showed following defects. **03**
- Edge wrinkling
 - Edge cracking

Your Task: Determine the probable reasons for the above defects and suggest suitable remedy for the same.

- Q.2** (a) (i) Differentiate: Ductile and brittle fracture **04**
- (ii) State the causes for creep failure in the material. **03**
- (b) Show through neat schematic diagram the type of stresses developed in the deformation zone on points on axis at entry, in the middle and exit of the single pass, single stand high rolling process. Explain their significance as regards to productivity. Assume the rolls of equal diameter, possessing equal circumferential velocity. **07**

OR

- (b) “The roll pressure increases continuously from the point of entry till the neutral point is reached and then after it decreases continuously in a flat strip rolling.” Evaluate the statement with reference to pressure distribution in the rolling process and bring out the significance of friction hill in the process. **07**

- Q.3** (a) With the help of neat schematic diagram explain the manufacturing of the pipe and tube by the rolling process. **07**
- (b) (i) Show a schematic of open die forging of a typical circular disc and state the reason for considering the process as a plain strain problem. **04**
- (ii) “A cube after upset forging acquires a pancake shape.” – Justify. **03**

OR

- Q.3** (a) Explain in brief various forging defects and suggest the suitable remedies to correct the same. **07**
- (b) Explain the swaging operation in brief and bring out its merits, demerits and applications. **07**

- Q.4** (a) Explain in brief the process of extrusion of seamless pipes. How does the process differ from manufacturing of pipes having seam? **07**
- (b) (i) The pipes can be manufactured by rolling and they can even be manufactured by extrusion process. On the basis of the stress of state the material is subjected to, the mechanical properties achieved, the **04**

surface finish arrived at compare the pipes manufactured through these two manufacturing routes.

(ii) Differentiate: Impact Extrusion and Hydrostatic Extrusion

03

OR

Q.4 (a) The deep drawn cup showed following defects. **07**

(i) Wrinkles in wall

(ii) Fractured rim and bottom

Your Task: Determine the probable reasons for the above said defects and suggest suitable remedy for the same

(b) (i) "Missile nose cones are made by spinning and not by deep drawing." – Justify. **04**

(ii) Differentiate: Blanking and Piercing. **03**

Q.5 (a) (i) With the help of schematic diagram explain the influence of clearance (between punch and die) and punch speed on the deformation zone. **04**

(ii) What is spring back phenomenon? How can it be reduced? **03**

(b) Mention the process steps involved in high velocity forming of metals and bring out its positive features, limitations and applications. **07**

OR

Q.5 (a) Mention the process steps involved in high energy rate forming of metals and bring out its positive features, limitations and applications. **07**

(b) With the help of schematic diagram show the manner in which metal attempts to approach equilibrium through the process of recovery, recrystallization and grain growth when subjected to bulk plastic deformation. **07**
