ذظرية وتكنولوجيا تشكيل المعادم

Kafrelsheikh University
Faculty of Engineering
Department of Mech. Engineering
Third Year
Code: MDP3115

د/ المنتصر

Subject: Theory & Tech of Metal Forming
Final Exam: 1 page
Time allowed: 3hr
Full Mark: 90
Date: 10/1/2018

بدء إمتحاح

This exam measure the following ILos, **a.14,a.15 b.7,b.11,b.18 c.13, and d6**
Answer the following questions with net drawing

Question No One (22 mark)

a- Classify the basic metal forming processes, and what are the effects of temperature and strain rate on stress strain curve?

b- Compare among hot, worm, and cold working, and what do you know about recrystallization, and strain hardening

c- A metal is deformed in a tension test into its plastic region. The starting specimen had a gage length = 2.0 in and an area = 0.50 in^2 . At one point in the tensile test, the gage length = 2.5 in and the corresponding engineering stress = 24,000 lb/in^2 ; and at another point in the test prior to necking, the gage length = 3.2 in and the corresponding engineering stress = 28,000 lb/in^2. Determine the strength coefficient and the strain hardening exponent for this metal.

Question No Two (22 mark)

a- How you can manufacture 10000 pieces as shown in Fig. 1? Support your answering by drawing

b- Compare between direct and indirect extrusion.

c- A billet that is 75 mm long with diameter = 35 mm is direct extruded to a diameter of 20 mm. The extrusion die has a die angle = 75°. For the work metal, K = 600 MPa and n = 0.25. In the Johnson extrusion strain equation, a = 0.8 and b = 1.4. Determine: (a) extrusion ratio, (b) true strain (homogeneous deformation), (c) extrusion strain, and (d) ram pressure at L = 70, 40, and 10 mm

Question No Three (23 mark)

a- Compare between different types of forging.

b- A sheet 2x1 m. calculate the maximum efficiency of using to produce Fig. 2.

c- A hydraulic forging press is capable of exerting a maximum force = 1,000,000 N. A cylindrical workpart is to be cold upset forged. The starting part has diameter = 30 mm and height = 30 mm. The flow curve of the metal is defined by K = 400 MPa and n = 0.2. Determine the maximum reduction in height to which the part can be compressed with this forging press, if the coefficient of friction = 0.1.

Question No Four (23 mark)

a- What is the process of wire or bar drawing?

b-There are different rolling mill arrangements, compare, and what are the defects of rolling?

c- A plat that is 250 mm wide and 25 mm thick is to be reduced in a single pass in a two-high rolling mill to a thickness of 20 mm. The roll has a radius = 500 mm, and its speed = 30 m/min. The work material has a strength coefficient = 240 MPa and a strain hardening exponent = 0.2. Determine: (a) roll force, (b) roll torque, and (c) power required to accomplish this operation, resolve using a roll radius = 250 mm and write your comment
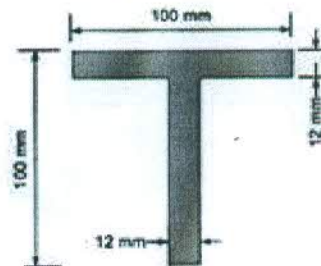
Fig. 1

Fig. 2

Good Luck
Prof. Montasser Dewidar
Dr. Hassan AboResha
Dr. Ahmed Saied