Menofiya University **Faculty of Engineering** **Tim Allowed: 3 hours** **Post- Graduate Exam, 2013-2014** **Date of Exam: 6/ 6 /2015**		**Production Diploma (500 Level)** **Subject : Forming theory** **Code: PRE 606** **Total Mark: 100 Marks** **Production Eng. Dep.**

Answer all the following questions

QUESTION NO. 1

(20 Mark)

What drawing stress is required to draw 500 mm wide, annealed steel strip from 2.5 to 2.4 thick in dies with 15° included angle and friction coefficient 0.1? What is the influence of a previous 20% reduction in area arising from rolling the annealed given that it conforms to a ludwick law?

$\sigma = 200+100\varepsilon^{0.8}$

QUESTION NO. 2

(20 Mark)

compare the work required to hot forge a 0.75 m long billet, with 150 mm square cross-section into a strip 50 mm thick, 150mm wide and 2.25 m long, using dies of breadth a) 50 mm, b) 100 mm and c) 150 mm. hence show that the minimum work is done when the die breadth lies between a) and b). Neglected work harding and spread and assume that small reductions are made so that the existence of the transitional shape at the edges of he die may be neglected. Take the load L at any thickness to given by L=YAC in which Y is the yield stress. The contact area is A=wb, where b is the die width and w the billet width. For this cogging process take constant C=0.797+0.203t/b for bit<1 and C=0.75+0.25M for blt >1.

QUESTION NO. 3

(20 Mark)

The final dimensions of the ring are to be t=125 mm, R=1.057 m and w=175 mm for k=40 MPa and a maximum available force of 1.5 MN, determine the maximum internal diameter of the ring at which forging can begin. Assume plan strain conditions and take the total pressure upon the platens to be p=2k [C+t/8R)]
Where C=0.797+0.203(t/b)

QUESTION NO. 4

(20 Mark)

Determine the pressure on a ram required to reduce a billet from 40 mm diameter to 37 mm diameter in a homogenous extrusion process. Assume mat the 40 mm diameter billet is the result of a previous process where the sectional area was reduced by 15% for material in an annealed state, obeying a Hollomon flow law:

$\sigma = 670e^{0.5}$

QUESTION NO. 5

(20 Mark)

In a homogenous wire drawing operation upon harding material, the drawing force F may be estimated as:

$$F = Y_m A_1 \ln\left(\frac{A_0}{A_1}\right)$$

Where A_0 is the original cross-sectional area, A_1 is area of the drawn wire and Y_m is the average yield stress for material hardened by the process. Using an average yield stress between entry and exit, determine the drawing force required to reduce a wire from 3 mm too 2.75 mm, given that a 20% reductions in area had previously been applied in reaching the 3mm wire size. These reductions should be referred to the annealed state for which the Hollomom flow law is: $\sigma = 622e^{0.32}$

********** GOOD LUCK************

Question number	Q1	Q2	Q2	Q3	Q2	Q2	Q3	Q3	Q2	Q3	Q3	Q3
Skills	a-1-1	a-2-2	a-3-1	a-4-1	b-1-1	b-2-4	b-4-1	b-4-3	c-1-1	c-2-2	c-4-3	c-4-4
	Knowledge& understanding skills				Intellectual skills				Professional Skills			

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