Mansoura University Faculty of Engineering Production Engineering & Mechanical Design Department	**Production Engineering and Material**	First Year Mechanical Power Students Time: 3 Hrs - Marks: 100 May, 2013

Question1: (15 Marks): Compare between the following processes:

1. Hot and Cold Forming.
2. Piercing and Blanking.
3. Open and die Forging.
4. Different types of Extrusion Process.
5. Different types of Forging Hammers and Presses.

Question2: (15 Marks): Explain briefly the following Forming Processes:

1. Spinning
2. Rolling
3. Ironing
4. Stretching
5. Stamping

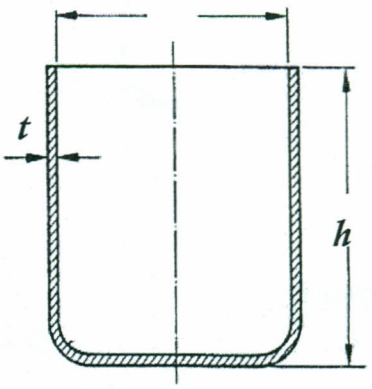
Question3: (20 Marks)

A Blank of Diameter (D) was cut to produce a cup in a deep drawing process such as shown in the figure. The final diameter of the cup d=100mm and the final height h=150mm, while the blank thickness t=2mm. Calculate the following:

- Blank Diameter (D)
- Blanking Force and the Work Done (τ_u=300MPa).
- Number of stages (n) required to produce this cup.

In each drawing stage, calculate with neat sketches:

- Drawing Force (σ_t=450MPa)
- Punch Diameter (Dp)
- Die Diameter (Dd)
- Height (H)
- Drawing Ratio (β)
- Clearance (C).



It is required to reduce the thickness of the cup to become 1mm through its whole height. Calculate the total Ironing Force; if the coefficient of friction μ=0.08 and σ_y=400MPa.

Answer All Questions in the same order

1 – Choose the right answer and state why ?
- Hematite , Lime stone , Magnetite and Dolomite are considered as iron ores . (5 Marks)

2 – Draw a sketch for a blast stove and write the name of each item below the sketch . (5 Marks)

3 – Illustrate the zones of reactions in the blast furnace . (5 Marks)

4 – Draw a figure to show the variations in gas analysis with distance from tuyeres in the blast furnace . (5 Marks)

5 – Write shortly on the behavior of sulfur in the blast furnace . (5 Marks)

6 – Write shortly on the efficiency of the blast furnace . (5 Marks)

7 – Write shortly on the DR process in El-Dekhaila steel company. Use equations and diagrams whenever possible . (15 Marks)

8 – Draw a diagram to illustrate the variations in metal composition during blowing in a basic Oxygen converter . (5 Marks)

Good Luck,

Prof. Essayed Abdelrasoul
D. Ahmed Galal